

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Safety Valve for Boiler and Pressure Vessel

with type designation(s)

SAFE BR Series 900: 901, 902, 911, 912, SAFE-P Series 920: 921, 922, 923, 924, SAFE-TC Series 940: 941, 942, 943, 945, 946, SAFE-TCS Series 950: 951, 952, 953, SAFE-TCP Series 960: 961, 962, 963

Issued to

ARI-Armaturen Albert Richter GmbH & Co. KG
SCHLOß HOLTE-STUKENBROCK, Germany

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment
DNV GL rules for classification – Ships
DNV GL rules for classification – Yachts
DNV GL class programme DNVGL-CP-0186 – Type approval – Valves
DNV GL offshore standards

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

K. factor: see page 3

This Certificate is valid until **2022-04-11**.

Issued at **Hamburg** on **2017-04-12**

DNV GL local station: **Magdeburg**

for **DNV GL**

Approval Engineer: **Peter Gierhan**

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Olaf Drews
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

Safety valves are safety devices designed to prevent the pressure in any pressurised system from exceeding the maximum permissible pressure by more than the permissible tolerance of +10%. Spring loaded safety relief valves, with closed or open lifting device, with closed or open bonnet or gastight cap.

Table 1: Types of safety valves covered by this certificate

TYPE	Body material	Max pressure	Size	Temp. range
SAFE Serie: 901/902/911/912	GG25/ EN-JL 1040, DIN 1561 ⁽¹⁾	2 bar	DN20-DN150	-10°C to +120°C
	GGG 40.3/ EN-JS 1049, DIN 1563 ⁽²⁾	40 bar	DN20-DN250	0°C to +120°C
	GS-C 25N / 1.0619 N, EN 10213	40 bar	DN15-DN250	-10°C to +450°C
	SA216WCB	ANSI300	1" – 6"	-10°C to +427°C
901/911	1.4408, EN 10213	40 bar	DN15-DN100	-55°C to +400°C
	SA351CF8M	ANSI300	1" – 4"	-30°C - +400°C
SAFE-P Series: 921/922/ 923/924	GG25/ EN-JL 1040, EN 1561 ⁽¹⁾	2 bar	DN15-DN100	-10°C to +120°C
	GS-C 25N / 1.0619 N, EN 10213	40 bar	DN15-DN100	-10°C to +450°C
921/923	1.4408, EN 10213	40 bar	DN15-DN100	-55°C to +400°C
SAFE-TC Series: 941/942/ 943	GGG 40.3/ EN-JS 1049, EN 1563 ⁽²⁾	40 bar	DN15-DN25	0°C to +120°C
941/943	1.4408, EN 10213	40 bar	DN15-DN25	-55°C to +400°C
945/946	GGG 40.3/ EN-JS 1049 DIN 1563 ⁽²⁾	40 bar	DN15-DN25	0°C to +120°C
SAFE-TCS Series: 951/952/ 953	1.4581, EN 10213	100 bar	DN15-DN25	-55°C to +300°C
SAFE-TCP Series: 961/962/ 963	1.4581, EN 10213	100 bar	DN15-DN25	-55°C to +300°C

⁽¹⁾ Grey Cast Iron

⁽²⁾ Nodular Cast Iron

Application/Limitation

The safety relief valves are approved for use on boilers and pressure vessels with body material as specified, are approved for the following applications:

Table 2: Media

Material	Media
GG25/EN-JL 1040 ¹⁾ , GGG40.3/EN-JS 1049 GS-C 25N/1.0619 N SA216WCB	Steam, neutral- gases, -vapours and -liquids
G-X6CrNiMo18 10 (1.4408) G-X5CrNiMo18 10 (1.4581) SA351CF8M	Acetic-acid, acetone, acetylene, ammonia, ammonia,-water ²⁾ , arsenic hydride, argon Butadiene, butane, benzene (benzol) carbon dioxide, clean steam, crude oil, chlorine (waterfree) diesel oil Ethane, ethanol, ethyl monoxide ²⁾ , ethylene glycol ³⁾ , freon-refrigerants, fuel oil
G-X6CrNiMo18 10 (1.4408) G-X5CrNiMo18 10 (1.4581) SA351CF8M	Glycerine, glycol heat transfer oil, hydrochloric acid, hydrogen Kerosene

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G-X6CrNiMo18 10 (1.4408) G-X5CrNiMo18 10 (1.4581) SA351CF8M	Glycerine, glycol
	heat transfer oil, hydrochloric acid, hydrogen
	Kerosene
	lubrication oil
	Methane, methanol ²⁾
G-X6CrNiMo18 10 (1.4408) G-X5CrNiMo18 10 (1.4581) SA351CF8M	natural gas
	Oxygen
	Petrol, phosphorus acid, propane
	sodium chloride, sodium hydroxide, sour water (pH<6), sulphuric acid, sulphuric oxide
	toluene

Notes:

- ¹⁾ Grey cast iron (GG25) may only be used in Class III piping systems.
- ²⁾ Bellow of neoprene from natural rubber is not to be used in this service
- ³⁾ The safety valve is only allowed to be used in solution with corrosion inhibitors.

Table 3: K-coefficient

K-Faktor DNV Section 6 B: Safety valve (aus Datenblatt)

Pressure	921-924		941-946			901,902,911,912		950	960
	DN15, 20, 40, 65	DN25-100	DN15	DN20	DN25	DN15-100/ DN200	DN125/150/ 250	DN15 - 25	DN15 - 25
0,2 bar	9,42	10,4	5,06	6,03	4,2	3,77	4,22		10,1
0,4 bar	7,2	7,91	4,04	4,52	3,4	3,01	3,4		8,08
0,6 bar	6,36	6,96	3,64	4	3,1	2,76	3,16	8,55	7,21
0,8 bar	6,07	6,61	3,44	3,77	2,9	2,63	3,03	8,01	6,95
1 bar	5,81	6,45	3,28	3,62	2,8	2,5	2,93	8,01	6,82
2 bar	5,38	5,83	3,01	3,28	2,6	2,51	2,61	7,52	6,43
3 bar	5,02	5,57	2,96	3,19	2,5	2,4	2,54	7,23	6,49
4 bar	5,06	5,55	2,96	3,16	2,5	2,37	2,51	7,28	6,31
5 bar	5,16	5,59	2,97	3,18	2,5	2,39	2,52	7,32	6,35
6 bar	5,17	5,64	2,99	3,19	2,6	2,39	2,52	7,35	6,37
8 bar	5,19	5,66	3,01	3,21	2,6	2,4	2,53	7,4	6,41
10 bar	5,23	5,7	3,02	3,23	2,6	2,41	2,54	7,43	6,44
15 bar	5,26	5,73	3,04	3,25	2,6	2,42	2,55	7,48	6,48
20 bar	5,28	5,76	3,05	3,26	2,6	2,42	2,55	7,5	6,5
25 bar	5,28	5,76	3,05	3,26	2,6	2,41	2,54	7,51	6,5
30 bar	5,28	5,76	3,05	3,26	2,6	2,41	2,55	7,5	6,5
35 bar	5,28	5,76	3,05	3,26	2,6	2,41	2,55	7,48	6,49
40 bar	5,28	5,76	3,05	3,26	2,6	2,41	2,55	7,47	6,48
50 bar								7,43	6,44
60 bar								7,37	6,39
70 bar								7,31	6,33
80 bar								7,24	6,27
90 bar								7,17	6,21
100 bar								7,1	6,15

$$K = A \cdot (p+1) / E$$

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For valves with or seat sealing of rubber materials, the following limiting temperatures apply:

70 EPDM 281	-35°C to +150°C
75 FKM 595	-20°C to +180°C
68 CR 84171/ 70 CR 884	-30°C to +100°C
WS12.309V2	-20°C to +220°C

For valves with EPDM-rubber bellows, the following limiting temperature applies: -35°C up to +130°C

Production Test / Certification

Safety valves of ordinary type with seat less than 38mm and safety valves of full lift type with inside seat diameter less than 20 mm may not be used on boilers or steam-heated steam generators. Threaded connections, where the threads perform the sealing, may only be used in class III piping systems. Valves made of Nodular & Grey cast iron shall be used just for class III piping.

Each valve shall be subject to the following tests:

- Hydraulic test of body to 1,5 times the design pressure. If DN > 100mm a DNV GL surveyor has to witness the test.
- Leakage test (at 90% of set pressure) after reset

Each valve is to be inspected and certified by DNV GL when DNV GL certificate is required.

Type Approval documentation

Type			

Type Approval documentation

Tests carried out

	TÜV Bauteilnummer 663		
	TÜV Bauteilnummer 668		
	TÜV Bauteilnummer 811		
	TÜV Bauteilnummer 995		
	TÜV Bauteilnummer 997		
	TÜV Bauteilnummer 1041		

Marking of product

For traceability to this Type Approval the products are to be marked with:

- Manufacturer's name or trade mark
- Valve type designation
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow on one way flow valves.

Periodical assessment



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A condition for retention of the Type Approval Certificate in its validity period is that periodical assessments are successfully carried out.

The objective of the periodical assessment is to verify that the conditions for the type approval have not been altered.

The main elements of the certificate retention survey are:

- Review of Type Approval documentation
- Review of possible changes in design, materials and performance
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

END OF CERTIFICATE