



Engineering Flow Solutions

# Pumps and Solutions for Nuclear Power Plants



Nuclear Power





## The HMS GROUP is the leading manufacturer of pumps, compressors and modular equipment, provider of engineering solutions in Russia and the Eastern Europe



We offer modern and reliable pumps, compressors modular and process equipment & systems for nuclear and thermal power, oil & gas, steel & mining, water & utilities.

- 18 manufacturing plants and engineering companies located in Russia, Ukraine, Belarus and Germany
- Own R&D and design engineering centers
- Over 15 000 employees
- Service centers and representative offices in Russia, CIS countries and internationally

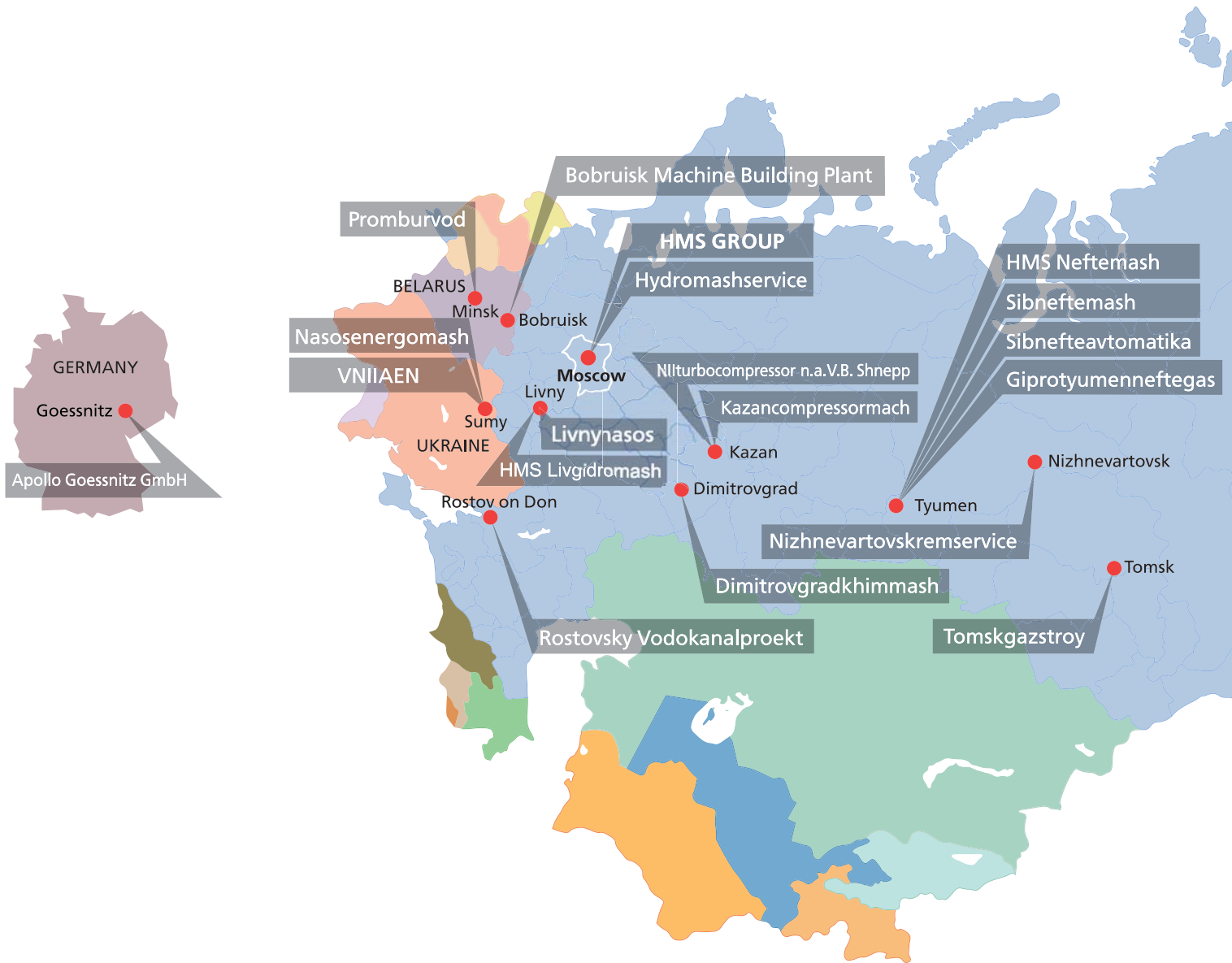
### **HMS Group offers process pumps based solutions for nuclear power plants:**

- Pump engineering and manufacturing for normal operating systems and safety systems, including new models and customized modifications
- Own testing facilities with up to 14 MW power
- Integrated supply of pumps and power equipment
- Installation supervision and commissioning
- Warranty and service maintenance
- Comprehensive audit, overhaul and retrofit

### **Major clients and partners in nuclear power:**

Atomenergoproekt, NIAEP, Atomstroyexport, SpbAEP, Rosenergoatom, Concern Energoatom, China National Nuclear Corporation, Nuclear Power Corporation of India and other companies – NPP-operators in Slovakia, Turkey, Belarus, Armenia

## The HMS Group on the Map



Our Quality Management System complies with ISO 9001:2008

## COMPANIES OF THE HMS GROUP SPECIALIZED IN PRODUCTS & SERVICES FOR NUCLEAR POWER PLANTS



## HMS Group for Nuclear Power Plants



### Pumps and systems

- Tailored design
- Manufacturing of standard and customized pumps
- Full load string tests with simulation of operating parameters
- Integrated supply

### Pump types for NPP

- Feed water pumps
- Condensate pumps
- Pumps for safety systems
- Pumps for oil supply systems
- Pumps for auxiliary systems

### Services

- Installation supervision and commissioning
- Warranty and service maintenance
- Audit and retrofit
- Product training for operating personnel

## Development, Manufacturing, Testing and Service



### Development

Strategic directions of the HMS Group are: new products development, extension of the product range in traditional segments and entering new perspective markets.

Our R&D infrastructure is represented by centrally managed 6 R&D centers in Russia and CIS countries where state-of-the-art engineering softwares including 3D (SolidWorks, ANSYS CFX) and methods are used.

We offer complete package supplies of pumps and equipment, including installation, commissioning and site maintenance.

Qualification of our engineers allows us to develop any kind of pumps for nuclear power plants.

### Testing

The HMS Group affiliated manufacturing companies have unique testing facilities to get head, power, cavitation and vibration parameters in the flow-rate range (up to 25 000 m<sup>3</sup>/h) and power range (up to 14 MW). Capacity, power and cavitation parameters are tested both in manual and automatic modes. Tests are carried out in accordance with ISO 9906:1999.

### Manufacturing

Our products are manufactured on the state-of-the-art machines from the world's leading companies of Germany, Italy, South Korea and meet Russian and International standards (API, ANSI, ISO, DIN, ASME).

Our Quality Management System complies with ISO 9001:2008.

We manufacture pumps of 2, 3 and 4 safety classes; I, II and III seismic categories in accordance with rules and regulations of nuclear energy industry.

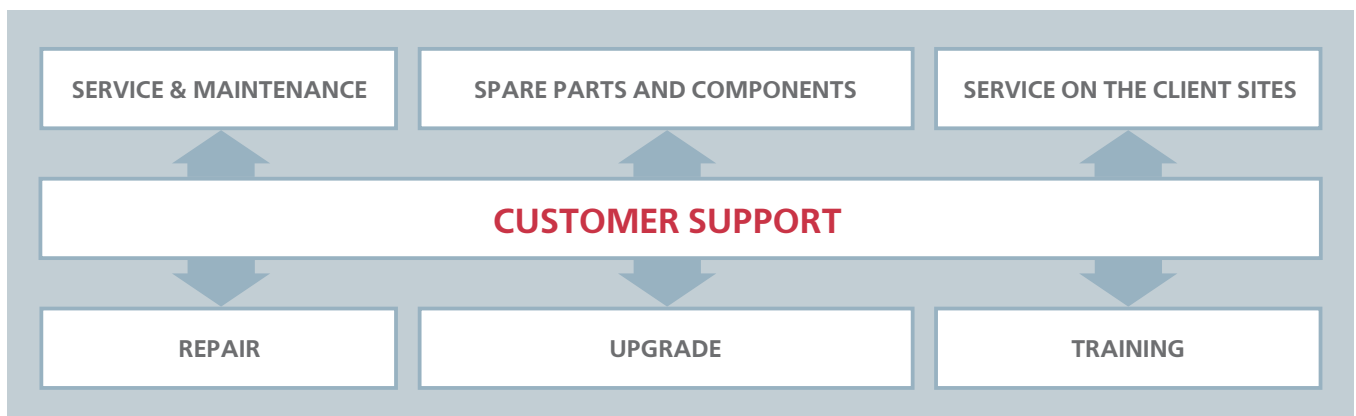
Equipment critical to the safety of NPP is certified according to OIT 0013-2000.

### Servicing

The HMS Group provides after-sales servicing including but not limited to operation consultancy, customer training, provision of spare parts, routine maintenance and overhauls, retrofit of supplied equipment.

### Personnel training

Our training programs are aimed at improvement of professional skills of the customer's personnel in efficient, trouble-free and safe operation of supplied equipment.



## Main product range for Nuclear Power Plants

### Feed water pumps

HMS Group offers efficient solutions based on the traditionally applied feed water systems with booster pumps and process solutions without booster pumps in operation.

#### Feed water systems without booster pumps. Main feed pumps, PEA and PED A series



**Application:**

Feed water handling in steam generation systems at NPPs

**Operating Parameters:**

Q: 1840 – 2500 m<sup>3</sup>/h    H: 910 – 980 m    P: 800 – 8000 kW

**Design features:**

- centrifugal, horizontal, multistage
- single casing or barrel type
- electric motor driven

#### Feed water systems with boosting. Main feed pumps, PTA 3750 series



**Application:**

Feed water handling in steam generation systems at NPPs

**Operating Parameters:**

Q: 3400 – 3750 m<sup>3</sup>/h    H: 635 – 860 m    P: 6285 – 9603 kW

**Design features:**

- centrifugal, horizontal, multistage, barrel type
- with sleeve bearings, mechanical seals
- turbine driven

#### Feed water systems with boosting. Feed water booster pumps, PTA 3800 series



**Application:**

Feed water handling, to ensure cavitation free operation of main feed water pumps (PTA 3750 series)

**Operating Parameters:**

Q: 3450 – 3800 m<sup>3</sup>/h    H: 134 – 170 m    P: 1280 – 1826 kW

**Design features:**

- centrifugal, horizontal, single-stage
- with double suction impellers
- turbine driven



## Main product range for Nuclear Power Plants

### Feed water pumps

#### Start-up/backup feed water pumps, PEA series

**Application:**

Feed water handling in steam generation systems of NPPs during start/stop of power units

**Operating Parameters:**

Q: 250 – 290 m<sup>3</sup>/h H: 880 – 1720 m P: 800 – 2000 kW

**Design features:**

- centrifugal, horizontal, multistage
- single casing or barrel type
- electric motor driven

### Condensate pumps

#### Condensate pumps, KsVA series

**Application:**

Condensate or demineralized water handling in steam-water delivery systems

**Operating Parameters:**

Q: 75 – 1250 m<sup>3</sup>/h H: 55 – 250 m P: 22 – 1250 kW

**Design features:**

- centrifugal, vertical, barrel-type, multistage
- with stuffing box or mechanical seals
- electric motor driven

#### Condensate pumps, Ks/1Ks series

**Application:**

Condensate water handling in steam-water delivery systems of NPPs and TPPs, and water/heat supply systems

**Operating Parameters:**

Q: 32 – 80 m<sup>3</sup>/h H: 50 – 155 m P: 7,5 – 75 kW

**Design features:**

- horizontal, single casing, multistage, with single suction impellers
- stuffing box or mechanical seals
- electric motor driven

## Main product range for Nuclear Power Plants

### Pumps for safety systems

#### Safety injection pumps, CNSA series



**Application:**

- reactor cooling after shutdown in all operating modes
- borated water solution circulation in residual heat removal system in all operating modes
- boric acid injection in emergency situations to stop a nuclear reaction

**Operating Parameters:**

Q: 750 – 816 m<sup>3</sup>/h    H: 140 – 156 m    P: 500 – 630 kW

**Design features:**

- centrifugal, horizontal, barrel-type, multistage, with inducer at the first stage
- with mechanical seals
- electric motor driven

#### High-pressure coolant injection pumps, CNA series



**Application:**

- reactor cooling in emergency situations and planned cooling down in NPPs
- boric acid injection in emergency situations to stop a nuclear reaction
- high-pressure charging of coolant water
- demineralization water handling in the intermediate loop
- component cooling water system in all operating modes including emergency

**Operating Parameters:**

Q: 6,3 – 3600 m<sup>3</sup>/h    H: 12 – 980 m    P: 5,5 – 800 kW

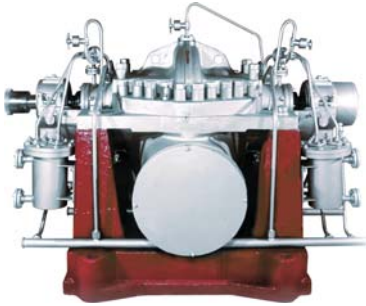
**Design features:**

- horizontal, barrel-type, multistage
- with mechanical seals
- electric motor driven

## Main product range for Nuclear Power Plants

### Pumps for safety systems

#### Low-pressure coolant injection pumps, CNR series

**Application:**

Core flooding and boric acid injection for residual heat removal

**Operating Parameters:**

Q: 800 m<sup>3</sup>/h H: 230 m P: 800 kW

**Design features:**

- horizontal, single-stage, with double suction impellers
- mechanical seals
- electric motor driven

### Pumps for oil supply systems

#### Pumps for bearing lubrication, A1 3V series

**Application:**

Bearing lubrication for main reactor coolant pump in NPPs

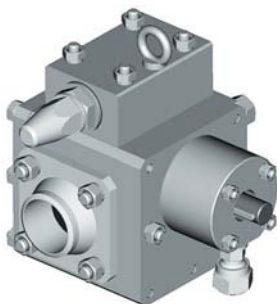
**Operating Parameters:**

Q: 12,5 – 80 m<sup>3</sup>/h H: 40 – 100 m P: 7,5 – 22 kW

**Design features:**

- positive displacement, three-screw, vertical pumps with pressure relief valves
- viscosity and temperature range for pumped liquid can be subject to customer requirements
- electric motor driven

#### Pumps for bearing lubrication, AS-NMSH/AS-SH series

**Application:**

Bearing lubrication for feed water and condensate pumps

**Operating Parameters:**

Q: 1,6 – 37,5 m<sup>3</sup>/h H: 25 – 250 m P: 1,5 – 15 kW

**Design features:**

- positive displacement gear pumps with pressure relief valves
- viscosity and temperature range for pumped liquid can be subject to customer requirements
- electric motor driven

## Main product range for Nuclear Power Plants

### Pumps for auxiliary systems

#### Industrial Pumps, D/1D series



**Application:**

- water circulation in cooling systems
- turbine bearing lubrication systems in NPPs

**Operating Parameters:**

Q: 160 – 12500 m<sup>3</sup>/h    H: 10 – 122 m    P: 8 – 1550 kW

**Design features:**

- centrifugal, horizontal, single-stage, with double suction impellers
- stuffing box or mechanical seals
- electric motor driven

#### Pumps for hot water supply systems, SE series



**Application:**

Water handling in heat supply system

**Operating Parameters:**

Q: 500 – 1250 m<sup>3</sup>/h    H: 70 – 140 m    P: 160 – 630 kW

**Design features:**

- centrifugal, horizontal, two-stage, with double suction impellers
- stuffing box or mechanical seals
- electric motor driven

#### Centrifugal multistage pumps, CNSg/1CNSg series



**Application:**

Feed water handling for low-power boilers, hot water supply and heating systems

**Operating Parameters:**

Q: 38 – 60 m<sup>3</sup>/h    H: 132 – 233 m    P: 45 – 55 kW

**Design features:**

- centrifugal, multistage, horizontal
- inducer at the first stage (1CNSg-1 model) allows to significantly reduce cavitation
- operating parameters can be subject to customer requirements

## Examples of integrated solutions for NPP: pump development, manufacturing and supply

All pumps have been engineered according to original specifications of NIAEP.

All equipment have been manufactured according to rules and norms of nuclear power industry.

Equipment critical for the power unit safety have been manufactured with quality assurance according to the acceptance procedure by the authorized organization in conformity with NP 071-06.

Novovoronezh NPP-2, Russia. Power generation units №1 and №2	
<b>Year of supply:</b> 2012-2013	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
Pump types	Application
APEA 1840-80	Feed water handling in steam generation systems at NPPs, NPP 2006 project with PWR-1200
AKsVA 650-135-6	Condensate handling
NMSH/ SH/ N1V	For auxiliary systems of NPP

Leningrad NPP-2, Russia. Power generation units №1 and №2	
<b>Year of supply:</b> 2011-2014	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
Pump types	Application
APEA 1840-80-1	Feed water handling in steam generation systems at NPPs, NPP 2006 project with PWR-1200
AKSVA 650-135-7	Condensate handling
ACNA 150-60-2	Boric acid supply to the first circuit in projected emergency modes
ACNSA 750-140a-2	Boric acid injection for reactor cooling after shutdown in all operating modes
APEA 250-80-3	Feed water handling in steam generation systems As start-up/backup feed water pump
CNSv 12,5-60A	Water circulation
NMSH, N1V	Auxiliary systems: handling of oil, oil products and oil drains
AD 2500-62-3	Cooling water supply for component cooling water systems
AKSv 125-55-2	Preoperational flushing of condensate-feed circuit

BELOYARSK NPP-2, Russia	
<b>Year of supply:</b> 2010	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
Pump types	Application
AS-NMSH/AS-VK/NMSH/VKS	Auxiliary pumps for backup diesel generators (supply of fuel, oil and cooling liquids)

## Examples of integrated solutions for NPP: pump development, manufacturing and supply

Rostov NPP, Russia. Power generation unit №3	
<b>Year of supply:</b> 2011-2013	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
Pump types	Application
PTA 3750-75	Feed water handling in steam generation systems at NPPs
PTA 3800-20	Feed water handling, to ensure cavitation free operation of main feed water pumps (PTA 3750-75-3 series)
AKsVA 650-135-5	Return steam condensate handling
AKsVA 125-55-1	Condensate handling
NMSH/VKS	Auxiliary processes
AS-NMSH/AS-SH	Fuel and oil supply for backup diesel generators
ASE 1250-140-11-1	Heat supply system
AKsV 125-140-4	Return steam condensate handling
AKsV 200-220-1	Handling of return steam condensate for steam turbines of second circuit in power generation units
D 6300-27-3 steel	Water supply for water towers
D 2000-100-2 steel	Water supply for the water chemical treatment of power generation units

Rostov NPP, Russia. Power generation unit №4	
<b>Year of supply:</b> 2013-2014	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
Pump types	Application
ACNA 4000-95/8	Component cooling water system
KsVA 650-135-5	Condensate handling
PTA 3750-75-3	Feed water handling in steam generation systems at NPPs
PTA 3800-20-3	Feed water handling, to ensure cavitation free operation of main feed water pumps (PTA 3750-75-3 series)
AS-NMSH/AS-SH	Fuel and oil supply for backup diesel generators

Kalinin NPP, Russia. Power generation unit №4	
<b>Year of supply:</b> 2010	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
Pump types	Application
PTA 3750-75-3	Feed water handling in steam generation systems at NPPs, with PWR-1000
PTA 3800-20-3	Feed water handling, to ensure cavitation free operation of main feed water pumps (PTA 3750-75-3 series)

## Examples of integrated solutions for NPP: pump development, manufacturing and supply

<b>Baltiisk NPP, Russia.</b> Power generation units №1 and №2	
<b>Year of supply:</b> 2012	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
<b>Pump types</b>	<b>Application</b>
ACNA 150-60-3	Boric acid supply to the first circuit in projected emergency modes
ACNSA 750-140a-3	Boric acid injection for reactor cooling after shutdown in all operating modes
1D 630-125a-A	External and internal firefighting systems
1K 100-65-250a-s-A-U4	Industrial water supply

<b>Kudankulam NPP, India.</b> Power generation units №1 and №2	
<b>Year of supply:</b> 2004-2007	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
<b>Pump types</b>	<b>Application</b>
PTA 3750-75-2	Feed water handling in steam generation systems at NPPs, with PWR-1000
PTA 3800-20-2	Feed water handling, to ensure cavitation free operation of main feed water pumps (PTA 3750-75-3 series)
AKsVA 650-135-3, Ks 50-55	Condensate pumps
ACNA 150-60-1, ACNA 750-140-1 ACNSA 750-140a-1	Emergency Core Cooling Systems
AD 1800-31, AD 960-35, ACNS 38-220	Pumps for auxiliary systems

<b>Tianwan NPP, China.</b> Power generation units №1 - №4	
<b>Year of supply:</b> 2003-2015	
<b>Scope of work:</b> engineering, manufacture, supply, installation supervision and commissioning	
<b>Pump types</b>	<b>Application</b>
APEA 250-80-2	Feed water pumps
AKsVA 650-135-2	Condensate pumps
ACNA 150-60, ACNSA 750-140a, ACNSA 750-140	Emergency Core Cooling Systems
ACNA 1700-35, ACNA 1700-35-2, ACNA 2000-40	Component cooling water system
ACNA 1400-12	Emergency Core Cooling Systems
ACNS 3-100-2	Auxiliary system

## Be our Partner

We are looking for experienced dealers & distributors to sell products and services of HMS Group.  
Please forward your queries to contact details below:

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