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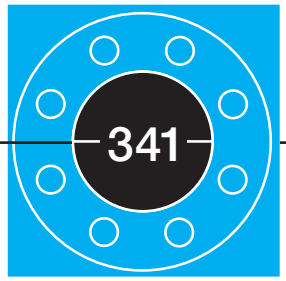
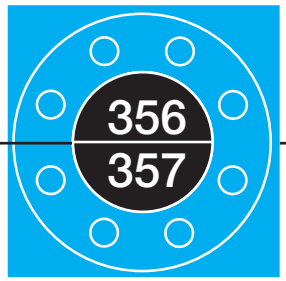
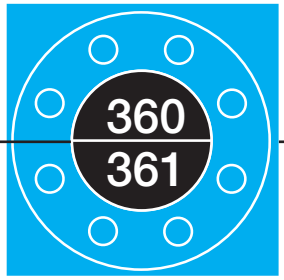


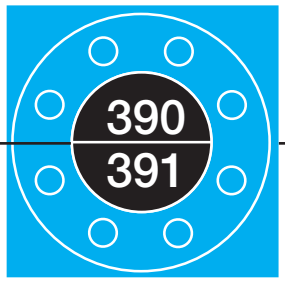
For heating systems as specified in DIN 4751 Pt. 2 / TRD 721



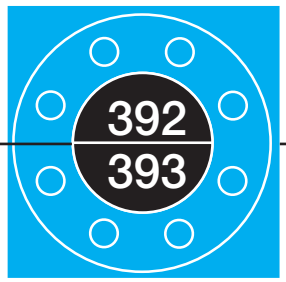
For steam, gases and hot water as specified in DIN 4752 / TRD



For liquids and district heating systems



As specified in DIN 4750 / TRD 721
response overpressure 0.5 bar



As specified in DIN 4750/TRD 721
response overpressure 1 bar

High-efficiency Safety Valves

CE 0045

TÜV CERT DIN EN ISO 9001:2000 Zertifikat 08/100/3154

Maximum blow-off rate due to low flow losses

was the principle governing the development of the THIES High-efficiency Safety Valves

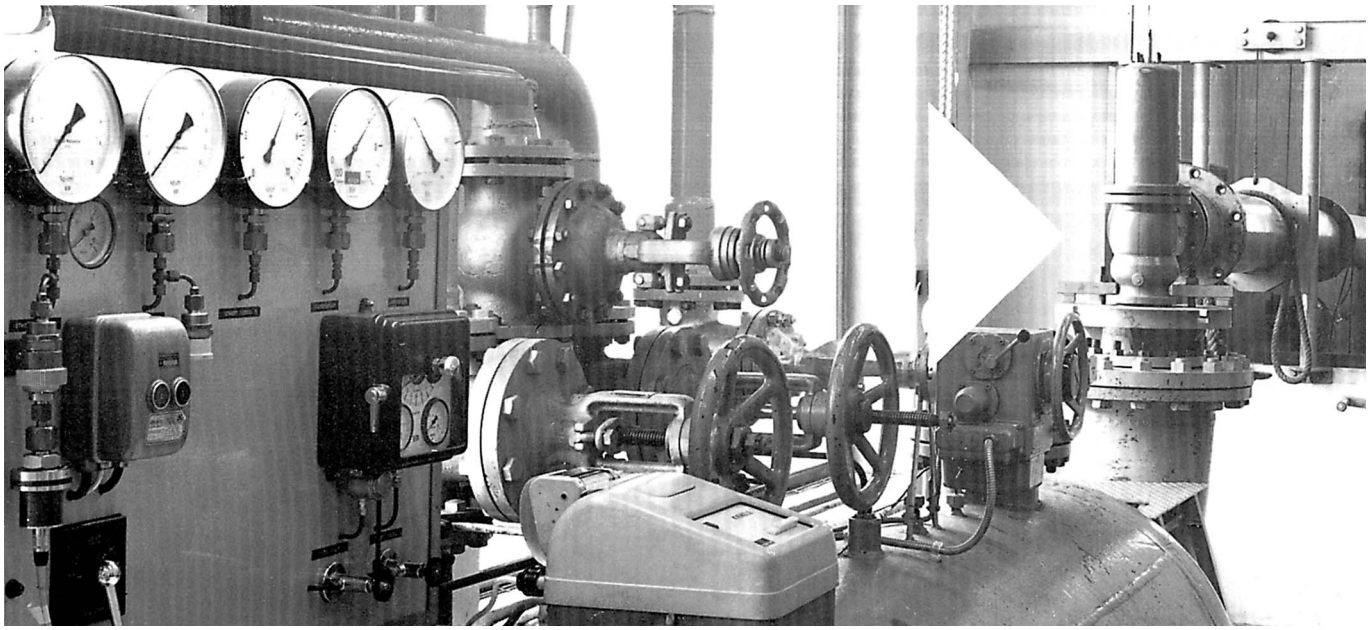
Special research led to the development of a simple construction of the flow passages leading to optimum efficiency and performance.

High functional and operational reliability due to a very simple configuration

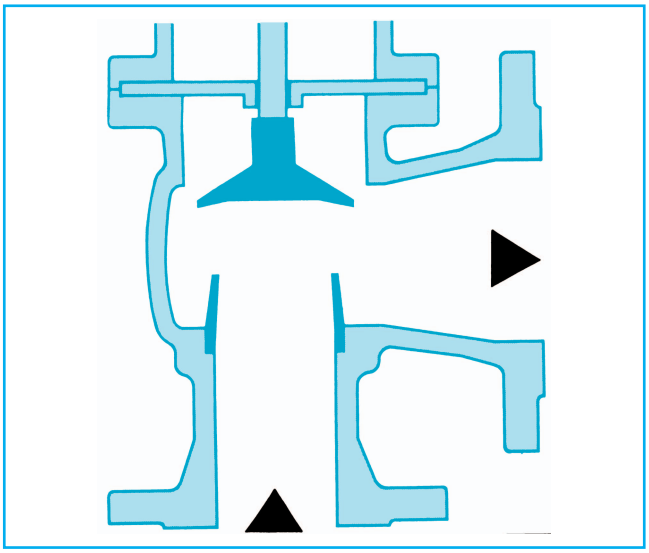
- 341 type approval (D/G/H) (steam/gas/heating system) for heating systems according to DIN 4751 Pt. 2/TRD 721
- 356/357 type approval (D/G) (steam/gas), spring loaded for steam and gas and other heating systems according to DIN 4752/TRD
- 360/361 type approval (F) (liquids), spring loaded for liquids and district heating systems
- 390/391 type approval (D) (steam), weight loaded according to DIN 4750-0,5 bar/TRD 721
- 392 type approval (D) (steam), weight loaded according to DIN 4750-1 bar/TRD 721
- 393 type approval (D) (steam), spring loaded according to DIN 4750-1 bar/TRD 721

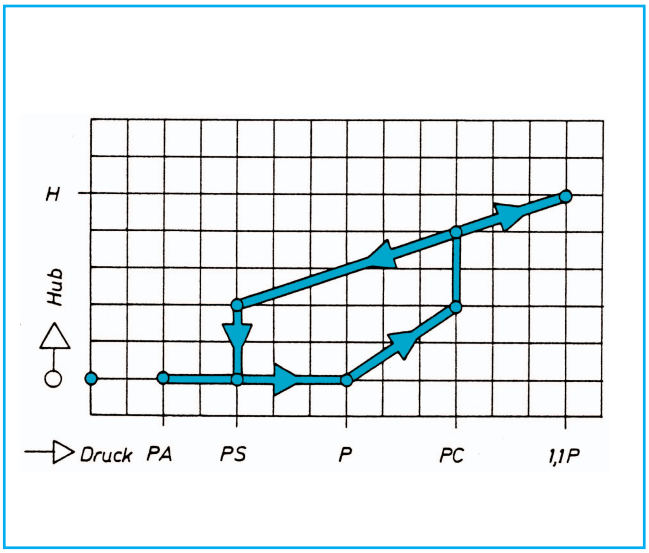
- High blow-off rate due to low flow losses
- Reliable valve response
- Favourable closing pressure differential
- No auxiliary lifting required for 341 + 356/357 + 390/391 + 392/393 series
- Corrosion-resistant spindle bushes
- Abrasion and corrosion resistant sealing surfaces
- Centrally applied closing force
- Available in: grey cast iron GG 25, spheroidal graphite iron GGG 40.3, cast steel GS-C 25 and stainless steel 1.4581

The acceptance tests for the type approval were carried out, in accordance with the newest regulations of the German Technical Inspection Authority (Vd TÜV Essen), on the valve test rig of the Aerodynamics Institute of Aachen Technical University.



Operation





Valve design

The schematic on the left shows the simple and efficient construction of the **THIES High-efficiency Safety Valve**.

At the inlet the incoming fluid is compressed slightly to compensate for any vortices and then discharges to the side through the gap between valve head and valve seat.

The special design of the valve seat and valve head result in the high-efficiency operation as described below.

Operation

THIES High-efficiency Safety Valves start to open at response pressure P. Additional increases in pressure produce proportionate valve opening, until pressure PC is reached. This produces instantaneous opening of the port´s full cross section. At a pressure 10% in excess of the response pressure lift H is measured, on which the design value of the outflow is based. The valve closes again as the pressure drops. At closing pressure PS the valve is fully shut. In order to ensure proper and reliable valve functioning the plant operating pressure should be PA.

The values of the rate of flow certified by the type approval mark issued by the German Technical Inspection Authority (Vd TÜV Essen) are determined by taking the lowest measured value for a particular series and subtracting a 10% safety margin.

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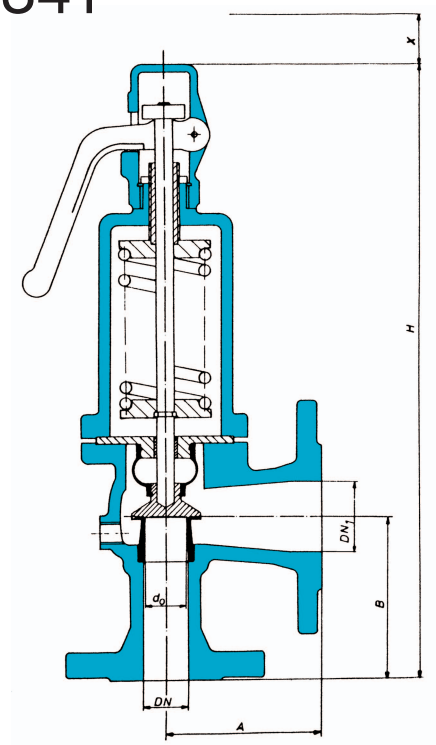
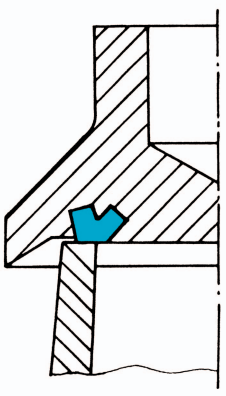
341



with closed protective bonnet and open spindle housing cap

x = Pressure change in range of fitted spring
x_1 = Pressure change requiring spring replacement

Valve heat with highly elastic seal and metal backing



leading to

- better tightness
- less sensitivity to fouling
- reliable response due to metal backing
- high strength and high resistance owing to highly elastic seal embedded by vulcanizing

Spring loaded Diaphragm type High-efficiency Safety Valve

Application:
Safety valve to satisfy safety requirements in heating systems with flow temperatures of 120° C according to DIN 4751 Pt. 2.

The following type approval mark has been issued by the German Technical Inspection Authority (Vd TÜV Essen):

TÜV · SV · **-662 · do · D/G/H · αw · p

1	2	3	4	5	6	7	8
set overpressure (bar)		1 to 3.5		3.5 to 10		2.4 to 3.6	
DN	do (mm)	$\alpha^{w=}$	h/do>	$\alpha^{w=}$	h/do>	$\alpha^{w=}$	h/do>
20	19.1					0.68	0.29
25	23.5						
32	30						
40	37.9						
50	46.5	0.61	0.29	0.69	0.28		
65	60						
80	74						
100	92			0.66	0.27		

THIES High-efficiency Safety Valves satisfy the German requirements of the following specifications: UVV-"Pressure Vessels", AD Specification A 2 „Safety Valves", the Technical Rules for Steam Boilers (TRD), SR Safety Valves and DIN 4751 Pt. 2.

Construction:
Spring loaded, diaphragm type, high-efficiency safety valve, angled, with highly elastic seal and metal backing in the valve head.

Series 341 with closed bonnet

Valve head is liftable. The pressure acts, via a ball, centrally onto the valve head. Corrosion-resistant spindle bushes ensure reliable and precise response of the valve.

Flange connections:
Grey cast iron version: inlet and outlet according to DIN 2533 PN 16
Spheroidal graphite iron version and cast steel version: inlet as per DIN 2545 PN 40, outlet as per DIN 2543 PN 16

Materials:

Valve body	GG 25, GGG 40.3 or GS-C 25
Protective bonnet	GG 25, GGG 40.3 or GS-C 25
Valve seat	Niro 1.4122/1.4301
Valve head	Niro 1.4305
Spindle, polished	Niro 1.4021
Guide bushes	Niro 1.4301, Ms 58 or Rg 7
Spring	Niro 1.4310, DIN 17223 C or 50 CrV 4
Bolts	CK 35/5.6
Rubber diaphragm (max. 140°C)	EPDM

Models and dimensions

Models		Order Code No.
Series 341 of grey cast iron	PN 16 *	341 GN
Series 341 of spheroidal graphite iron	PN 40 *	341 GGG
Series 341 of cast steel	PN 40 **	341 SNC

Example of Order:
1 x 341 SNC 32 — 4 bar
i. e. 1 THIES-diaphragm high-efficiency safety valve, series 341 made of cast steel GS-C 25, nom. diam. 32/50, PN 40/16, with elastic seal incorporated in valve head and rubber diaphragm. Response overpressure 4 bar.

Dimensions and weights in mm and kg									
Nom. diam. DN		20	25	32	40	50	65	80	100
Nom. diam. DN_1		32	40	50	65	80	100	125	150
Length	A	100	100	110	115	120	140	160	180
Length	B	100	105	115	140	150	170	195	220
Overall height *	H	380	395	410	565	575	710	735	860
Overall height **	H	420	445	465	580	600	710	735	860
Seat diameter	do	19,1	23,5	30,0	37,9	46,5	60,0	74,0	92,0
Weight	kg	10	12	15	24	26	46	50	72
Clearance	x	50	50	50	55	55	70	70	70
Clearance	x_1	90	90	90	150	150	150	150	200

As the cross sectional area of the inlet is designed to be approximately equal to that of the narrowest flow passage, a pressure drop in the feed line may affect the function of the safety valve.
The feed line must be adapted to the maximum permissible pressure drop of 3% and, if necessary, enlarged appropriately.
The safety valves are provided with a drain plug: up to nominal diameter size 50 – R ¼", over 65 – R ⅜".
The dimensions and weights quoted are non-binding. Subject to design modifications.

Performance table

Heat capacity in kW at response overpressure p

The values quoted apply to the response overpressure.
This gives an additional margin of 10% compared with the actual outflow. According to the German Safety Valve Code and AD specification A 2, it is not permissible to calculate the outflow at response pressure + 10% extra pressure.

(DN) – nominal diameter

DN	20	25	32	40	50	65	80	100	DN
p bar	kW	kW	kW	kW	kW	kW	kW	kW	p bar
1		**177**	**289**	**461**	**694**	**1155**	**1757**	**2715**	1
1,5		**217**	**353**	**564**	**849**	**1414**	**2150**	**3323**	1,5
2		**257**	**418**	**667**	**1004**	**1672**	**2544**	**3931**	2
2,5	**218**	**296**	**483**	**770**	**1160**	**1931**	**2937**	**4539**	2,5
3	**245**	**333**	**543**	**867**	**1305**	**2172**	**3304**	**5107**	3
3,5	**275**	**373**	**608**	**970**	**1460**	**2431**	**3697**	**5715**	3,5
4	**306**	**464**	**756**	**1206**	**1815**	**3022**	**4597**	**6797**	4
4,5	**334**	**506**	**824**	**1315**	**1979**	**3295**	**5013**	**7411**	4,5
5	**362**	**547**	**892**	**1424**	**2143**	**3568**	**5428**	**8025**	5
5,5	**389**	**588**	**958**	**1529**	**2301**	**3832**	**5829**	**8639**	5,5
6	**415**	**628**	**1024**	**1634**	**2459**	**4095**	**6229**	**9209**	6
6,5	**442**	**669**	**1090**	**1739**	**2618**	**4358**	**6630**	**9823**	6,5
7	**468**	**709**	**1155**	**1844**	**2776**	**4621**	**7030**	**10393**	7
7,5	**495**	**750**	**1221**	**1949**	**2934**	**4885**	**7431**	**11007**	7,5
8	**522**	**790**	**1287**	**2054**	**3092**	**5148**	**7831**	**11577**	8
8,5	**549**	**830**	**1353**	**2159**	**3250**	**5411**	**8231**	**12191**	8,5
9	**575**	**870**	**1419**	**2264**	**3408**	**5674**	**8631**	**12761**	9
9,5	**600**	**908**	**1480**	**2362**	**3555**	**5918**	**9002**	**13331**	9,5
10	**624**	**945**	**1540**	**2459**	**3701**	**6162**	**9373**	**13857**	10

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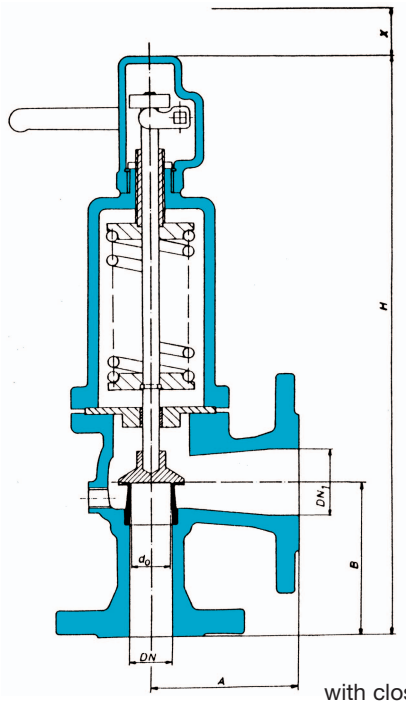
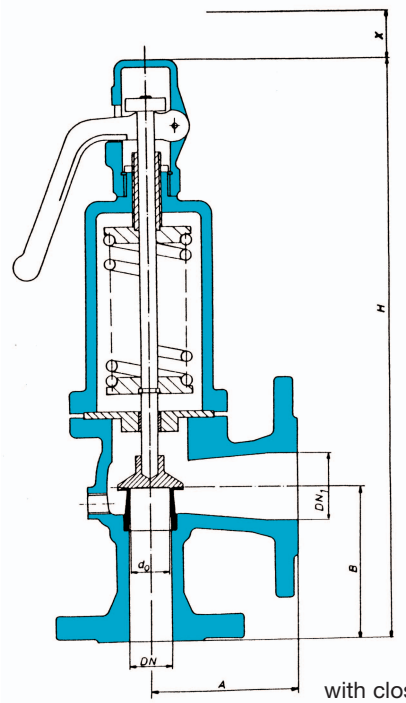
356 Gastight model



with closed protective bonnet
and gastight lift housing
DN 125 and DN 150 not shown

x = Pressure change in range of fitted spring
x1 = Pressure change requiring spring replacement

357 Closed bonnet



with closed protective bonnet
and open lift housing
DN 125 and DN 150 not shown

Spring loaded High-efficiency Safety Valves

Application:
As safety valves for steam, gases and hot water in pressure vessels and steam boilers.
Application also in accordance with DIN 4752.

Range of use:		
	GG 25	up to 300°C
	GGG 40.3	up to 350°C
	GS-C 25	up to 400°C
	1.4581	up to 550°C

Proof marks for the valves, as follows, were issued by the official German Technical Inspection Authority (Vd TÜV Essen):
For overpressure sets from 1.0 up to 3.5 bar for nominal diameters 25 to 100 mm:
TÜV · SV · **-335 · do · D / G · 0,61 · p
For overpressure sets from 2.5 up to 3.5 bar for nom. diam. 20 mm:
TÜV · SV · **-335 · do · D / G · 0,68 · p
For overpressure sets above 3.5 up to 20 bar for nom. diam. 20 to 80 mm:
TÜV · SV · **-336 · do · D / G · 0,69 · p
For overpressure sets above 20 up to 30 bar for nom. diam. 25 to 50 mm:
TÜV · SV · **-336 · do · D / G · 0,65 · p
For overpressure sets above 3.5 up to 18 bar for nom. diam. 100 mm:
TÜV · SV · **-335 · do · D / G · 0,66 · p
For overpressure set 1 bar for nom. diam. 125 mm:
TÜV · SV · **-776 · do · D / G · 0,53 · p
For overpressure set 1 bar for nom. diam. 150 mm:
TÜV · SV · **-776 · do · D / G · 0,45 · p
THIES High-efficiency Safety Valves meet the following German requirements: Pressure Vessel Safety Regulations, AD Specification A 2 for „Safety Valves“, the Technical rules for steam boilers (TRD) and the Safety Valves Code.

Construction:
THIES spring loaded high-efficiency safety valve, angled.
Series 356 gastight version
Series 357 version with closed bonnet
Liftable valve head. Force is transmitted centrally at the valve head via ball. Corrosion-resistant spindle guides ensure reliable and precise response of the valve.

Flange connections:
Grey cast iron version: inlet and outlet as per DIN 2533 PN 16
Spheroidal graphite iron version, cast steel version and stainless steel version: inlet as per DIN 2545 PN 40
outlet as per DIN 2543 PN 16

Materials:

Valve body	GG 25, GGG 40.3, GS-C 25 or 1.4581
Protective bonnet	GG 25, GGG 40.3, GS-C 25 or 1.4408
Valve seat	Niro 1.4021/1.4301 or 1.4541
Valve head	Niro 1.4305 or 1.4571
Spindle, polished	Niro 1.4021 or 1.4571
Guide bushes	Niro 1.4310, Ms 58 or Rg 7
Spring	Niro 1.4310, DIN 17223 C or 50 CrV 4
Bolts	CK 35 or 1.4401,24 CrMo 5/5.6

Models and dimensions

Models and dimensions	Order Code No.
Series 356 of grey cast iron	PN 16 300°C 356 GN
Series 357 of grey cast iron	PN 16 300°C 357 GN
Series 356 of spheroidal graphite iron	PN 40 350°C 356 GGG up to 20 bar
Series 356 of spheroidal graphite iron	PN 40 350°C 356 GH over 20 bar
Series 357 of spheroidal graphite iron	PN 40 350°C 357 GGG up to 20 bar
Series 357 of spheroidal graphite iron	PN 40 350°C 357 GH over 20 bar
Series 356 of cast steel	PN 40 400°C 356 SNC up to 20 bar
Series 356 of cast steel	PN 40 400°C 356 SH over 20 bar
Series 357 of cast steel	PN 40 400°C 357 SNC up to 20 bar
Series 357 of cast steel	PN 40 400°C 357 SH over 20 bar
Series 356 of stainless steel	PN 40 550°C 356 EN

Special Versions	
Flexible gasket, max. 140°C [1]	A
Free from nonferrous metals	O
High temperature spring 50 CrV 4 [2]	W

[1]) Not required for steam [2]) Contained in GGG and SNC as standard

Example of Order:
1 x 357 SNC 32 — 4 bar:
i. e. 1 THIES high-efficiency safety valve, series 357 made of cast steel GS-C 25, nom. diam. 32/50, PN 40/16. Usable up to 400° C, response overpressure 4 bar.

Dimensions and weights in mm and kg

Nom. diam. DN		20	25	32	40	50	65	80	100	125	150
Nom. diam. DN_1		32	40	50	65	80	100	125	150	200	250
Length	A	100	100	110	115	120	140	160	180	200	225
Length	B	100	105	115	140	150	170	195	220	250	285
Overall height	H	385	395	410	580	600	710	735	860	980	1045
Seat diameter	do	19,1	23,5	30,0	37,9	46,5	60,0	74,0	92,0	123	148
Weight	kg	10	12	15	24	26	46	50	72	100	133
Clearance	x	50	50	50	55	55	70	70	70	70	70
Clearance	x_1	90	90	90	150	150	150	150	200	260	260

As the cross sectional area of the inlet is designed to be approximately equal to that of the narrowest flow passage, a pressure drop in the feed line may affect the function of the safety valve.
The feed line must be adapted to the maximum permissible pressure drop of 3% and, if necessary, enlarged appropriately.
The safety valves are provided with a drain plug of size R ¼" up to nom. diam. 50 mm and R ⅜" from nom. diam. 65 mm upwards.
The dimensions and weights quoted are non-binding. Subject to design modifications.

Performance Table

The values quoted apply to the response overpressure.

Saturated steam in kg/h at response overpressure p
Air in Nm^3/h at 0°C and 760 Torr at response overpressure p

This gives an additional safety margin of 10% compared with the actual outflow. According to the German Safety Valve Code and AD specification A 2, it is not permissible to calculate the outflow at response pressure + 10% extra pressure. The flow rates in heavy type are the figures for which the valve´s type approval was issued.

DN	20		25		32		40		50		65		80		100		125		150		DN
p bar	Steam	Air	Steam	Air	Steam	Air	Steam	Air	Steam	Air	Steam	Air	Steam	Air	Steam	Air	Steam	Air	Steam	Air	p bar
1	205	251	**286**	**344**	**463**	**556**	**738**	**887**	**1111**	**1335**	**1851**	**2223**	**2815**	**3381**	**4351**	**5226**	**6845**	**8214**	**8429**	**10115**	1
1,5	260	315	**355**	**430**	**574**	**695**	**916**	**1109**	**1379**	**1669**	**2296**	**2779**	**3493**	**4227**	**5399**	**6533**					1,5
2	311	377	**425**	**516**	**686**	**834**	**1112**	**1330**	**1648**	**2003**	**2744**	**3334**	**4173**	**5072**	**6450**	**7839**					2
2,5	**359**	**441**	**491**	**602**	**794**	**973**	**1267**	**1552**	**1907**	**2336**	**3176**	**3890**	**4830**	**5917**	**7466**	**9146**					2,5
3	**408**	**503**	**559**	**688**	**903**	**1111**	**1441**	**1774**	**2168**	**2670**	**3610**	**4446**	**5492**	**6762**	**8488**	**10452**					3
3,5	**466**	**573**	**711**	**875**	**1149**	**1414**	**1833**	**2257**	**2759**	**3398**	**4594**	**5657**	**6988**	**8606**	**10016**	**12334**					3,5
4	**515**	**637**	**786**	**973**	**1269**	**1572**	**2026**	**2508**	**3050**	**3776**	**5078**	**6268**	**7724**	**9562**	**11070**	**13705**					4
4,5	**563**	**701**	**860**	**1070**	**1389**	**1729**	**2217**	**2759**	**3338**	**4153**	**5557**	**6915**	**8453**	**10518**	**12115**	**15075**					4,5
5	**614**	**764**	**938**	**1167**	**1516**	**1886**	**2419**	**3010**	**3641**	**4531**	**6062**	**7543**	**9221**	**11474**	**13216**	**16446**					5
5,5	**662**	**828**	**1011**	**1264**	**1633**	**2043**	**2607**	**3261**	**3924**	**4908**	**6533**	**8172**	**9938**	**12430**	**14243**	**17816**					5,5
6	**713**	**892**	**1089**	**1362**	**1759**	**2200**	**2807**	**3511**	**4226**	**5286**	**7036**	**8800**	**10702**	**13386**	**15340**	**19186**					6
6,5	**762**	**956**	**1163**	**1459**	**1880**	**2357**	**3000**	**3762**	**4516**	**5663**	**7519**	**9429**	**11437**	**14343**	**16392**	**20557**					6,5
7	**811**	**1019**	**1238**	**1556**	**2000**	**2514**	**3192**	**4013**	**4805**	**6041**	**8000**	**10058**	**12168**	**15299**	**17441**	**21928**					7
7,5	**861**	**1083**	**1315**	**1653**	**2125**	**2672**	**3391**	**4264**	**5105**	**6418**	**8500**	**10686**	**12929**	**16255**	**18532**	**23298**					7,5
8	**910**	**1147**	**1389**	**1751**	**2244**	**2829**	**3582**	**4515**	**5392**	**6796**	**8977**	**11315**	**13654**	**17211**	**19571**	**24668**					8
8,5	**958**	**1210**	**1462**	**1848**	**2363**	**2986**	**3771**	**4765**	**5677**	**7174**	**9451**	**11943**	**14376**	**18167**	**20606**	**26039**					8,5
9	**1008**	**1274**	**1539**	**1945**	**2487**	**3143**	**3970**	**5016**	**5975**	**7551**	**9949**	**12572**	**15133**	**19123**	**21689**	**27409**					9
9,5	**1056**	**1338**	**1612**	**2042**	**2605**	**3300**	**4157**	**5267**	**6258**	**7929**	**10420**	**13201**	**15849**	**20080**	**22716**	**28780**					9,5
10	**1103**	**1401**	**1685**	**2140**	**2722**	**3457**	**4344**	**5518**	**6540**	**8306**	**10888**	**13829**	**16562**	**21036**	**23738**	**30151**					10
11	**1204**	**1529**	**1838**	**2334**	**2969**	**3772**	**4739**	**6020**	**7134**	**9061**	**11878**	**15086**	**18067**	**22948**	**25897**	**32892**					11
12	**1301**	**1656**	**1986**	**2529**	**3209**	**4086**	**5121**	**6521**	**7709**	**9816**	**12835**	**16344**	**19523**	**24860**	**27983**	**35633**					12
13	**1397**	**1784**	**2133**	**2723**	**3447**	**4400**	**5501**	**7023**	**8281**	**10572**	**13788**	**17601**	**20972**	**26773**	**30060**	**38374**					13
14	**1497**	**1911**	**2285**	**2918**	**3693**	**4715**	**5894**	**7524**	**8873**	**11327**	**14772**	**18858**	**22470**	**28685**	**32206**	**41115**					14
15	**1597**	**2038**	**2438**	**3112**	**3939**	**5029**	**6287**	**8026**	**9464**	**12082**	**15757**	**20115**	**23968**	**30597**	**34354**	**43856**					15
16	**1692**	**2166**	**2584**	**3307**	**4175**	**5343**	**6663**	**8528**	**10030**	**12837**	**16700**	**21372**	**25402**	**32510**	**36409**	**46596**					16
17	**1787**	**2293**	**2729**	**3501**	**4409**	**5657**	**7038**	**9029**	**10594**	**13592**	**17638**	**22630**	**26829**	**34422**	**38454**	**49338**					17
18	**1887**	**2421**	**2880**	**3696**	**4654**	**5972**	**7428**	**9531**	**11182**	**14347**	**18617**	**23887**	**28319**	**36335**	**40590**	**52079**					18
19	**1986**	**2548**	**3032**	**3890**	**4899**	**6286**	**7819**	**10033**	**11771**	**15102**	**19507**	**25144**	**29810**	**38247**	42727	54820					19
20	**2075**	**2675**	**3168**	**4084**	**5119**	**6600**	**8169**	**10534**	**12297**	**15857**	**20474**	**26401**	**31144**	**40159**	44638	57561					20
21			**3162**	**4079**	**5150**	**6644**	**8217**	**10600**	**12370**	**15957**											21
22			**3305**	**4263**	**5389**	**6952**	**8591**	**11082**	**12932**	**16682**											22
23			**3449**	**4449**	**5619**	**7249**	**8964**	**11564**	**13494**	**17407**											23
24			**3593**	**4635**	**5853**	**7550**	**9338**	**12046**	**14056**	**18132**											24
25			**3736**	**4819**	**6087**	**7852**	**9711**	**12527**	**14619**	**18859**											25
26			**3880**	**5005**	**6321**	**8154**	**10085**	**13010**	**15181**	**19583**											26
27			**4024**	**5191**	**6555**	**8456**	**10458**	**13491**	**15743**	**20308**											27
28			**4168**	**5377**	**6789**	**8758**	**10832**	**13973**	**16305**	**21033**											28
29			**4311**	**5561**	**7023**	**9060**	**11205**	**14454**	**16868**	**21760**											29
30			**4455**	**5747**	**7257**	**9361**	**11579**	**14937**	**17430**	**22484**											30

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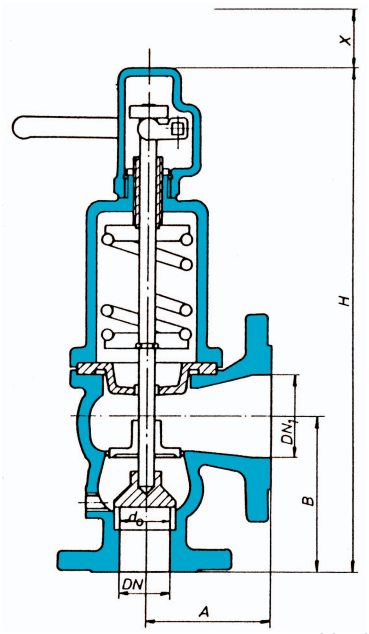
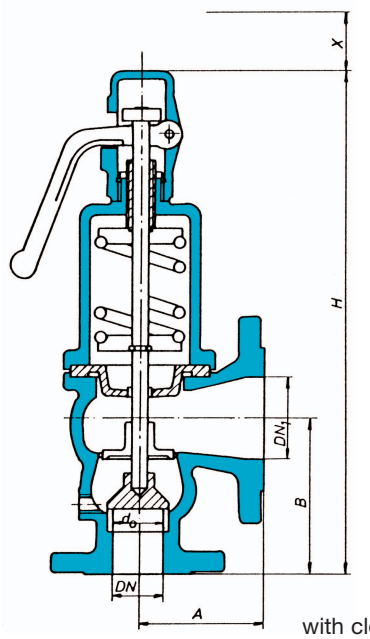
360 Gastight model



with closed protective bonnet and closed lift housing

x = Pressure change in range of fitted spring
x1 = Pressure change requiring spring replacement

361 Closed bonnet



with closed protective bonnet and open lift housing

Spring loaded High-efficiency Safety Valves

Application:
Safety valves for blowing-off liquid from fixed pressure vessels, subject to the condition that no evaporation occurs.

Also suited to district heating systems. If the liquid to be blown off does not have similar properties to the liquid (water) used in the valve testing procedure, then the properties of the liquid, in respect to chemical aggressiveness or sticking tendency, must be taken into account in the acceptance testing of the pressure vessel.

Proof marks for these valves, as follows, were issued by the official German Technical Inspection Authority (Vd TÜV Essen), for response overpressure of 1.0 to 10 bar:
For nom. diam. 25 mm
TÜV · SV · **-575 · do · F · 0,5 · p
For nom. diam. 32 mm
TÜV · SV · **-575 · do · F · 0,42 · p
For nom. diam. 40 mm
TÜV · SV · **-575 · do · F · 0,45 · p
For nom. diam. 50 mm
TÜV · SV · **-575 · do · F · 0,45 · p

THIES high-efficiency safety valves meet the requirements of the German Pressure Vessel Safety Regulations and AD Specification A 2 „Safety Valves“.

Construction:
Spring loaded high-efficiency valves, angled, with O-ring seal in the valve head.

Series 360 with closed protective bonnet and closed lift housing.

Series 361 with closed protective bonnet and open lift housing.

Valve head is liftable. Force is transmitted centrally at the valve head. Corrosion-resistant spindle guides ensure reliable and precise response of the valve.

Flange connections:

Spheroidal graphite iron version:

inlet as per DIN 2533 PN 16 = DIN 2545 PN 40
outlet as per DIN 2543 PN 16

Materials:

Valve body	GGG 40
Protective bonnet	GGG 40
Valve seat	GCu Sn 7 Zn Pb/Niro 1.4122
Valve head	Cu Zn 39 Pb 2, Niro 1.4305
O-ring in the valve head	Viton
Spindle, polished	Niro 1.4021
Spring	Niro 1.4310
Bolts	5.6

Models and dimensions

Models and dimensions	Order Code No.
Series 360 of spheroidal graphite iron	PN 40 = PN 16 360 GGG
Series 361 of spheroidal graphite iron	PN 40 = PN 16 361 GGG

Example of order:
1 x 360 GGG 32 — 4 bar:
i. e. 1 THIES high-efficiency safety valve, series 360 made of spheroidal graphite iron GGG 40, nom. diam. 32/50, PN 40 = PN 16, response overpressure 4 bar.

Dimensions and weights in mm and kg					
Nom. diam. DN		25	32	40	50
Nom. diam. DN_1		40	50	65	80
Length	A	100	110	115	120
Length	B	105	115	140	150
Overall height	H	380	390	465	500
Narrowest flow passage cross section	do	25	32	40	50
Weight	kg	12	15	18	20
Clearance	x	50	50	50	50
Clearance	x_1	90	90	90	90

As the cross sectional area of the inlet is designed to be approximately equal to that of the narrowest flow passage, a pressure drop in the feed line may affect the function of the safety valve.
The feed line must be adapted to the maximum permissible pressure drop of 3% and, if necessary, enlarged appropriately.
The safety valves are provided with a drain plug: size R ¼".
The dimensions and weights quoted are non-binding. Subject to design modifications.

Performance table

Water at 20°C (γ = 998 kg/m³)
in kg/h at response overpressure p

The values quoted apply to the response overpressure.
This gives an additional safety margin of 10% compared with the actual outflow. According to the German Safety Valve Code and AD specification A 2, it is not permissible to calculate the outflow at response pressure + 10% extra pressure.

DN	25	32	40	50	DN
bar	Q kg/h	Q kg/h	Q kg/h	Q kg/h	bar
1	**12406**	**17072**	**28581**	**44659**	1
1,5	**15194**	**20909**	**35005**	**54697**	1,5
2	**17547**	**24146**	**40424**	**63165**	2
2,5	**19616**	**26994**	**45192**	**70615**	2,5
3	**21490**	**29572**	**49508**	**77359**	3
3,5	**23210**	**31939**	**53471**	**83551**	3,5
4	**24812**	**34144**	**57162**	**89319**	4
4,5	**26316**	**36214**	**60627**	**94733**	4,5
5	**27742**	**38175**	**63912**	**99865**	5
5,5	**29097**	**40040**	**67033**	**104743**	5,5
6	**30389**	**41818**	**70010**	**109394**	6
6,5	**31630**	**43525**	**72869**	**113861**	6,5
7	**32824**	**45168**	**75619**	**118159**	7
7,5	**33978**	**46757**	**78279**	**122315**	7,5
8	**35090**	**48287**	**80839**	**126316**	8
8,5	**36170**	**49773**	**83327**	**130204**	8,5
9	**37218**	**51216**	**85743**	**133978**	9
9,5	**38239**	**52621**	**88096**	**137654**	9,5
10	**39233**	**53988**	**90385**	**141231**	10

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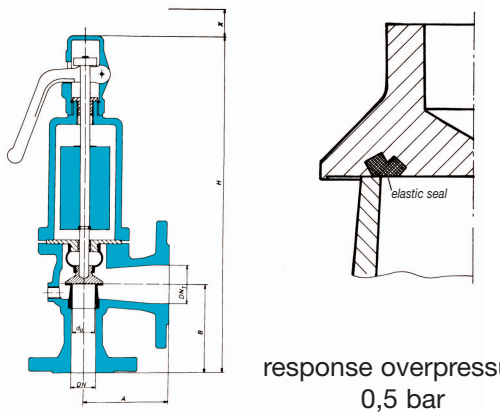
390 + 391

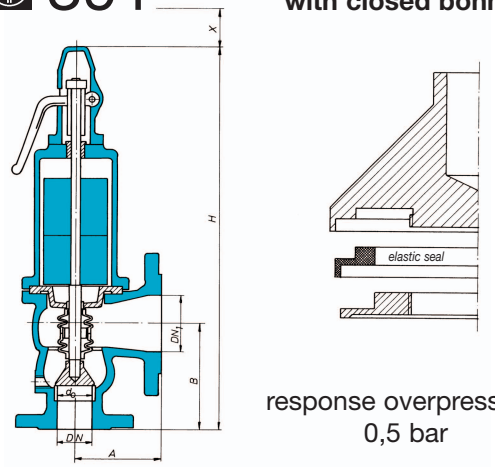
390 with closed bonnet



response overpressure: 0,5 bar

Series 390
nom. diam. 25 to 100

391 with closed bonnet



response overpressure: 0,5 bar

Series 391
nom. diam. 125 to 150

Diaphragm type High-efficiency Safety Valves

Application: These safety valves are for blowing-off saturated steam from pressure generators.
THIES-diaphragm high-efficiency safety valves meet the following German requirements: the AD Specification A 2 for „Safety Valves“, the Technical rules for steam boilers **(TRD)**, the Safety Valve Code acc. to **DIN 4750 and 4751 Pt. 1.**
Response overpressure: 0,5 bar.

Proof marks for these valves, as follows, were issued by the official German Technical Inspection Authority (Vd TÜV Essen):

Series 390 (DN 25 to DN 100)
TÜV · SV · **-368 · do · D · G · 0.5

Series 391 (DN 125 to DN 150)
TÜV · SV · **-263 · do · D · G · 0.5

Constructions:
Weight loaded, diaphragm type, high-efficiency safety valve, angled, with highly elastic seal and metal backing in valve head.

Series 390/391 with closed bonnet
Liftable valve head. Force is transmitted centrally at the valve head via ball. Corrosion-resistant spindle guides ensure reliable and precise response of valve.

Flange connections:
Grey cast iron version: inlet and outlet as per DIN 2533 PN 16
Spheroidal graphite iron version and cast steel version: inlet as per DIN 2545 PN 40, outlet as per DIN 2543 PN 16

Materials:

Valve body	GG 25, GGG 40.3, GS-C 25 or 1.4581
Protective bonnet	GG 25, GGG 40.3, GS-C 25 or 1.4408
Valve seat	Niro 1.4021/1.4301 or 1.4541
Valve head	Niro 1.4305 or 1.4571
Spindle, polished	Niro 1.4021 or 1.4571
Guide bushes	Niro 1.4301, Ms 58 or Rg 7
Rubber diaphragm (max. 140°C)	EPDM
Load weight	GG 20 or 1.4305

Models	Order Code No.
Series 390 of grey cast iron	PN 16 DN 25-100 390 GN
Series 391 of grey cast iron	PN 16 DN 125-150 391 GN
Series 390 of spheroidal graphite iron	PN 40 DN 25-100 390 GGG
Series 390 of cast steel	PN 40 DN 25-100 390 SNC
Series 390 of stainless steel	PN 40 DN 25- 50 390 EN
Series 391 of spheroidal graphite iron	PN 40 DN 125-150 391 GGG
Series 391 of cast steel	PN 40 DN 125-150 391 SNC

Example of Order:
1 x 390 GN 25
i. e. 1 THIES-diaphragm type high-efficiency safety valve, series 390 made of grey cast iron/Niro, nom. diam. 25/40, PN 16 response overpressure 0,5 bar.

Blow-off rates for saturated steam, response overpressure 0.1 to 0.5 bar

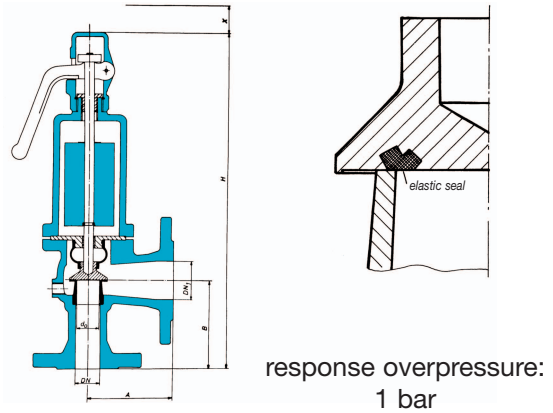
DN		25	32	40	50	65	80	100	125	150
DN_1		40	50	65	80	100	125	150	200	250
kg/h/kw -	0,5 bar	280/173	455/281	710/438	875/540	1590/981	2410/1488	3730/2302	5500/3395	7400/4568
	0,4 bar	240/148	310/191	605/373	760/469	1265/781	1930/1191	2980/1840	4917/3035	6525/4028
	0,3 bar	205/127	270/167	520/321	650/401	1085/670	1650/1019	2550/1574	4200/2593	5565/3435
	0,2 bar	165/102	215/133	420/259	525/324	875/540	1325/ 818	2050/1265	3376/2084	4466/2757
	0,1 bar	115/ 71	150/ 93	295/182	365/225	610/377	930/ 574	1435/ 886	2357/1455	3114/1922

Dimensions and weights in mm and kg

Length	A	100	110	115	120	140	160	180	200	225
Length	B	105	115	140	150	170	195	220	250	285
Overall height	H	480	500	610	625	710	735	860	980	1045
Seat diameter	do	23,5	30,0	37,9	46,5	60,0	74,0	92,0	123	148
Weight	kg	14,5	18	27,5	32	64	80	111	182	250
Clearance	x	90	90	150	150	150	150	200	260	260

As the cross sectional area of the inlet is designed to be approximately equal to that of the narrowest flow passage, a pressure drop in the feed line may affect the function of the safety valve. The feed line must be adapted to the maximum permissible pressure drop of 3% and, if necessary, enlarged appropriately.
The safety valves are provided with a drain plug of size R ¼" up to nominal diameter 50 mm and R ⅜" from nominal diameter 65 mm upwards.
The dimensions and weights quoted are non-binding. Subject to design modifications.

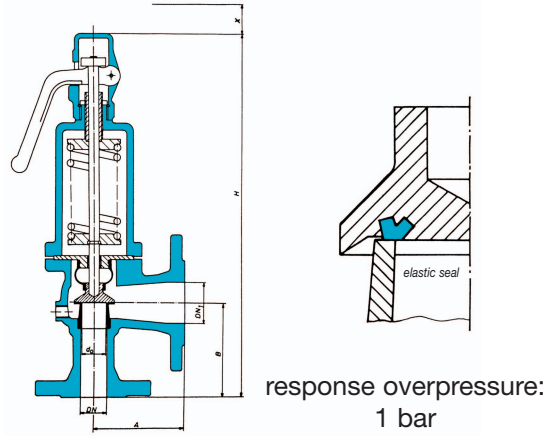
392 with closed bonnet



response overpressure: 1 bar

Series 392
nom. diam. 25 to 50

393 with closed bonnet



response overpressure: 1 bar

Series 393
nom. diam. 25 to 100
nom. diam. 125 to 150 not shown

Diaphragm type High-efficiency Safety Valves

Application: These safety valves are for blowing-off saturated steam from pressure generators.
THIES-diaphragm high-efficiency safety valves meet the following German requirements: the AD Specification A 2 for „Safety Valves“, the Technical rules for steam boilers **(TRD 721)**, the Safety Valves Code according to **DIN 4750 and 4751 Pt. 1. Response overpressure: 1 bar.**

Proof marks as follows have been issued by the official German Technical Inspection Authority (Vd TÜV Essen):

Series 392 (DN 25 to DN 50)

TÜV · SV · **-368 · do · D · G · 1

Weight loaded, diaphragm type, high-efficiency safety valve, angled, with highly elastic seal and metal backing in valve head.

Series 393

TÜV·SV·**-368·do·D·G·1 (DN 25 to DN 100)
TÜV·SV·**-775·do·D·G·1 (DN 125 to DN 150)

Spring loaded, diaphragm type, high-efficiency safety valve, angled, with highly elastic seal and metal backing in valve head.

Series 392/393 with closed bonnet

Valve head is liftable. Force is transmitted centrally at valve head via a ball. Corrosion-resistant spindle guides ensure reliable and precise response of the valve.

Flange connection:
Grey cast iron version: inlet and outlet as per DIN 2533 PN 16
Spheroidal graphite iron version and cast steel version: inlet as per DIN 2545 PN 40, outlet as per DIN 2543 PN 16

Materials:

Valve body	GG 25, GGG 40.3, GS-C 25 or 1.4581
Protective bonnet	GG 25, GGG 40.3, GS-C 25 or 1.4408
Valve seat	Niro 1.4021/1.4301 or 1.4541
Valve head	Niro 1.4305 or 1.4571
Spindle, polished	Niro 1.4021 or 1.4571
Guide bushes	Niro 1.4301, Ms 58 or Rg 7
Load weight (392)	Pb
Spring (393)	Niro 1.4310, DIN 17223 C or 50 CrV4
Rubber diaphragm (max. 140°C)	EPDM

Models	Order Code No.		
Series 392 of GG 25	PN 16 DN 25- 50	392	GN
Series 393 of GG 25	PN 16 DN 25-150	393	GN
Series 392 of GGG 40.3	PN 40 DN 25- 50	392	GGG
Series 393 of GGG 40.3	PN 40 DN 25-150	393	GGG
Series 392 of GS-C 25	PN 40 DN 25- 50	392	SNC
Series 392 of 1.4581	PN 40 DN 25- 50	392	EN
Series 393 of GS-C 25	PN 40 DN 25-150	393	SNC

Example of Order:
1 x 393 GN 25
i. e. 1 THIES-diaphragm type high-efficiency safety valve, series 393 made of grey cast iron/Niro, nom. diam. 25/40, PN 16 response overpressure 1 bar.

Blow off rates for saturated steam, response overpressure 1 bar

DN	25	32	40	50	65	80	100	125	150
DN_1	40	50	65	80	100	125	150	200	250
kg/h (Series 392)	400	645	1030	1330	—	—	—	—	—
kW	247	398	636	821	—	—	—	—	—
kg/h (Series 393)	290	465	750	1130	1880	2850	4410	6970	8600
kW	179	287	463	698	1161	1759	2722	4276	5278

Dimensions and weights in mm and kg

Length A	100	110	115	120	140	160	180	200	225
Length B	105	115	140	150	170	195	220	250	285
Overall height H (Series 392)	445	535	585	695	—	—	—	—	—
Overall height H (Series 393)	445	465	580	600	710	735	860	980	1045
Seat diameter do	23,5	30,0	37,9	46,5	60,0	74,0	92,0	123	148
Weight kg (Series 392)	17	23	35	44	—	—	—	—	—
Weight kg (Series 393)	12	15	24	26	41	45	72	100	133
Clearance x	90	90	150	150	150	150	200	200	210

The dimensions and weights quoted are non-binding. Subject to design modifications. Installation instructions as per series 390/391.

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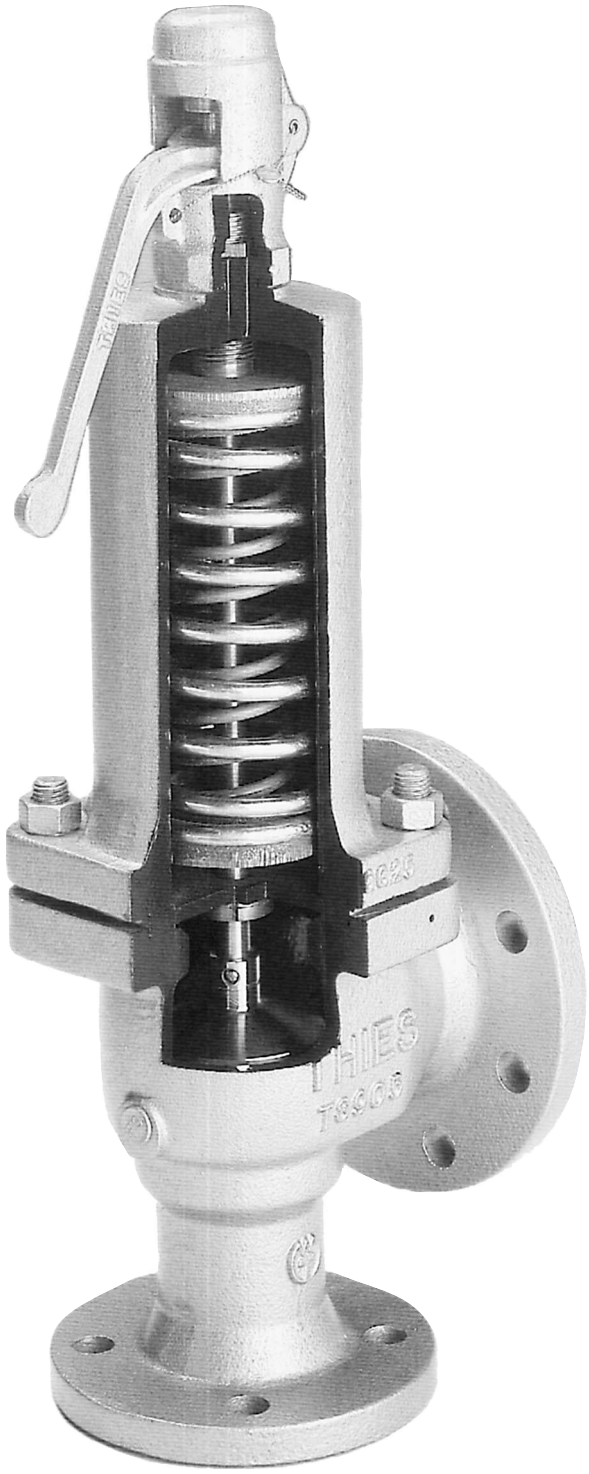
Maximum blow-off rate due to low flow losses



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