

INDUSTRIAL VALVES

for Nuclear Power Plants

History and Present of LDM

1909 - birth of the tradition of control valves manufacture in Česká Třebová



1909 - Josef Jindra with his employees

History and Present of LDM



Advertisement from 1920 's



1920 's - Jindra & Šrefl

1948 - nationalization

1975 - part of the Sigma concern

1990 - Sigma concern split and privatized

History and Present of LDM



Origin of company in leased premises



Production and administrative facilities
used from 1993 till 2001

1991 - foundation of LDM

1993 - start of operation in leased premises

1996 - part of former Sigma bought

2001 - original LDM facility sold

2002 - LDM moved into one location



Production and administrative facilities of former Armaturka
(Sigma), headquarters of LDM since 2002



History and Present of LDM - Certificates

1997 - Initial certification of the Quality Management System according to ISO 9001, currently being implemented integrated management system according to ISO 9001, ISO 14001 and ISO 45001

2023 - Recertification of product approvals and welding processes

2024 - Recertification of a qualified supplier for a nuclear plant energy companies ČEZ and Slovenské elektrárne



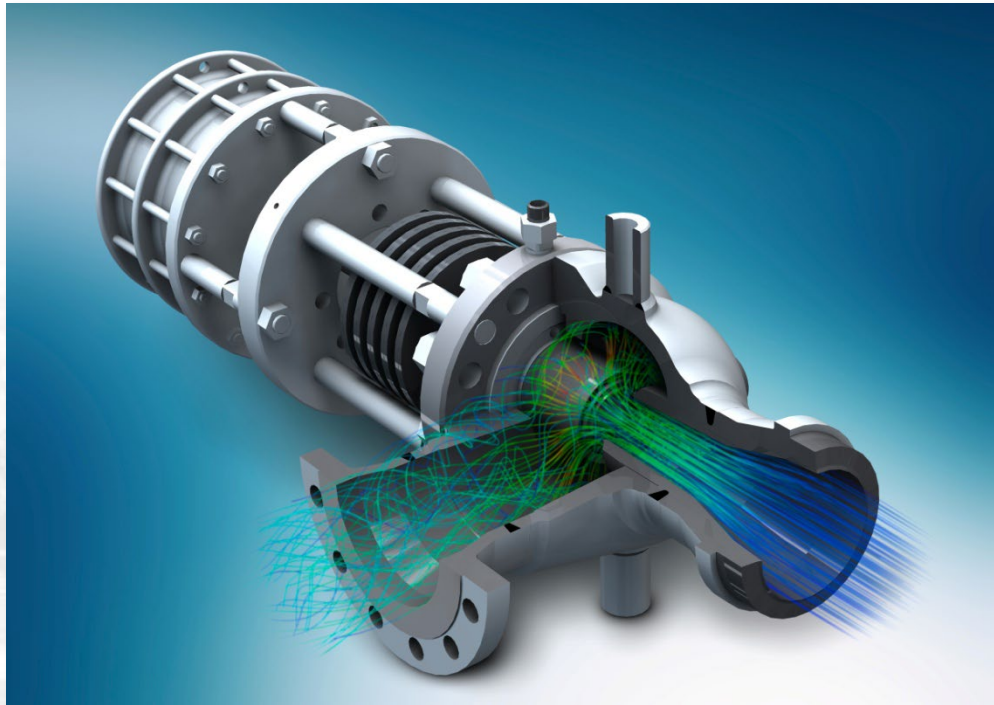
History and Present of LDM

Subsidiaries and technical offices



- 1994 - LDM Bratislava (Slovakia)**
- 1997 - LDM Polska (Poland)**
- 1997 - LDM servis (warranty and post-warranty maintenance and repair)**
- 1998 - LDM Bulgaria (Bulgaria)**
- 1998 - technical offices in Prague and Ústí n. Labem**
- 2005 - OOO "LDM Promarmatura" (Russia)**
- 2008 - TOO "LDM" (Kazakhstan)**

R&D and production



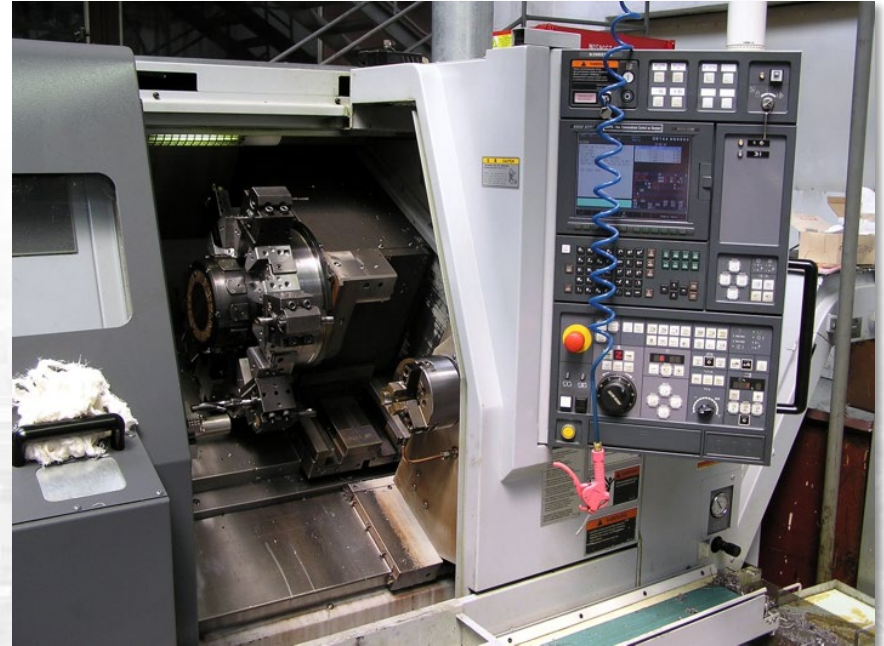
Valve design with support of Siemens NX , ANSYS and Fluent. „Ventily LDM“ software is custom-built for our product portfolio and is available for calculation and sizing of LDM valves.

R&D and production

Quality check of purchased castings

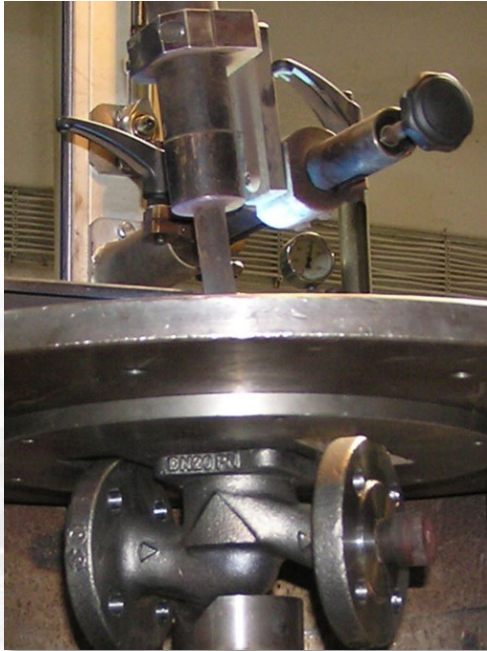


R&D and production



CNC machining

R&D and production



Robot welding of valve seats



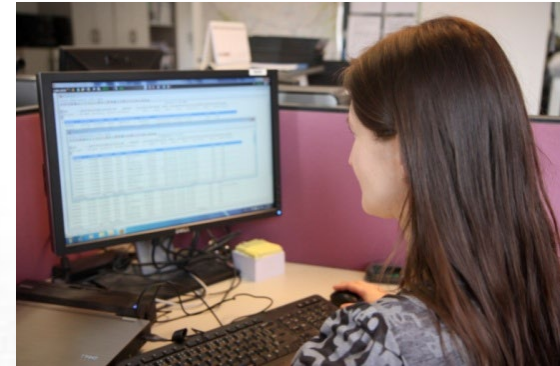
Laser Cutting of V-ported plugs



Heat treatment

R&D and production

Production management support with APS



Just-in-time valve assembly

100% pressure test of assembled valves



R&D and production



Surface finish coating

- galvanic zinc coating
- chemical nickel-coating
- galvanic tin coating
- cyanide copper coating
- galvanic silver coating



Testing of flow characteristics and Kv values



Lifetime testing

Overview of the product portfolio for nuclear generation

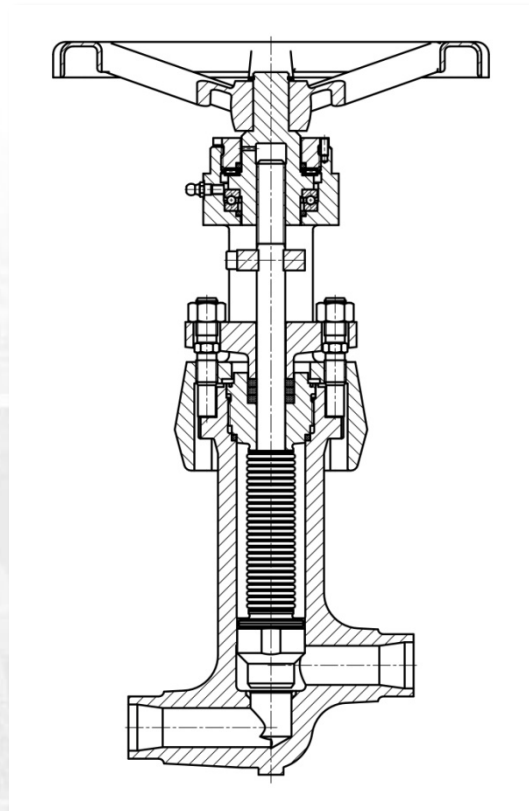
Product segment 03



Shutt-off valve for nuclear generation A10, A11, A13



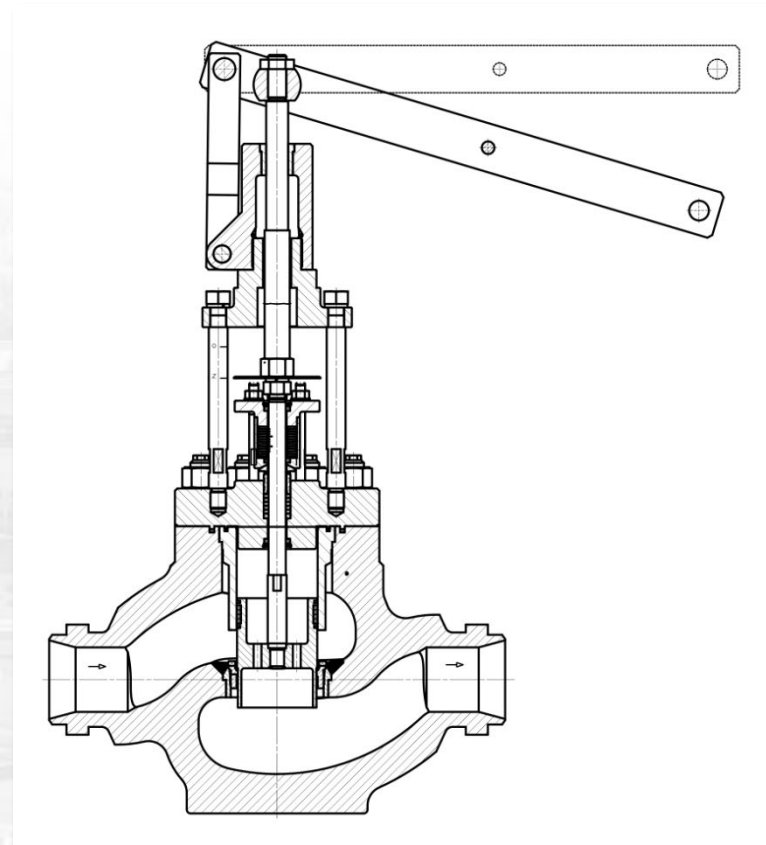
- A10, A11, A13 - bellows seal shut-off valve
- DN 10 - DN 150
- MAWP 2.5 - 20.0 MPa
- seismic resistant according to OTT-87/91
- flanged and welding connection
- application - nuclear power plants VVER and RBMK
- designation: primary circuit



Control valve for nuclear generation RV 701 NB with lever actuator



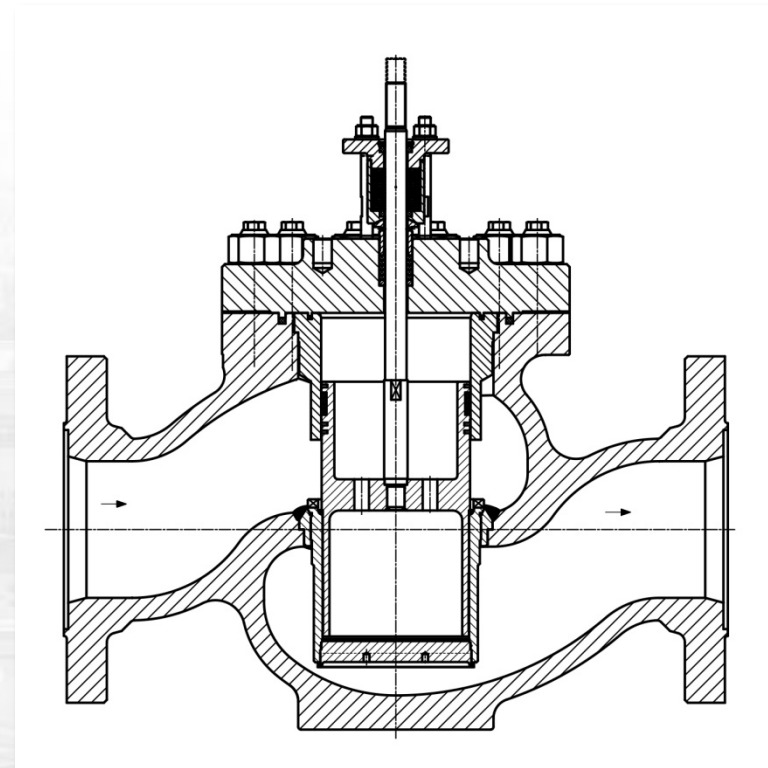
- DN 25 - DN 250
- MAWP 4.0 - 12.0 MPa
- flanged and welding connection
- medium: water
- designation: secondary circuit



Control valve for nuclear generation RV 701 NB with linear actuator



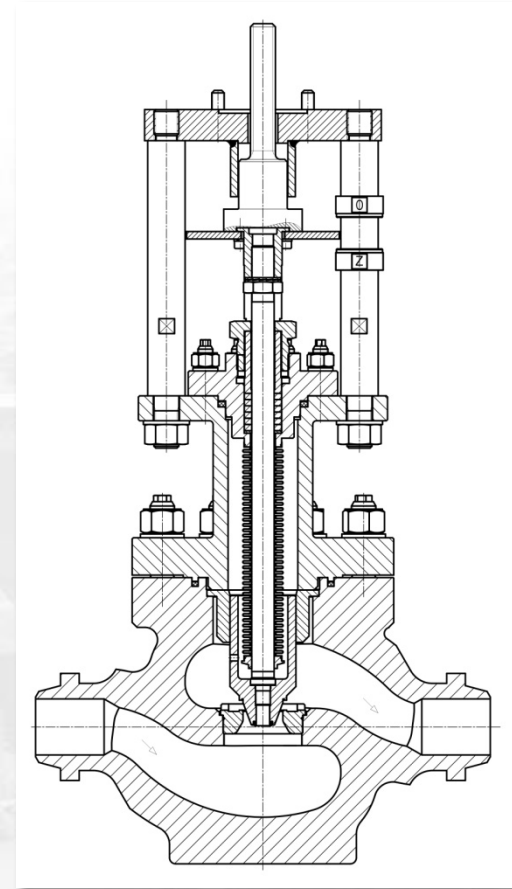
- DN 25 - DN 250
- MAWP 4.0 - 12.0 MPa
- flanged and welding connection
- medium: water
- designation: secondary circuit



Control valve for nuclear generation RV 702 NA



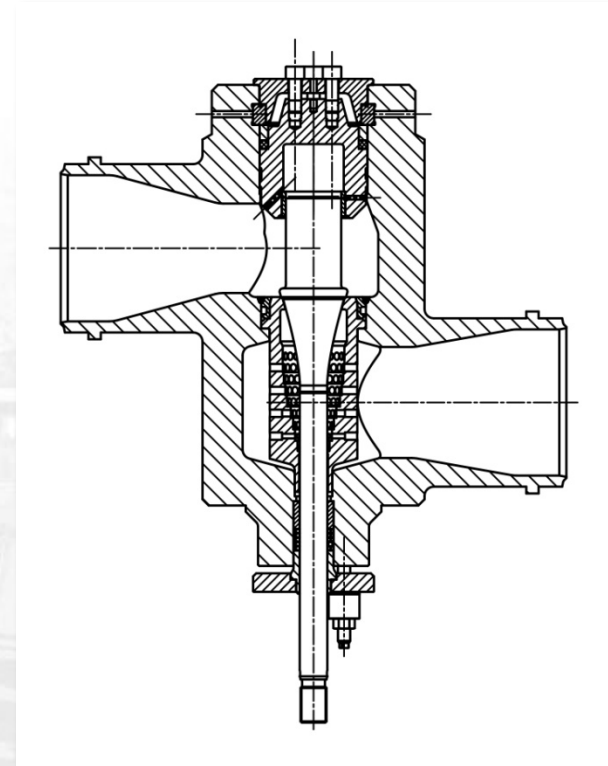
- RV 702 NA - bellows seal
- DN 25 - DN 250
- MAWP 4.0 - 12.0 MPa
- flanged and welding connection
- medium: condensate
- designation: secondary circuit



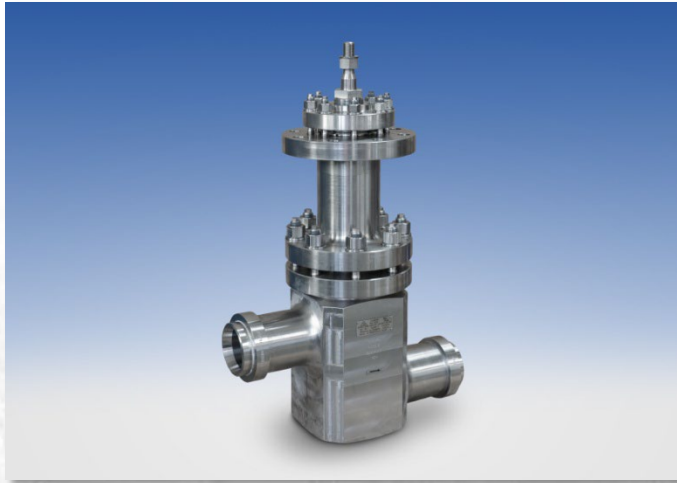
Control valve for nuclear generation RV 821



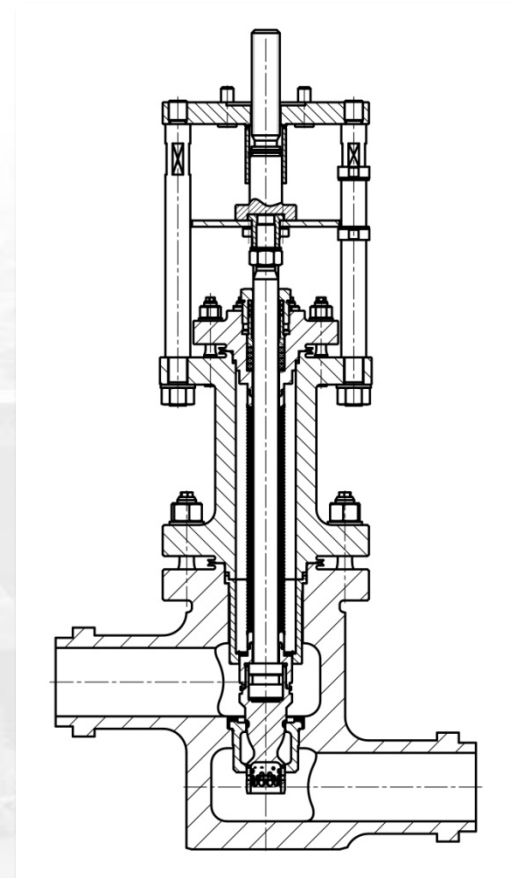
- Main feedwater valve for steam generator
- DN 250
- MAWP 12,0 Mpa
- MAWT 250°C
- material: forged steel
- welding connection, medium: water
- designation: secondary circuit, feeding water



Control valve for nuclear generation RV 832



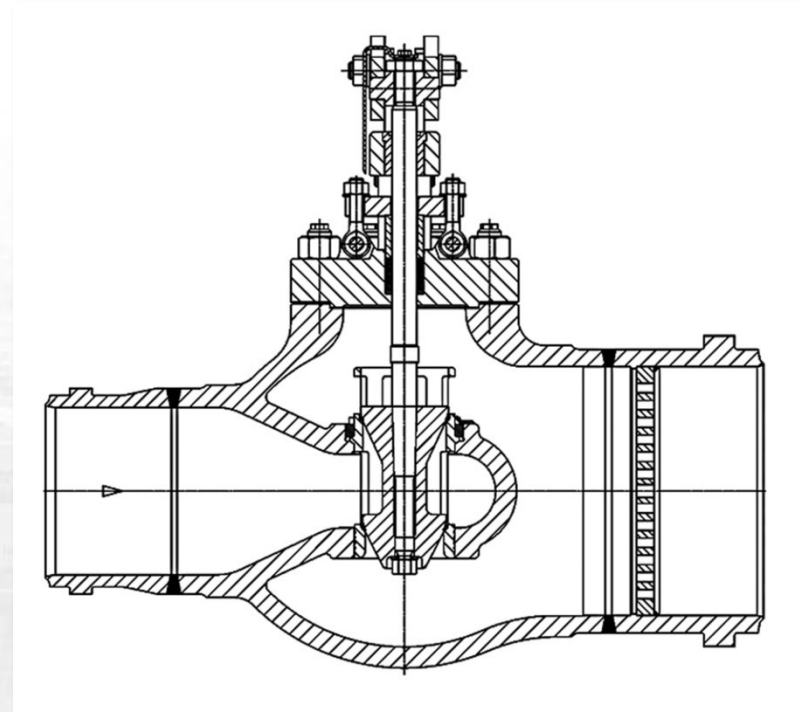
- DN 50 - 150
- MAWP 14,0 Mpa
- material: stainless steel
- welding connection
- medium: water, steam
- designation: primary and secondary circuit



Control valve for nuclear generation G 46 NB



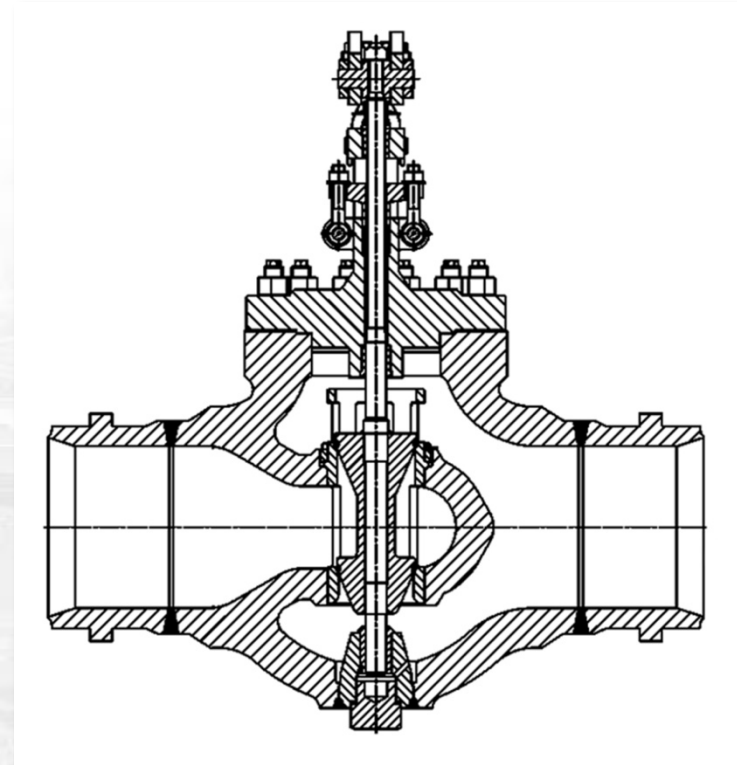
- DN 65/125 - DN 300/600
- MAWP 4.0 - 12.0 MPa
- welding connection
- medium: steam
- designation: secondary circuit



Control valve for nuclear generation G 47 NB



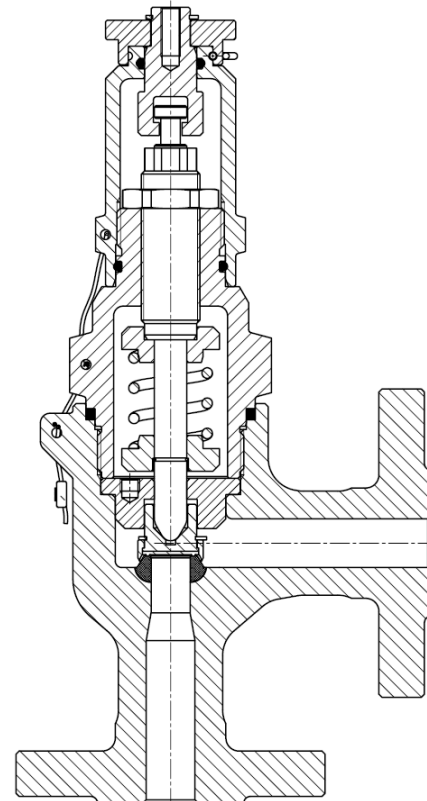
- DN 125 - DN 300
- MAWP 4.0 - 12.0 MPa
- welding connection
- medium: water, condensate
- designation: secondary circuit



Safety valve for nuclear generation PV 1108



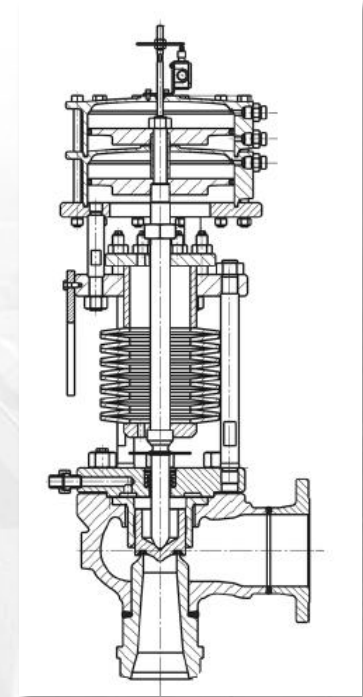
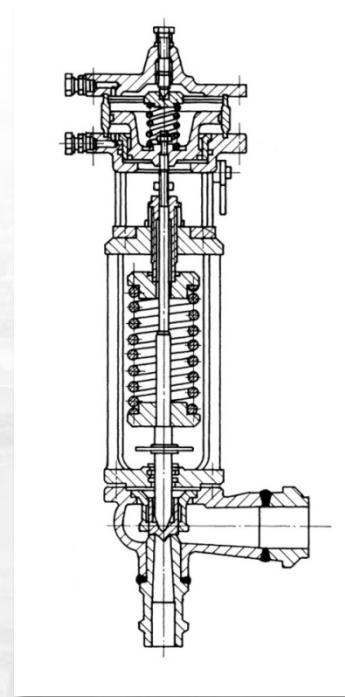
- **DN 15/15, MAWP 1.6 MPa**
- **stainless steel construction**
- **max. temperature 150°C**
- **flanged connection**
- **medium: liquid or gaseous**
- **also suitable for non-explosive environments**



Safety valve in modification for for nuclear generation SiZ 1508 and PV 1509



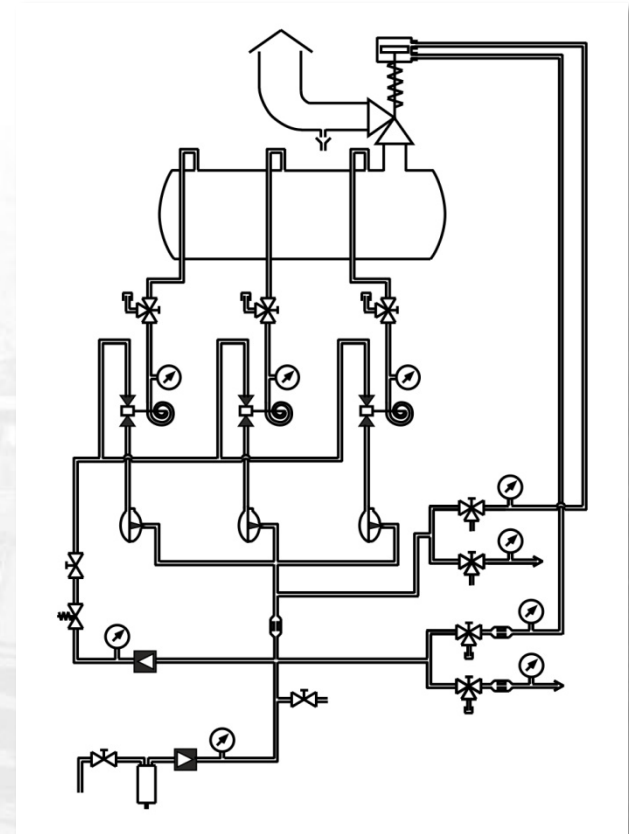
- safety valves SiZ 1508 and PV 1509
- with additional CSPRS loading
- operated by appropriate control unit
- DN 25/40 to 350/600
- designation: secondary circuit
- protection of steam generators against excessive overpressure
- with the appropriate control unit enables function of emergency cooling (HD)



Control unit in modification for nuclear generation RP 5330



- RP 5330 control unit with custom modification required by nuclear standards
- for safety valves with additional loading SiZ and PV
- additional safety functions available



Schematic diagram of control unit

Reference list - Nuclear Power Plants

valve	valve type	circuit / position	DN	MAWP [MPa]	power plant	year
A 10	bellows seal shutt-off, butt-welded	primary	10	4,0 - 20,0	ETE, EDU, EMO, PAKS	2009 - 2023
G 40	control valve, flanged	secondary	100	4,0	EDU	2024
G 45	control valve, flanged	secondary, turbine	300	1,6	ETE	2024
G 45	control valve, flanged	secondary	400	4,0	EDU	2021 - 2024
G 46	control valve, flanged	secondary, steam generator	200/300	10,0	ETE	2014
G 46	control valve, butt-welded	secondary	200/300	8,6	EDU	2014 - 2022
G 47	control valve, butt-welded	secondary	300	8,6	EDU	2022
PV 1108	safety valve, flanged	secondary	15	---	EDU	2023
PV 1509	safety valve with CSPRS control	secondary	200/350	---	EMO	2010
RP 5320	CSPRS control unit	secondary	---	---	PAKS	2013 - 2018
RP 5330	CSPRS control unit	secondary	---	---	EBO	2021
RP 5330 HD	CSPRS control unit	secondary, steam generator	---	---	EDU	2013
RP 5340 N2	control unit	secondary	---	---	EMO	2010
RV 210	control valve, flanged	secondary	65	1,6	ETE	2016
RV 210	control valve, flanged	secondary	15	1,6	ETE	2024
RV 220	control valve, flanged	secondary	32	1,6	ETE	2023
RV 222	control valve, flanged	secondary, high pressure heater	200	4,0	ETE	2013
RV 222	control valve, flanged	secondary, low pressure heater	200	1,6	EDU	2013
RV 230 SPN1	control valve, flanged	secondary	100	1,6	EDU	2022
RV 230 SP	control valve, flanged	secondary	150	1,6	EDU	2015 - 2019
RV 230 N1	bellows seal control valve, flanged	secondary	80	4,0	EDU	2018 - 2022
RV 232	control valve, flanged	secondary, steam separator	100	4,0	EDU	2014

Reference list - Nuclear Power Plants

valve	valve type	circuit / position	DN	MAWP [MPa]	power plant	year
RV 232 N1	control valve, flanged	secondary	200	1,6	EDU	2022
RV 320	control valve, butt-welded	secondary	100	4,0	EDU	2013 - 2021
RV 501 NA1	bellows seal control, butt-welded	secondary, blowdown of SG	50	8,6	EMO	1998
RV 701 NA	control valve, flanged	secondary	150	8,6	ETE	2019 - 2022
RV 701 PKNA	control valve, butt-welded	secondary	100	11,0	EDU	2013 - 2018
RV 702 NA	bellows seal control, butt-welded	secondary, blowdown of SG	50	8,6	EDU	2018
RV 821 NB	control valve, butt-welded	secondary	250	12,0	EDU	2024
RV 832 NA	bellows seal control, butt-welded	primary, fluid replenishment	100	14,0	EDU	2024
SiZ 1508	safety valve with CSPRS control	secondary, steam generator	300/500	---	PAKS	2019
SiZ 1508	safety valve with CSPRS control	secondary, steam generator	150/200	---	EDU	2019 - 2022
SiZ 1508	safety valve with CSPRS control	secondary, steam generator	200/350	---	ETE	2022
SiZ 1508	safety valve with CSPRS control	secondary, steam generator	250/400	---	ETE	2022
SiZ 1508	safety valve with CSPRS control	secondary, steam separator	300/500	---	ETE	2022
SiZ 1508	safety valve with CSPRS control	secondary, steam generator	350/600	---	ETE	2022
SiZ 1508 HD	safety valve with CSPRS control	sec., SG - emerg. cooling control	150/200	---	EDU	2013
UV 226	shutt-off valve, flanged	secondary	15 - 150	1,6 a 4,0	EDU, ETE	continuously
UV 526	shutt-off, flanged or butt-welded	secondary	10 - 65	up to 16,0	EDU, ETE	continuously
UV 526 NA	shutt-off, flanged or butt-welded	secondary	20	11,0	ETE	2014 - 2023
UV 926	high pressure shutt-off, butt-welded	secondary	10 - 65	up to 25,0	EDU, ETE	continuously

EDU - Dukovany NPP, **ETE** - Temelín NPP, **EMO** - Mochovce NPP, **EBO** - Jaslovské Bohunice NPP, **PAKS** - Paks NPP (Hungary)

Valves located on Kozloduj NPP (Bulgaria) are not listed here.

Overview of the product portfolio up to PN 40

Product segment 01



- COMAR line
- BEE line
- RV 113
- 200 line
- UV x16
- UV 200
- Check valves

Overview of the product portfolio up to PN 630

Product segment 02



- 300 line
- 500 line
- 700 line
- 800 line
- 900 line
- Steam desuperheating
- Series G
- Safety valves
- RK 601
- SU 59

