



Centrifugal Gas Separator

ZGA

Operating Manual



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1 Identification

1.1 Supplier/Manufacturer

Bopp & Reuther Messtechnik GmbH

1.2 Type of Product

ZGA centrifugal gas separator with float-deaeration device and sight glass

1.3 Name of Product

ZGA Centrifugal Gas Separator

1.4 Date of Release

15/12/03

1.5 Version No.

03671-01-001

2 Area 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 $< 20 \text{ mPa}\cdot\text{s}$ (at 20°C).

The German weights and measures regulations (*Eichordnung*) specify the use of gas separators for liquids up to $20 \text{ mPa}\cdot\text{s}$ in measuring systems with pump operation which are subject to calibration. Centrifugal gas separators in connection with oval wheel meters comply with the regulations for the calibration of measuring systems in Germany and other countries.

Bopp & Reuther centrifugal gas separators have EEC qualification approval and are therefore approved for EEC initial calibration.

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, a lead seal at the information sign is used to fix a calibration mark after measuring system calibration.

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

4. Technical Data

4.1 Operating Temperature

Standard: -10 to max. +100 °C

Low temperature model

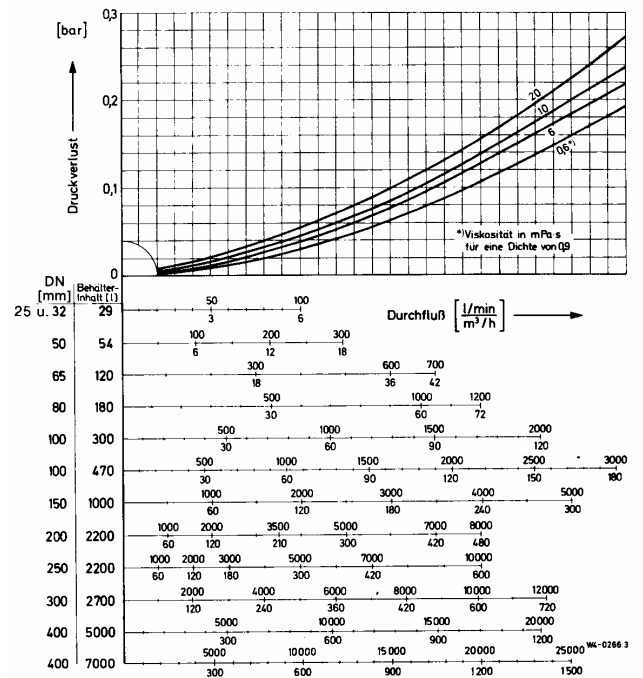
(-140 to -10 °C) on request

4.2 Nominal Pressure:

PN 10, 16, 25 and 40

PN 63 and 100 on request

4.3 Pressure Drop and Throughput



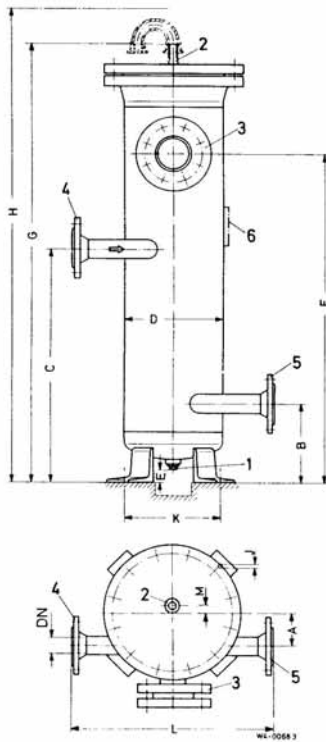
Centrifugal gas separator pressure drops depending on the flow rate and liquid viscosity.

5 Constructive Design

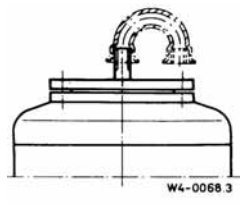
5.1 Model/Dimensions

DN	Inch	Container capacity [l]	Effective volume [l]	Max. permissible flow rate Q (l / min)	Dimensions and installation dimensions													Draining port	
					Dimensions in mm													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	
32	1 1/4"																	228-G 1/2	
50	2"	54	25	300	90	220	645	273	≥50	900	-1180	-1500	13	220	540	20	-	(or 1/2 - 14	
65	2 1/2"	120	60	700	120	290	840	368	≥80	1100	-1385	-1600	13	280	650	20	-	NPT)	
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	880	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	

DN 25 - DN 65



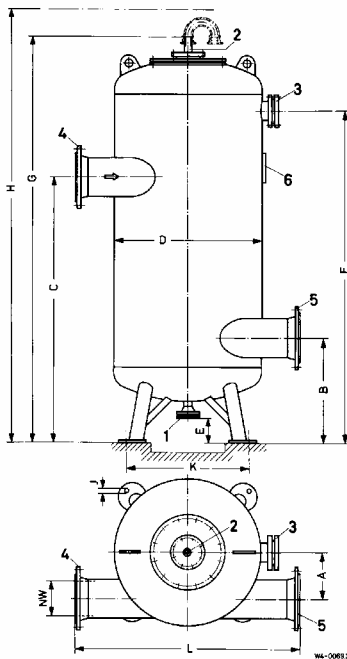
- 1 Draining port ISO 228 – G 1/2 (or ½ - 14 NPT)
 - 2 Deaeration connection ISO 228 – G 1 A (or 1 – 11 ½ NPT)
 - 3 Sight glass
 - 4 Inlet port
 - 5 Outlet port
 - 6 Manufacturer and information sign with details and calibration seal of the German Board of Weights and Measures.
- H Valve expansion height
 Port and sight glass position, sketch of model a 1 (see 5.4)



Deckelausführung bei DN 65 with deaeration device

Cover design for DN 65

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 and information sign with details and calibration seal of the German Board of Weights and Measures
- 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]			
				PN 10	PN 16	PN 25	PN 40
25	29	10	100	78	78	100	10
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 ¹⁾	1800	2200	2700	4300
400	5000	2800	20000 ¹⁾	1800	2200	2700	4300
300	7000	5000	25000 ¹⁾	2400	3050	3500	6050
400	7000	5000	25000 ¹⁾	2400	3050	3500	6050

1) with 2 deaeration devices

5.3 Materials

Material	Model A	Model F
Casing:	P265 GH (HII)	-
Wear allowance:	C2 = 1 mm (for wall thickness < 30 mm)	1.4571 ¹⁾
Floor:	P265 GH (HII)	1.4571 ¹⁾
Ports:	P235 GH (ST 35.8 I)	1.4571 ¹⁾
Flanges:	According to DIN C 22.8 ¹⁾ According to ANSI C 21 (A105 ¹⁾	1.4571 ¹⁾
Cover and welding flange:	P265 GH (HII)	1.4571 ¹⁾
Bolts:	C 35 E according to DIN 931 or 938	1.4751 ¹⁾ according to DIN 931 or 938
Nuts:	C 35 according to DIN EN 24032	1.4571 ¹⁾ according to DIN EN 24032
Gaskets:	Novapress-Multi/Viton	Teflon
Welding:	Electrofusion welding	Electrofusion 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), 141 (WIG)
Welding Consumables:	141 (WIG) EN 1668 – W2Mo 111 (TIG/GTAW) DIN EN 499 – E420RR12 135 (MAG) EN 440 – G 46 2 C G4 Si 1	141 (WIG) prEN 12072 – W 19 12 3 L Si 111 (TIG/GTAW) EN 1600 – E 19 12 3 LR 32 135 (MAG) 9rEN 12072 – G 19 12 3 L Si
Deaeration device:	Cast brass/steel and chrome nickel steel 1.4571	Chrome nickel steel 1.4408 and 1.4571

1) Acceptance test certificate 3.1 B according to DIN EN 10204

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

5.4 Port and Sight Glass Positions

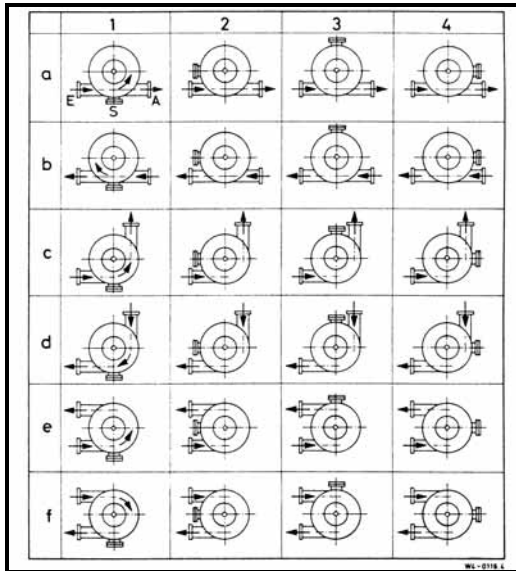


Fig. 3 Port and sight glass positions of the centrifugal gas separator DN 25 - 400

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

EEC Approval: D82 5.151.03. Manufactured by a welding specialist with HP0 approval (TRB200/TRD201) and TÜV (German Technical Inspection Authority) approval for welding quality requirements according to DIN-EN 729-2.

7 Order Information

When ordering please state:

The product data, especially weight, temperature, pressure, viscosity, material, connection sizes, measuring range, desired accessories, required approvals, certificates and material certificates. See device selection according to model code.

8 Standards and Directives

- Designed and manufactured according to AD 2000 directives.
- Interpretation of measuring ranges and conversion of values should conform to VDE VDI 3513 directives.
- Explosion protection directive 94/9/EC: The device complies with the standards EN1127-1 and EN13463-1 in accordance with ATEX100a. The operator should always observe respective regulations when installing and connecting the device in explosive areas.
- Pressure equipment directive 97/23/EC: ZGA centrifugal gas separators are suitable for group 1 liquids. Classification generally within Category IV, with individual acceptance acc. to Module G of the pressure equipment device directive.

9 Commissioning and Operation

The gas separator should be connected to the process via the flanges (please observe the direction of flow!!). Depending on the application, the same applies for deaerating and draining connections. The gas separator has to be connected to earth via an earthing strap fixed to one of the feet. This ensures that the gas separator is included in the system's equipotential bonding.

Caution!

Release the transportation lock at the float ball prior to commissioning. To achieve this, remove the housing cover with the device and subsequently retighten it carefully.

The entire measuring system and pipework are deaerated via the ventilating valve during start-up.

10 Safety Information

The centrifugal gas separator should only be used for its intended area of application (see 2). Always observe the pressure and temperature limits stated on the type plate as well as all other technical data and safety information during device installation, commissioning and operation.

Always observe national and international regulations concerning the operation of devices and systems under pressure.

Prior to installation, the operator has to ensure that the pressure bearing parts have not been damaged during transportation.

The devices have to be installed, operated and serviced by qualified personnel. The operator has the responsibility to ensure that the personnel have received sufficient and appropriate training. In case of doubt, please contact the manufacturer.

Only measure liquids to which the materials of the pressure bearing elements are resistant.

Only release flanges, connections for deaerating or draining purposes, or the sight glass when the devices are depressurised.

Only use the original spare parts specified by the manufacturer when replacing components. In the case of non-compliance, warranty shall not apply.

Carefully select gaskets or sealing elements according to the operating instruction specifications (see 5.3).

Type plate with pressure-relevant information

The used abbreviations have the following meaning:

Serial number:	Clear identification no.
Year:	Year of construction
PT:	Achieved test pressure, and test date
DN:	Nominal width
Capacity:	Container capacity in litres
TS:	Permissible operating temperature
PS:	Permissible excess operating pressure

The image shows a rectangular type plate for a centrifugal gas separator. At the top left is the CE mark with '0036' below it. At the top right is the manufacturer's name 'Bopp & Reuther Messtechnik' with a logo and 'D-67346 Speyer' below it. The title 'Zentrifugal-Gasabscheider' is centered. Below the title are several fields for technical data: 'Fabrik-Nr.' (Factory No.), 'DN' (Nominal width), 'Baujahr' (Year of construction), 'Inhalt' (Capacity in litres), 'PS zul.Betr.-Überdruck' (Permissible excess operating pressure in bar), 'TS zul.Betr.-Temp.' (Permissible operating temperature in °C), 'PT aufgebr. Prüfdruck' (Achieved test pressure in bar), and 'PT Prüf-Datum' (Test date). The plate is marked with '1-13-69176-550/-' on the left side.

11 Disposal and Decommissioning

Disposal or decommissioning should only be carried out by qualified personnel. Product residue has to be disposed of in accordance with legal regulations.

12 Maintenance

The centrifugal gas separator is maintenance-free.

13 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.

14 Service Addresses

Bopp & Reuther Messtechnik GmbH Service Dept. MRV-S Am Neuen Rheinhafen 4 D-67346 Speyer Phone: +49 (6232) 657-402 Fax: +49 (6232) 657 401	Bopp & Reuther Messtechnik GmbH Workshop Essen Laubenhof 15 D-45326 Essen Phone: +49 (201) 3602742 Fax: +49 (201) 3602743 Mobile: +49 (172) 6128045	Bopp & Reuther Messtechnik GmbH Münchener Str. 23 D-85123 Karlskron Industrial Estate Brautlach, on the B 13 Phone: +49 (8450) 928330 Fax: +49 (8450) 928332
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ZERTIFIKAT Certificate

Konformität mit der Bauart (Modul C1)
nach Richtlinie 97/23/EG

Conformity to Type (Module C1) according to Directive 97/23/EC

Zertifikat-Nr.: DDB-MAN/02/04/13461050-001
Certificate No.:

Name und Anschrift
des Herstellers:

Name and postal address of manufacturer:

Bopp & Reuther
Messtechnik GmbH
Carl-Reuther-Straße 1
68305 Mannheim

Der Hersteller ist nach Prüfung der Voraussetzungen berechtigt, die von ihm im Rahmen des Geltungsbereichs hergestellten Druckgeräte mit unserer Kennnummer gemäß dem abgebildeten CE-Kennzeichen zu kennzeichnen:

The manufacturer is - after examination of the prerequisites - authorised to provide his pressure equipment manufactured within the scope of the examination our identification number to the CE-mark as illustrated:

CE 0036

Prüfbericht Nr.:
Test report No.:

P-DDB-MAN/02/04/13461050-367

Geltungsbereich:
Scope of examination:

Durchfluß-Messgeräte, Filter,
Gasabscheider

Fertigungsstätte:
Manufacturing plant:

68305 Mannheim

Mannheim, 2. Mai 2002
(Ort, Datum)
(Place, date)

Bitte beachten Sie die Hinweise auf der zweiten Seite.
Please note the remarks on the second page.

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TÜV Süddeutschland
Bau und Betrieb GmbH
TÜV-CERT-Zertifizierungsstelle
für Druckgeräte

Benannte Stelle, Kennnummer 0036
Notified Body, No. 0036

Mitglied der
CONFÉDÉRATION EUROPÉENNE



D'ORGANISMES DE CONTROLE

CERTIFICAT

CERTIFICADO

‘ΕΡΗΤΗΓΑΤΗ

認証証書

CERTIFICATE

ZERTIFIKAT