VALVES FOR NUCLEAR POWER
The company ARMATUREY Group a.s. is a leading Czech manufacturer and distributor of industrial valves, fittings and control systems for valves. The annual production is of more than 100,000 valves and 500,000 metallurgical stock items.

The company was established January 1, 2000. The tradition of our young and dynamically developing company is closely linked with the more than fifty-years' history of valve production in the Hlučín Region.

Our products have been supplied to local and foreign customers for the following industries:

- power engineering, nuclear power
- chemical and petrochemical
- gas supply
- metallurgical industry
- water supply
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Valves for nuclear power are supplied according to specifications, which are in accordance with requirements of these regulations:

**Russia:**
- supplies according to NP-068-05

**Slovakia:**

**Czech Republic:**
- supplies according to notice No. 132/2008 Coll., 309/2005 Coll., State Office for Nuclear Safety

Valves designed for the third and higher safety levels are, depending on their location within the power plant, subjected to design and check calculations, seismic resistance calculations, lifetime tests at maximum service parameters, experimental tests for seismic resistance, and other tests according to specific design requirements.

Dimensions and weights of valves, materials used, scope of testing, and documentation to be delivered with the valves are defined in the Technical Conditions applicable to each particular type of valves intended for nuclear power plants.

We can deliver any necessary spare parts for all valves of our production. Buyers can make use of our services provided in the fields of consultancy and training of personnel, we can offer installation supervision under contract, and it goes without saying that guarantee and after-guarantee servicing is provided on a high level by us.

Our comprehensive services focused on satisfaction of our customers are complemented by delivery guarantees that extend the guarantee period for our products in case of their proper storage and use.
Application
The gate valve is designed to open or close the service fluid flow fully. The gate valve is not used for flow-control or throttling purposes. It is used in primary, secondary and auxiliary circuits of the nuclear power plants inside or outside hermetically sealed zones.

Working medium
- radioactive water
- steam
- gas
- other working media

Maximum working temperature
- $T_{\text{max}}$ 350 °C

Technical description
The gate valves are with rising stem and flexible wedge. The body and the bonnet are connected mutually by flanged joint–bolted design. The seat rings are welded into the body. The sealing surfaces of the seats and of the wedge are overlay by hard faced but without cobalt overlay alloy. The packing is made of graphite rings.

Production range
- DN 50-600
- MAWP up to 25,0Mpa

Body material
- forged carbon steel 11 416.1
- stainless forged steel 08X18H10T (1.4541)

Operation
- manual (hand wheel)
- actuator located out of the valve
- electric actuator (gearbox)

Testing
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to GOST R 54808-2011 or EN 12266-1 class B. (GOST 9544-2005). The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

Connection to the piping
- welded ends
**Application**
The gate valve is designed to open or close the service fluid flow fully. The gate valve is not used for flow-control or throttling purposes. It is used in primary, secondary and auxiliary circuits of the nuclear power plants outside hermetically sealed zones.

**Working medium**
- water
- steam
- air
- gas
- other fluids

**Maximum working temperature**
- Tmax 250 °C

**Technical description**
The gate valves designed in cast version are with rising stem and flexible wedge. The gate valve is made of cast semi-finished products. The body and the bonnet are connected mutually by flanged joint-bolted design. The seat rings are welded into the body. The sealing surfaces of the seats and of the wedge are overlay by hard faced but without cobalt overlay alloy. The packing is made of graphite rings. The gate valves designed in fully welded version are flat with rising stem and solid wedge. The body and the bonnet are fabricated and connected together by flanged joint.

**Production range**
cast version - DN 50-600
- MAWP up to 4,0Mpa
fully welded version - DN 400-1200
- MAWP up to 1,6Mpa

**Body material**
cast version:
- stainless steel 08X18H10T
- carbon steel GS-C25N
fully welded version:
- forged carbon steel 11 416.1, 1.0425
- stainless forged steel 08X18H10T (1.4541)

**Operation**
- manual (hand wheel)
- actuator located out of the valve
- electric actuator (gearbox)

**Testing**
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to GOST R 54808-2011 or EN 12266-1 class B for cast version, class D for fully welded version, (GOST 9544-2005). The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

**Connection to the piping**
- flanged ends
- flanged ends with counter flanges
- welded ends
Application
The gate valve is designed to open or close the service fluid flow fully. It is used in primary, secondary and auxiliary circuits of the nuclear power plants inside or outside hermetically sealed zones.

Working medium
- water
- air
- gas
- sea water
- other working media

Maximum working temperature
- Tmax 200 °C

Technical description
The ball valve is designed with floating ball. All elements are made of forged materials.

Production range
- DN 10-200
- MAWP up to 4,0Mpa

Body material
- forged carbon steel 11 416.1 or 12020.1
- stainless forged steel 08X18H10T (1.4541)
- duplex stainless steel SAF 2507 (sea water)

Operation
- manual (lever)
- electric actuator

Testing
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to GOST R 54808-2011 or EN 12266-1 class A, (GOST 9544-2005). The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

Connection to the piping
- welded ends
- flanged ends
- wafer type
Application
The self-acting valve protects backward fluid flow. It is used in primary, secondary and auxiliary circuits of the nuclear power plant inside and outside hermetically sealed zones.

Working medium
- radioactive water
- steam
- gas
- other working media

Maximum working temperature
- $T_{max} \leq 250 \, ^\circ C$

Technical description
The swing check valve is fabricated design. The weight of disc is balanced by counterweight.

Production range
- DN 50-600
- MAWP up to 4.0Mpa

Body material
- forged carbon steel 11 416.1 or 1.0425
- stainless forged steel 08X18H10T (1.4541)
- duplex stainless steel SAF 2507 (sea water)

Operation
- self-acting operation

Testing
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to NP 068-05. The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

Connection to the piping
- wafer type
- flanged ends
- welded ends
- flanged ends with counter flanges
- wafer type with welded ends
SWING CHECK VALVES

Application
The self-acting valve protects backward fluid flow. It is used in primary, secondary and auxiliary circuits of the nuclear power plant inside and outside hermetically sealed zones.

Working medium
- radioactive water
- steam
- gas
- other working media

Maximum working temperature
- Tmax 350 °C

Technical description
The swing check valve is fabricated design. The body and the bonnet are connected together by flanged joint.

Production range
- DN 50-500
- MAWP up to 25,00MPa

Body material
- forged carbon steel 11 416.1
- stainless forged steel 08X18H10T (1.4541)

Operation
- self-acting operation

Testing
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to NP 068-05. The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

Connection to the piping
- welded ends
**Application**
The butterfly check valve is designed to open or close the service fluid flow fully. It is used in primary and auxiliary circuits of the nuclear power plant outside hermetically sealed zones.

**Working medium**
- water
- air
- gas
- sea water
- other working media

**Maximum working temperature**
- Tmax 200 °C

**Technical description**
The design of butterfly valve is single or double eccentric. The body and the disc are fabricated. The tightness on the disc is ensured by metal x rubber seal or metal x PTFE seal.

**Production range**
- DN 150-1200
- MAWP up to 2,5Mpa

**Body material**
- forged carbon steel 11 416.1 or 1.0425
- stainless forged steel 08X18H1OT (1.4541)
- duplex stainless steel SAF 2507 (sea water)

**Operation**
- manual (hand wheel)
- electric actuator

**Testing**
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to GOST R 54808-2011 or EN 12266-1 class B and C, (GOST 9544-2005). The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

**Connection to the piping**
- wafer type
- wafer type with counter flanges
- flanged ends
- welded ends
- flanged ends with counter flanges
- wafer type with welded ends
Application
The butterfly valve is designed to open or close the ventilation system of power plant. It is used in primary, secondary and auxiliary circuits of the nuclear power plant inside or outside hermetically zones.

Working medium
- radioactive air
- mixture air and steam

Maximum working temperature
- Tmax 150 °C

Technical description
The butterfly valve is single eccentric. The body and the disc are fabricated. The special design of operating shaft packing allows usage of the butterfly valve for air venting in radioactivity environment.

Production range
- DN 150-1600
- MAWP up to 0,6Mpa

Body material
- forged carbon steel 11 416.1 or 1.0425
- stainless forged steel 08X18H10T (1.4541)

Operation
- manual (hand wheel)
- electric actuator

Testing
Each valve is tested according to NP 068-05 let us say VTP-87. Allowable leakage is according to GOST R 54808-2011 or EN 12266-1 class A, (GOST 9544-2005). The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

Connection to the piping
- flanged ends
Application
Control check valve is valve to regulate flow, which can be bi-directional. Control check valve is not shut-off valves. It is used in secondary and auxiliary circuits of the nuclear power plant outside hermetically sealed zones.

Working medium
- water
- air
- gas
- sea water
- other working media

Maximum working temperature
- Tmax 200 °C

Technical description
The control check valve is centric. The body and the disc are fabricated. The regulation characteristic is stated in specifications.

Production range
- DN 150-1200
- MAWP up to 2,5Mpa

Body material
- forged carbon steel 11 416.1 or 1.0425
- stainless forged steel 08X18H10T (1.4541)
- duplex stainless steel SAF 2507 (sea water)

Operation
- manual (hand wheel)
- electric actuator

Testing
Each valve is tested according to NP 068-05 let us say VTP-87. The calculation proposal, control calculation and calculation for seismic endurance are provided per each valve. The results of seismic endurance are experimentally verified on particular sizes.

Connection to the piping
- wafer type
- wafer type with counter flanges
- flanged ends
- welded ends
- flanged ends with counter flanges
- wafer type with welded ends
DEVELOPMENT AND DESIGN

Preview of flow calculation through valve AC09 (head loss, Kvs, flow characteristic, force effects of flow, cavitation, …)

Preview of strength calculation of gate valve bonnet AS00 (FEA – static strength, temperature stress, flanged tightness, fatigue, …)

Preview of seismic endurance calculation of gate valve AS00 with el. actuator

CERTIFICATION

QMS Certificate acc. to ČSN EN ISO 9001:2008
OIT Certificates
BS OHSAS 18001:2007
Certificates of conformity for export of valves for nuclear energy

QMS Certificate in welding acc. to EN ISO 3834-2
EMS Certificate acc. to ČSN EN ISO 14001:2004
ASME N Certificate
ASME NPT Certificate
VALVES FOR NUCLEAR POWER

TYPE NUMBER COMPOSITION

Type number uniquely describes the valve.
Type number is fixed by the manufacturer (supplier).
Type number serves to customers in subsequent communication with the manufacturer (supplier) valve.

Supplementary marking
Valve size
Max. working temperature
Nominal pressure

AS00 123-4250/350–100d

Body material
Operation
Connection
Flow direction
Valve type

Valve type
AS00 - gate valve for nuclear power (high-pressure, forged body)
AS33 - gate valve for nuclear power (middle-pressure, cast body)
AK91 - ball valve with floating ball for nuclear power
AC09 - swing check valve for nuclear power
AL32 - butterfly check valve for nuclear power
AL32G - butterfly valve for nuclear power
AL35 - control check valve for nuclear power

Flow direction
1 - direct flow
3 - three-way L

Connection
1 - flanged ends
2 - welded ends
7 - wafer type
8 - combined

Operation
1 - handwheel, lever
2 - manual gear box
3 - electric actuator
5 - shaft
6 - other
7 - self-acting

Body material
0 - stainless steel
4 - carbon wrought steel, carbon forged steel
5 - carbon cast steel

Supplementary marking
d - with position indicator

Specification for order: nominal pressure (PN), valve size (DN), real working pressure in MPa, type and temperature working medium, connecting dimensions and standards for ends, required operation.

Data mentioned in the catalogue are not subject to changes, for an order and delivery of the goods are obligatory the data mentioned in respective specifications.
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