# JSC “VNIIAEN”

Research and Design Institute
for Atomic and Power Pumpbuilding

# Pumpbuilding cluster of Sumy


Sumy State University

**Training of specialists and academic science in the field of pump engineering**

**Applied scientific researches, design and engineering of pumps**

Research and Design Institute for Atomic and Power Pumpbuilding (JSC “VNIIAEN”)


JSC “Nasosenergomash”

**Pumps manufacturing**

Public Joint Stock Company “Sumy Machine-Building Science-and-Production Association”

# JSC “VNIIAEN” today:

- more than 60 years of professional work in the field of pump engineering
- leading organization in Ukraine in the domain of research and technical support in pump engineering
- for more than 15 years our company has been properly certified by the government as a scientific institution
- being a public enterprise, in accordance with the relevant decisions of the Cabinet of Ministers of Ukraine, JSC “VNIIAEN” has been added to the List of Companies that are of Strategic Importance for Economy and National Security, with its test center included to the State Register of scientific facilities that form the national resources
- on JSC “VNIIAEN” basis the Technical Committee for standardization TK-21 “Rotordynamic and positive displacement pumps” has been organized. Moreover, JSC “VNIIAEN” is a collaborative member of the Technical Committee for standardization TK-79 “Atomic Power”
- an approved vendor for state enterprise “National Nuclear Energy Generating Company “Energoatom” (NNEGC “Energoatom”)
- copyright owner of design documentation for equipment developed for different manufacturers over the years
- in JSC “VNIIAEN” the affiliate of the Applied Fluid Mechanics Department of Sumy State University works to train future specialists for pump engineering

# History of JSC “VNIIAEN”

**1956** in Sumy, the regional center of Ukraine, according to the Government decision a Special Design Bureau of Feed Water Pumps, SDB-FWP, was established in order to solve in a short time the problem pertaining to national economy: development and implementation of powerful feed water, condensate and network pump units for commissioning the large-size hydro-electrical power plants (HEPPs) and Central Heating and Power Plant (CHPP) being under construction in USSR. Increase of volume of works being fulfilled, their complexity and importance for the country stipulated transformation of Bureau into Ukrainian branch of VNDIGidromash

in the late 60s JSC “VNIIAEN” was involved in implementation of works connected with design of pumping equipment for nuclear power plants with power generating units of single-unit power of 440 thousand, a million and 1.5 million kW. It was our organization that has developed all the pumps for Leningrad nuclear power plant (NPP) – the first NPP in the USSR with power units RBMK of 1000MW

1970 UkrVNDIGidromash was reorganized into All-Union Research and Design Institute for Atomic and Power Pumpbuilding

**1974** JSC “VNIIAEN” has been located on the new place, where in those days one of the largest in Europe experimental and research bases together with an administrative building had been built

1992 JSC “VNIIAEN” was appointed the head organization of Ukraine in the field of pump engineering. The Technical Committee for standardization of TK-21 “Rotordynamic and positive displacement pumps” was established on the Institute basis

**1993** the test center of JSC “VNIIAEN” has been accredited by Accreditation Council for its technical competence with the right to perform all kinds of tests of rotordynamic pumps including certification tests

1997 JSC “VNIIAEN” entered the List of Companies that are of Strategic Importance for Economy and National Security (Decree of the Cabinet of Ministers of Ukraine No. 911 dated 21.08.1997 and Decree No. 1346 dated 29.08.2000)

# History of JSC “VNIIAEN”

**2000** JSC “VNIIAEN” has been reorganized into a joint-stock company without changing the name

**2002** JSC “VNIIAEN” was registered as a collaborative member of Technical Committee for standardization TK-79 "Atomic Power"

**2006** the test center of JSC “VNIIAEN” was included in the State Register of scientific facilities that form the national resources (Instruction No.665-P dd. December 27, 2006)

**2008** JSC “VNIIAEN” was included to the State Register of scientific institutions to be provided with State support (Certificate of Ministry of Education and Science of Ukraine НД No. 01138 dated 31.12.2008)

**2012** JSC “VNIIAEN” has been appointed a leading organization in the field of research, development and implementation of scientific, technical and design production in pump engineering (Letter No.1/06-2-692 from State Agency for Science, Innovation and Informatization of Ukraine dated 12.10.2012)

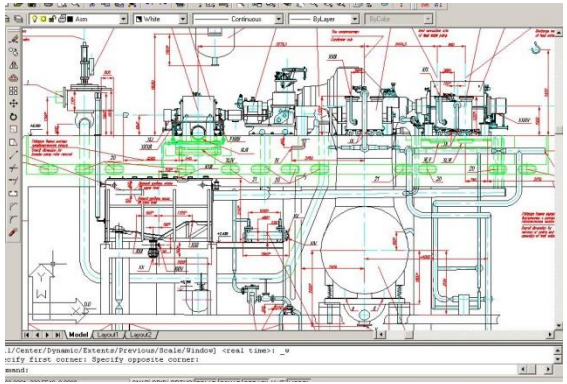
**2015** JSC “VNIIAEN” was renamed Public Joint Stock Company “Research and Design Institute for Atomic and Power Pumpbuilding” (abbreviated company name – Public JSC “VNIIAEN”)

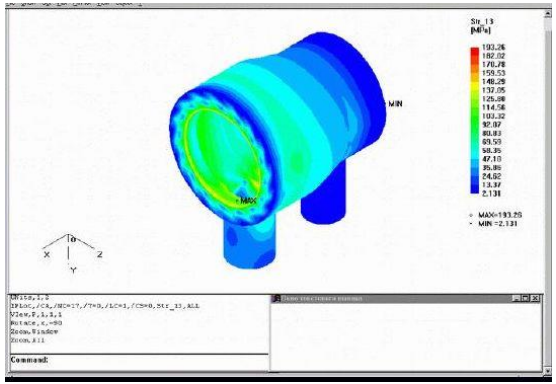
**2018** the full name Public Joint Stock Company “Research and Design Institute for Atomic and Power Pumpbuilding” was changed for Joint Stock Company “Research and Design Institute for Atomic and Power Pumpbuilding” (abbreviated company name Public JSC “VNIIAEN” was changed for JSC “VNIIAEN”) according to resolution of the shareholders meeting (Report No. 11 dated April 27, 2018)

**2019** nowadays JSC “VNIIAEN” has more than 200 highly skilled specialists that ensure full development cycle of unique high-technology equipment for different applications

# Research and development

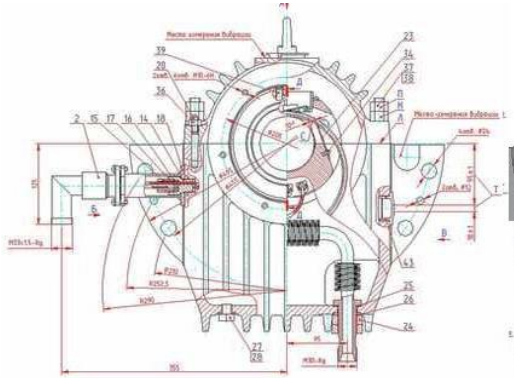
- development of engineering design documentation in the field of centrifugal pumps and pump units on their basis as well as pump unit control systems
- design of research and test stands
- strength analyses and hydrodynamic design of the equipment being developed
- design of updated assemblies of centrifugal pumps, including hydraulic devices for tightening joints of thermal and mechanical equipment, and flexible ring and plate-type couplings

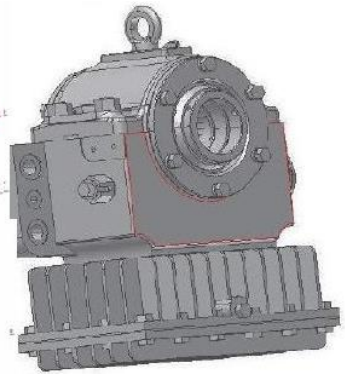




# Scientific and technical research on:

- development of highly economical hydraulic components of centrifugal pumps
- development of seals and pump bearings
- vibration monitoring and vibroacoustics of pumping equipment
- unification of pumping equipment
- development of national and industrial standards and regulations to be used in the field of pump engineering





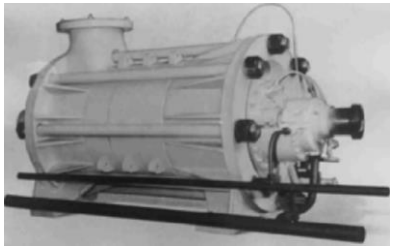
# Technical expert services

- evaluation of technical condition of pumping equipment based on strength properties, and determination of its residual useful life
- inspection of pumping equipment for the purpose of extending its service life

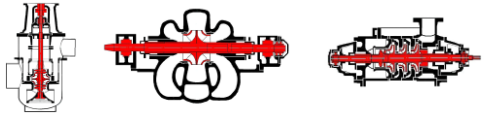
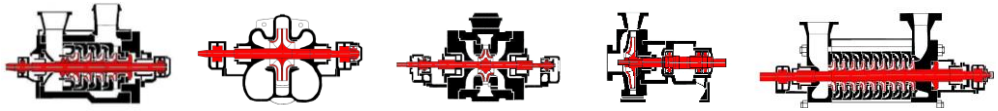
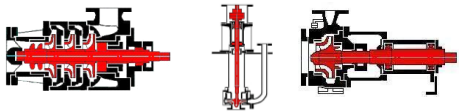
# Pump nomenclature of JSC “VNIIAEN”

JSC “VNIIAEN” has experience in designing of more than 600 pump dimensional series for more than twenty branches of industry

- Thermal power – 15 dimensional series
- Nuclear power – 14 dimensional series
- Oil transportation – 9 dimensional series
- Water supply – 9 dimensional series
- Chemical industry – 9 dimensional series
- Pumping of ground and sewage water – 7 dimensional series
- Coal and coal-mining industry – 5 dimensional series
- Oil refining industry – 5 dimensional series
- Sugar refining industry – 5 dimensional series
- Crude oil production – 4 dimensional series



# Design configuration of JSC “VNIIAEN” pumps

| | |
|---|---|
| NPP reactor coolant pumps |  |
| Feed water pumps for NPP and CHPP |  |
| Condensate pumps for NPP and CHPP |  |
| Safety injection pumps for NPP |  |
| Service water pumps for NPP and CHPP |  |
| Oil pumps for NPP |  |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **KURSKAYA Nuclear Power Station 4 units × RBMK 1000 (1000 MW), RUSSIA** | | | |
| 1978 | Feed pumps СПЭ 1650-75 | 5 | 1500 - 1800 | 700 - 900 |
| 1996-1997 | Feed pump ПЭА 250-80-1 | 7 | 250 | 700 - 900 |
| 1978-1981 | Condensate pump КсВ 1500-120 | 12 | 1500 | 120 |
| 1978-1981 | Condensate pump ЦН 1500-240 | 12 | 1500 | 240 |
| 1978 | Pumps for reactor unit and emergency systems ЦНР 500-115 | 8 | 500 | 115 |
| | **CHERNOBYLSKAYA Nuclear Power Station 4 units × RBMK 1000 (1000 MW), UKRAINE** | | | |
| 1978-1980 | Feed pumps СПЭ 1650-75 | 10 | 1500 - 1800 | 700 - 900 |
| 1978-1981 | Condensate pump КсВ 1500-120 | 16 | 1500 | 120 |
| 1983 | Condensate pump КСА 1500-240-2 | 3 | 1500 | 240 |
| 1978-1981 | Condensate pump ЦН 1500-240 | 18 | 1500 | 240 |
| 1978-1980 | Pumps for reactor unit and emergency systems ЦНР 500-115 | 3 | 500 | 115 |
| | **NOVOVORONEZSKAYA Nuclear Power Station 2 units × VVER 440 (440MW) + 1 unit × VVER 1000 (1000 MW), RUSSIA** | | | |
| 1978 | Booster pumps ПД 3750-200 | 2 | 3700-4000 | 180 -220 |
| 1993 | Booster pump Booster pump ПТА 3800-20 | 2 | 3700-4000 | 180 -220 |
| 1978 | Feed pumps ПТА 3750-75 | 4 | 3500-4000 | 700-1100 |
| 1978 | Condensate pump КсВ 1000-220 | 6 | 900 - 1100 | 200 - 240 |
| 1990-1992 | Condensate pump КсВА 500-220 | 6 | 500 | 220 |
| 1991 | Condensate pump КсВА 360-160-1 | 3 | 360 | 160 |
| 1991 | Special pumps ЦНА 10-20 | 8 | 10 | 20 |
| 1978 | Pumps for reactor unit and emergency systems ДХ 700-115 | 6 | 700 | 115 |
| 1978 | Pumps for reactor unit and emergency systems ДХ 750-240 | 6 | 750 | 240 |
| 2009 -2013 | Feed pumps АПЭА 1840-80 | 10 | 2100 | 850 |
| 2009 -2013 | Condensate pump КсВА 650-135-5 | 6 | 650 | 135 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **KALININSKAYA Nuclear Power Station 2 units × VVER 1000 (1000 MW), RUSSIA** | | | |
| 1982-1991 | Feed pump ПТА 3750-75 | 6 | 3500-4000 | 700-1100 |
| 1982 | Booster pumps ПД 3750-200 | 2 | 3700-4000 | 180 -220 |
| 1984-1992 | Booster pump ПТА 3800-20 | 4 | 3700-4000 | 180 -220 |
| 1981-1983 | Condensate pump КсВ 360-160 | 4 | 360 | 160 |
| 1982 | Condensate pump КсВ 1500-120 | 3 | 1500 | 120 |
| 1982 | Condensate pump КсВА 630-125 | 1 | 630 | 125 |
| 1988 | Condensate pump КсВА 200-220 | 1 | 200 | 220 |
| 1990 | Condensate pump КсВА 630-125-1 | 3 | 630 | 125 |
| 1991-1992 | Condensate pump КсВА 650-135-1 | 4 | 650 | 135 |
| 1998 | Condensate pump КсВА 360-160-1 | 3 | 360 | 160 |
| 1998 | Condensate pump КсВА 360-125-1 | 3 | 360 | 125 |
| 1978-1982 | Special pump ЦН 60-180 with hydro coupling MG-500 | 5 | 60 | 1900 |
| 1981-1985 | Condensate pump ЦН 1500-240 | 6 | 1500 | 240 |
| 1981 | Pumps for reactor unit and emergency systems ДХ 700-140 | 3 | 700 | 115 |
| 1982 | Pumps for reactor unit and emergency systems ДХ 750-240 | 3 | 750 | 240 |
| 1986-1988 | Pump for reactor unit and emergency systems ЦНР 800-230 | 3 | 800 | 230 |
| 1986 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 3 | 700 | 140 |
| | **LENINGRADSKAYA Nuclear Power Station 4 units × RBMK 1000 (1000 MW), RUSSIA** | | | |
| 1979-1980 | Feed pumps СПЭ 1650-75 | 10 | 1500 - 1800 | 700 - 900 |
| 1979-1981 | Condensate pump КсВ 1500-120 | 10 | 1500 | 120 |
| 1979-1980 | Condensate pump ЦН 1500-240 | 12 | 1500 | 240 |
| 1979-1980 | Pumps for reactor unit and emergency systems ЦНР 500-115 | 16 | 500 | 115 |
| 2009 - 2013 | Feed pumps АПЭА 1840-80 | 10 | 2100 | 850 |
| 2009 - 2013 | Condensate pump КсВА 650-135-5 | 6 | 650 | 135 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **SMOLENSKAYA Nuclear Power Station 1 unit × RBMK 1000 (1000 MW), RUSSIA** | | | |
| 1979 | Feed pumps СПЭ 1650-75 | 5 | 1500 - 1800 | 700 - 900 |
| 1979-1980 | Condensate pump КсВ 1500-120 | 5 | 1500 | 120 |
| 1982-1986 | Condensate pump КСА 1500-240 | 6 | 1500 | 240 |
| 1987 | Condensate pump КСА 1500-240-2 | 2 | 1500 | 240 |
| 1979-1981 | Condensate pump ЦН 1500-240 | 9 | 1500 | 240 |
| 1979 | Pumps for reactor unit and emergency systems ЦНР 500-115 | 2 | 500 | 115 |
| | **ARMENIAN Nuclear Power Station 2 units × VVER 440 (440 MW), ARMENIA** | | | |
| 1979 | Feed pumps СПЭ 65-56 | 6 | 65 | 560 |
| 1979 | Feed pump РЕ 850-65 | 5 | 800 - 1000 | 650 - 1000 |
| | **IGNALINSKAYA Nuclear Power Station 2 units × RBMK 1500 (1500 MW), LITHUANIA** | | | |
| 1982-1983 | Feed pumps ПЭА 1650-80 | 7 | 1500-1800 | 700 - 900 |
| 1983-1989 | Feed pump ПЭА 250-80 | 14 | 250 | 900 |
| 1982 | Condensate pump КсВА 900-180 | 4 | 900-1000 | 170 - 200 |
| 1982 | Condensate pump КСА 1500-240 | 6 | 1500 | 240 |
| 1982 | Condensate pump КсВ 500-220-2 | 4 | 500 | 220 |
| 1984 | Condensate pump КСА 1500-240-2 | 6 | 1500 | 240 |
| 1984 | Condensate pump КсВ 500-220 | 4 | 500 | 220 |
| 1982-1988 | Condensate pump КсВА 320-210 | 20 | 320 | 210 |
| | **SOUTHUKRAINIAN Nuclear Power Station 4 units × VVER 1000 (1000 MW), UKRAINE** | | | |
| 1981-1992 | Feed pump ПТА 3750-75 | 8 | 3500 - 4000 | 700 - 1100 |
| 1981 | Special pump ЦН 60-180 with hydro coupling МГМ-500 | 3 | 60 | 1900 |
| 1980 | Condensate pump КсВ 360-160 | 4 | 360 | 160 |
| 1980 | Condensate pump КсВ 1500-120 | 3 | 1500 | 120 |
| 1981 | Condensate pump КсВ 630-125 | 4 | 630 | 125 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **SOUTHUKRAINIAN Nuclear Power Station 4 units × VVER 1000 (1000 MW), UKRAINE** | | | |
| 1982 | Condensate pump КсВА 360-160 | 3 | 360 | 160 |
| 1982 | Condensate pump КсВА 630-125 | 3 | 630 | 125 |
| 1991 | Condensate pump КсВА 630-125-1 | 1 | 630 | 125 |
| 1981-1982 | Booster pumps ПД 3750-200 | 4 | 3700-4000 | 180 -220 |
| 1986 | Booster pumps Booster pump ПТА 3800-20 | 2 | 3700-4000 | 180 -220 |
| 1998 | Booster pumps Booster pump ПТА 3800-20-1 | 2 | 3700-4000 | 180 -220 |
| 1980 | Condensate pump ЦН 1500-240 | 3 | 1500 | 240 |
| 1980-1982 | Pumps for reactor unit and emergency systems ДХ 750-240 | 6 | 750 | 240 |
| 1980-1985 | Pumps for reactor unit and emergency systems ДХ 700-140 | 9 | 700 | 140 |
| 1985-1986 | Pump for reactor unit and emergency systems ЦНР 800-230 | 3 | 800 | 230 |
| | **ROVENSKAYA Nuclear Power Station 2 units × VVER 440 (440 MW) + 2 units × VVER 1000 (1000 MW), UKRAINE** | | | |
| 1979-1981 | Feed pumps СПЭ 65-56 | 10 | 65 | 560 |
| 1979 | Feed pump PE 850-65-2 | 5 | 800 - 1000 | 650 - 1000 |
| 1980 | Feed pump PE 850-65 | 5 | 800 - 1000 | 650 - 1000 |
| 1984 | Feed pump ПТ 3750-75 | 2 | 3500 - 4000 | 700 - 1100 |
| 1992 | Feed pump ПТА 3750-75 | 2 | 3500 - 4000 | 700 - 1100 |
| 1993 | Booster pumps Booster pump ПТА 3800-20 | 2 | 3700-4000 | 180 -220 |
| 1995 | Booster pump ПТА 3800-20-1 | 2 | 3700-4000 | 180 -220 |
| 1980-1981 | Special pump ЦН 50-135 with hydro coupling МГМ-500 | 6 | 50 | 1400 |
| 1980 | Condensate pump КсВ 200-220 | 2 | 200 | 220 |
| 1981 | Condensate pump КсВ 500-220-2 | 6 | 500 | 220 |
| 1983 | Condensate pump КсВА 200-220 | 2 | 200 | 220 |
| 1983 | Condensate pump КсВ 1000-190 | 5 | 900 - 1100 | 200 - 240 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **ROVENSKAYA Nuclear Power Station 2 units × VVER 440 (440 MW) + 2 units × VVER 1000 (1000 MW), UKRAINE** | | | |
| 1984 | Condensate pump КсВА 900-180 | 2 | 900-1000 | 170 - 200 |
| 1985-1989 | Pumps for reactor unit and emergency systems ЦН 150-110 | 6 | 150 | 1150 |
| 1984-1990 | Pump for reactor unit and emergency systems ЦНР 800-230 | 6 | 800 | 230 |
| 1987 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 3 | 700 | 140 |
| | **BALAKOVSKAYA Nuclear Power Station 4 units × VVER 1000 (1000 MW), RUSSIA** | | | |
| 1989 | Feed pump ПЭА 250-80 | 1 | 250 | 900 |
| 1985-1990 | Feed pump ПТА 3750-75 | 6 | 3500 - 4000 | 700 - 1100 |
| 1986-1991 | Booster pump ПТА 3800-20 | 6 | 3700-4000 | 180 -220 |
| 1982 | Condensate pump КсВА 630-125 | 3 | 630 | 125 |
| 1986 | Condensate pump КсВА 360-160 | 3 | 360 | 160 |
| 1990 | Condensate pump КсВА 360-160-1 | 3 | 360 | 160 |
| 1988-1991 | Condensate pump КсВА 650-135 | 4 | 650 | 135 |
| 1992 | Condensate pump КсВА 650-135-1 | 2 | 650 | 135 |
| 1985-1987 | Pump for reactor unit and emergency systems ЦН 150-110 | 4 | 150 | 1150 |
| 1983 | Pumps for reactor unit and emergency systems ДХ 700-140 | 3 | 700 | 140 |
| 1983-1988 | Pump for reactor unit and emergency systems ЦНР 800-230 | 12 | 800 | 230 |
| 1985-1989 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 11 | 700 | 140 |
| | **KOLSKAYA Nuclear Power Station 2 units × VVER 440 (440 MW), RUSSIA** | | | |
| 1980 | Special pump ЦН 50-135 with hydro coupling МГМ-500 | 3 | 50 | 1350 |
| 1980 - 1981 | Feed pumps СПЭ 65-56 | 8 | 65 | 560 |
| 1980 | Feed pump РЕ 850-65 | 5 | 800 - 1000 | 650 - 1000 |
| 1980 | Condensate pump КсВ 220-220 | 2 | 200 | 220 |
| 1980-1982 | Condensate pump КсВ 500-220-2 | 9 | 500 | 220 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **KOLSKAYA Nuclear Power Station 2 units × VVER 440 (440 MW), RUSSIA** | | | |
| 1981 | Condensate pump КсВ 200-220-2 | 4 | 200 | 220 |
| 1982-1992 | Condensate pump КсВА 500-220 | 7 | 500 | 220 |
| 1990 | Condensate pump КсВА 200-220 | 4 | 200 | 220 |
| | **ROSTOVSKAYA Nuclear Power Station 1 unit × VVER 1000 (1000 MW), RUSSIA** | | | |
| 1985 | Feed pumps ПТА 3750-75 | 2 | 3500 - 4000 | 700 - 1100 |
| 1985 | Booster pump ПТА 3800-20 | 2 | 3700-4000 | 180 -220 |
| 1984-1986 | Condensate pump КсВА 630-125 | 5 | 630 | 125 |
| 1984-1988 | Condensate pump КсВА 360-160 | 4 | 360 | 160 |
| 1988 | Condensate pump КсВА 200-220 | 1 | 200 | 220 |
| 1990 | Condensate pump КсВА 650-135 | 1 | 650 | 135 |
| 1990 | Condensate pump КсВА 650-135-1 | 1 | 650 | 135 |
| 1986-1987 | Pumps for reactor unit and emergency systems ЦН 150-110 | 6 | 150 | 1150 |
| 1985 | Pump for reactor unit and emergency systems ЦНР 800-230 | 3 | 800 | 230 |
| 1985-1987 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 6 | 700 | 140 |
| | **BYELOYARSKAYA Nuclear Power Station BN-600 (600 MW) - 2 units, RUSSIA** | | | |
| 1985 - 1998 | Feed pumps РЕ 380-185-3 | 4 | 380 | 1900 |
| | **LOVIIZA Nuclear Power Station 2 units ×VVER 440 (440 MW), FINLAND** | | | |
| 1975-1977 | Feed pumps РЕ 850-65 | 15 | 800 - 1000 | 650 - 1000 |
| 1975-1978 | Feed pumps СПЭ 65-56 | 6 | 65 | 560 |
| 1974-1981 | Condensate pump КС 125-140 | 20 | 125 | 140 |
| 1974-1977 | Condensate pump КсВ 500-220 | 12 | 500 | 220 |
| 1975-1976 | Condensate pump КсВ 200-220 | 4 | 200 | 220 |
| 1976 | Water pumps Д 2000-21 | 4 | 2000 | 21 |
| 1975 | Water pumps 16 НДН | 4 | 2500 | 62 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **KHMELNITSKAYA Nuclear Power Station 2 units × VVER 1000 (1000 MW), UKRAINE** | | | |
| 1984-1988 | Feed pumps ПТА 3750-75 | 4 | 3500 - 4000 | 700 - 1100 |
| 1990 | Booster pumps ПТА 3800-20 | 2 | 3700-4000 | 180 -220 |
| 1984-1988 | Condensate pump КсВА 360-160 | 4 | 360 | 160 |
| 1988 | Condensate pump КсВА 200-220 | 1 | 200 | 220 |
| 1990 | Condensate pump КсВА 650-135 | 2 | 650 | 135 |
| 1990 | Condensate pump КсВА 650-135-1 | 4 | 650 | 135 |
| 1983 | Feed pumps ПТ 3750-75 | 1 | 3500 - 4000 | 700 - 1100 |
| 1982-1989 | Feed pump ПТА 3750-75 | 3 | 3500 - 4000 | 700 - 1100 |
| 1982 | Booster pumps ПД 3750-200 | 2 | 3700-4000 | 180 -220 |
| 1985-1991 | Booster pump ПТА 3800-20 | 2 | 3700-4000 | 180 -220 |
| 1998 | Booster pump ПТА 3800-20-1 | 2 | 3700-4000 | 180 -220 |
| 1982-1986 | Condensate pump КсВА 630-125 | 9 | 630 | 125 |
| 1982-1986 | Condensate pump КсВА 360-160 | 13 | 360 | 160 |
| 1987 | Condensate pump КсВА 650-135 | 2 | 650 | 135 |
| 1994 | Condensate pump КсВА 650-135-1 | 2 | 650 | 135 |
| 1994 | Condensate pump КсВА 360-160-1 | 2 | 360 | 160 |
| 1994 | Condensate pump КсВА 630-125-1 | 2 | 630 | 125 |
| 1983-1988 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 18 | 700 | 140 |
| 1983-1989 | Pump for reactor unit and emergency systems ЦНР 800-230 | 18 | 800 | 230 |
| | **KOZLODUI Nuclear Power Station 4 units × VVER 440 (440 MW) + 2 units × VVER 1000 (1000 MW), BULGARIA** | | | |
| 1973-1981 | Feed pumps PE 850-65 | 19 | 800 - 1000 | 650 - 1000 |
| 1973-1981 | Feed pumps СПЭ 65-56 | 7 | 65 | 560 |
| 1984-1987 | Feed pump ПТА 3750-75 | 4 | 3500 - 4000 | 700 - 1100 |
| 1984-1987 | Booster pumps 3800-20 | 4 | 3700-4000 | 180 -220 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **KOZLODUI Nuclear Power Station 4 units × VVER 440 (440 MW) + 2 units × VVER 1000 (1000 MW), BULGARIA** | | | |
| 1987-2002 | Booster pump ПТА 3800-20-2 | 6 | 3700-4000 | 180 -220 |
| 1973 | Condensate pump КсД 140-140 | 3 | 140 | 140 |
| 1973-1983 | Condensate pump КсВ 200-220 | 9 | 200 | 220 |
| 1973-1980 | Condensate pump КсВА 500-220 | 28 | 500 | 220 |
| 1976-1990 | Condensate pump КС 125-140 | 10 | 125 | 140 |
| 1983-1986 | Condensate pump КС 125-55 | 8 | 125 | 55 |
| 1983-1986 | Condensate pump КС 50-110-1 | 6 | 50 | 110 |
| 1983-1986 | Condensate pump КсВА 200-220 | 4 | 200 | 220 |
| 1986 | Condensate pump КсВА 360-160 | 3 | 360 | 160 |
| 1990-1991 | Condensate pump КсВА 650-135-1Э | 4 | 650 | 135 |
| 1975-1978 | Deep well pumps 24А18´1 | 17 | 120 | 600 |
| 1983-1986 | Hot water pump СЭ 1250-140-11 | 4 | 1250 | 140 |
| 1984-1986 | Cooling pump Д 2500-62 | 4 | 2500 | 62 |
| 1984-1986 | Cooling pump Д 3200-75 | 4 | 3200 | 75 |
| 1979-1983 | Vacuum pumps НВЗ-20 | 6 | | |
| 1981 | Vacuum pumps АВЗ-20 | 2 | | |
| 1985 | Vacuum pumps АВЗ-20Д | 1 | | |
| 1988 | Vacuum pumps АВЗ-125Д | 5 | | |
| 1985-1987 | Water pumps ЦН 400-105 | 13 | 400 | 104 |
| 1984-1986 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 6 | 700 | 140 |
| 1984-1987 | Pump for reactor unit and emergency systems ЦНР 800-230 | 6 | 800 | 230 |
| | **PAKSH Nuclear Power Station 4 units × VVER 440 (440 MW), HUNGARY** | | | |
| 1980 | Feed pump PE 850-65 | 5 | 800 - 1000 | 650 - 1000 |
| 1980 | Feed pump СПЭ 65-56 | 11 | 65 | 560 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **PAKSH Nuclear Power Station 4 units × VVER 440 (440 MW), HUNGARY** | | | |
| 1981 | Special pump ЦН 50-135with hydro coupling МГМ-500 | 6 | 50 | 1350 |
| 1978-1985 | Condensate pump КС 32-150 | 24 | 32 | 150 |
| 1979 | Condensate pump КсВ 200-220 | 2 | 200 | 220 |
| 1980-1985 | Condensate pump КС 125-140 | 9 | 125 | 140 |
| 1980 | Condensate pump КсВ 500-220 | 6 | 500 | 220 |
| 1981-1982 | Condensate pump КсВА 500-220-2 | 12 | 500 | 220 |
| 1982 | Condensate pump КсВА 200-220-2 | 4 | 200 | 220 |
| 1981-1982 | Condensate pump КсВ 200-220-2 | 6 | 200 | 220 |
| 1983-1986 | Condensate pump КсВА 500-220 | 8 | 500 | 220 |
| 1986 | Condensate pump КсВА 200-220 | 1 | 200 | 220 |
| 1985-1997 | Water pumps СЭ 500-70-16 | 5 | 500 | 70 |
| 1978-1982 | Vacuum pumps НВЗ-20 | 5 | | |
| 1980 | Vacuum pumps НВЗ-75 | 1 | | |
| 1984 | Vacuum pumps АВЗ-63Д | 1 | | |
| | **TEMELIN Nuclear Power Station 2 units × VVER 440 (440 MW), CHEKHOSLOVAKIA** | | | |
| 1989-1990 | Condensate pump КС 50-110-2 | 3 | 50 | 110 |
| 1989 | Condensate pump КС 80-155-2 | 2 | 80 | 155 |
| 1988-2000 | Pump for reactor unit and emergency systems ЦНСА 700-140 | 6 | 700 | 140 |
| 1988-2000 | Pump for reactor unit and emergency systems ЦНР 800-230 | 6 | 800 | 230 |
| 2000 | Special pumps ЦН 160-110 | 1 | 160 | 1150 |
| | **KAIGA Nuclear Power Station , India** | | | |
| 2004 | Turbine control oil pumps ACNSg 16-165 | 4 | 16 | 165 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 440-1000 MW from 1976 to 2007

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| **TIANVAN Nuclear Power Station 2 units × VVER-1000 (1000 MW), CHINA** | | | | |
| 2001-2004 | Feed pumps PEA 250-80-2 | 4 | 250 | 900 |
| | Condensate pumps KcBA 650-135-2 | 6 | 650 | 135 |
| | DM Cooling pumps ACNA 1700-35 | 12 | 1700 | 35 |
| | Special emergency pumps ACNA 150-60 | 8 | 150 | 700 |
| | Special and emergency reactor cooling pumps ACNA 750-140, ACNA 750-140a | 16 | 750 | 140 |
| **BUSHEHR Nuclear Power Station 1 unit × VVER-1000 (1000 MW), Iran** | | | | |
| 2003-2004 | Condensate pumps KcBA 650-135-4 | 3 | 650 | 135 |
| | Treated water pumps AKc 80-155-3 | 2 | 80 | 148 |
| | Generator cooling pumps ACNA1400-12 | 2 | 1400 | 12 |
| | Drainage pump AKc 50-110-3 | 1 | 50 | 110 |
| | Condensate pumps AKc 32-150-3 | | 32 | 150 |
| **KUDANKULAM Nuclear Power Station 2 units × VVER-1000 (1000 MW), India** | | | | |
| 2004 - 2007 | Condensate pumps KcBA 650-135-2 | 6 | 650 | 135 |
| | Special emergency pumps ACNA 150-60 | 8 | 150 | 700 |
| | Special and emergency reactor cooling pumps ACNA 750-140, ACNA 750-140a | 16 | 750 | 140 |
| | Main turbine driven Feed pump PTA 3750-75-1 | 4 | 3500 - 4000 | 700 - 1000 |
| | Booster pumps PTA 3800-20-3 | 4 | 3700-4000 | 180 -220 |
| | Feed pumps ACNS 38-220 | 4 | 38 | 220 |
| | Closed cycle water pumps AD 1800—31,5 | 4 | 1800 | 32 |
| | Closed cycle water pumps AD 960-35 | 6 | 960 | 35 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 1000 MW from 2004 to 2016

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| **ROSTOVSKAYA Nuclear Power Station 1 unit × VVER 1000 (1000 MW), RUSSIA** | | | | |
| 2009 | Condensate pumps АКсВА 650-135-5 | 2 | 650 | 135 |
| | Condensate pumps АКсВА 630-125-2 | 3 | 630 | 125 |
| | Condensate pumps АКсВА 360-160-3 | 3 | 360 | 160 |
| | Condensate pumps АКсВ 200-220-1 | 2 | 200 | 220 |
| | Feed pumps ПТА 3750-75-3 | 2 | 3500 - 4000 | 700 – 1100 |
| | Booster pumps ПТА 3800-20-3 | 2 | 3700-4000 | 180 -220 |
| | Motor Pump Units АЦНА 4000-95/8 | 6 | 4000 | 95 |
| | Motor Pump Units АЦНА 150-110-2 | 3 | 150 | 110 |
| | Condensate pumps АКс 50-110-4 | 1 | 50 | 110 |
| **PAKSH Nuclear Power Station 4 units × VVER 440 (440 MW), HUNGARY** | | | | |
| 2013-2015 | Hot water pump СЭ 500-70-16 | 5 | 500 | 70 |
| **KALININSKAYA Nuclear Power Station 2 units × VVER 440 (440 MW), RUSSIA** | | | | |
| 2009-2010 | Feed pumps ПТА 3750-75-3 | 2 | 3500 - 4000 | 700 - 1100 |
| | Booster pumps ПТА 3800-20-3 | 2 | 3700-4000 | 180 -220 |
| | Condensate pumps АКсВА 125-55 | 4 | 125 | 55 |
| | Motor Pump Units АД 3200-75-3 | 3 | 3200 | 75 |
| | Motor Pump Units АД 6300-27-3 | 2 | 6300 | 27 |
| | Condensate pumps АКс 50-110-4 | 1 | 50 | 110 |
| 2014 | Motor Pump Units АКСД230-115-4 | 2 | 230 | 115 |
| **NOVOVORONEZSKAYA Nuclear Power Station 2 units × VVER 440 (440 MW), RUSSIA** | | | | |
| 2012 | Condensate pump КсВ125-140-3 | 4 | 125 | 140 |

# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 1000 MW from 2004 to 2016

| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| | **NOVOVORONEZSKAYA Nuclear Power Station II 2 units × VVER 1200 (1200 MW), RUSSIA** | | | |
| 2011, 2013 | Condensate pumps КсВА650-135-6 | 4 | 650 | 135 |
| 2012, 2014 | Feed pumps ПЭА1840-80 | 10 | 1840 | 80 |
| | **LENINGRADSKAYA Nuclear Power Station II 2 unit × VVER 1200 (1200 MW), RUSSIA** | | | |
| 2011,2013 | Condensate pumps КсВА650-136-7 | 2 | 3700-4000 | 180 -220 |
| 2012 | Condensate pumps КсВа125-55-2 | 2 | 125 | 55 |
| 2013, 2015 | Intermediate circuit cooling pump Д2500-62-3 | 6 | 2500 | 62 |
| 2013,2014 | Feed pumps ПЭА1840-80-01 | 10 | 1840 | 80 |
| 2013, 2014, 2016 | Special emergency pumps ЦНА150-60-2 | 6 | 150 | 60 |
| 2014, 2016 | Special and emergency reactor cooling pumps АЦНСА 750-140 а-2 | 8 | 750 | 140 |
| | **ROSTOVSKAYA Nuclear Power Station Unit No.3 (1 unit × VVER 1000 (1000 MW), RUSSIA** | | | |
| 2012 | Hot water pump СЭ1250-140-11-1 | 2 | 1250 | 140 |
| | Feed pumps ПТА 3750-75-3 | 2 | 3500 - 4000 | 700 - 1100 |
| | Booster pumps ПТА 3800-20-3 | 2 | 3700-4000 | 180 -220 |
| | Condensate pumps КсВА650-135-5 | 2 | 650 | 135 |
| | Condensate pumps КсВ125-140-4 | 2 | 125 | 140 |
| | Condensate pumps КсВ200-220-1 | 2 | 200 | 220 |
| 2013 | Condensate pumps КсВ125-55-1, КсВ125-55-1а | 4 | 125 | 55 |
| | **ROSTOVSKAYA Nuclear Power Station Unit No.4 (1 unit × VVER 1000 (1000 MW), RUSSIA** | | | |
| 2014 | Feed pumps ПТА 3750-75-3 | 2 | 3500 - 4000 | 700 - 1100 |
| | Booster pumps ПТА 3800-20-3 | 2 | 3700-4000 | 180 -220 |
| | Condensate pumps КсВА650-135-5 | 2 | 650 | 135 |
| | Cooling water pump АД3200-75-4 | 2 | 3200 | 75 |
| | Closed loop cooling pump АД2500-62-4 | 2 | 2500 | 62 |
| 2015 | Condensate pumps КсВ125-140-4 | 1 | 125 | 140 |
| | Condensate pumps КсВ200-220-1 | 2 | 200 | 220 |
| | Condensate pumps КсВ125-55-1, КсВ125-55-1а | 4 | 125 | 55 |
| | Hot water pump СЭ1250-140-11-2 | 2 | 1250 | 140 |

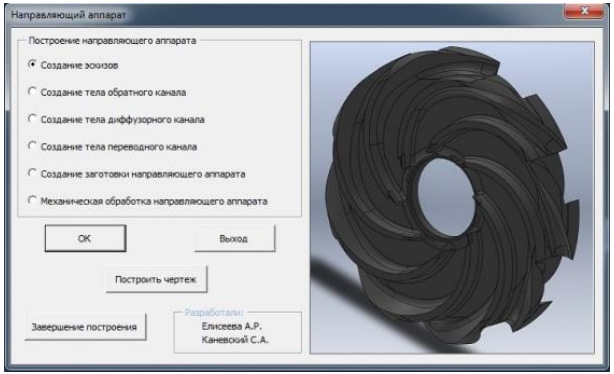
# Reference list

## of pumps designed by JSC “VNIIAEN” and supplied for nuclear power units 1000 MW from 2004 to 2016

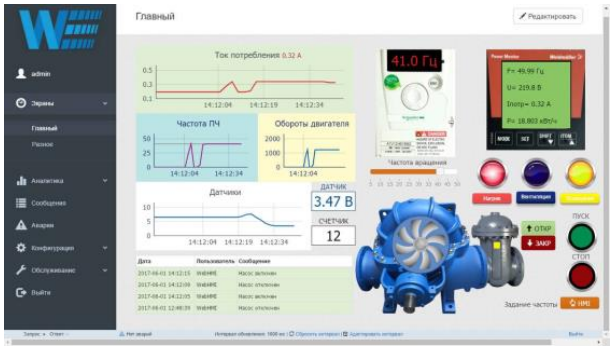
| Years of supply | Type of equipment to be supplied | Pump quantity | Capacity, m3/hr | Head, m |
|---|---|---|---|---|
| **TIANVAN Nuclear Power Station 2 units × VVER-1000 (1000 MW), CHINA** | | | | |
| 2015 | Intermediate circuit cooling pump АЦНА2000-40 | 6 | 2000 | 40 |
| | Special emergency pumps ЦНА150-60-4 | 4 | 150 | 60 |
| | Special and emergency reactor cooling pumps АЦНСА 750-140а-4 | 4 | 750 | 140 |
| | Special and emergency reactor cooling pumps АЦНСА 750-140-2 | 4 | 750 | 140 |
| **BALTIYSKAYA Nuclear Power Station 2 units × VVER-1200 (1200 MW), RUSSIA** | | | | |
| 2015 | Special emergency pumps ЦНА150-60-3 | 4 | 150 | 60 |
| | Special and emergency reactor cooling pumps АЦНСА 750-140а-3 | 4 | 750 | 140 |
| | Condensate pumps АКсВА125-55-2.1 | 2 | 125 | 55 |
| **BELORUSSKAYA Nuclear Power Station 2 units × VVER-1200 (1200 MW), BELARUS** | | | | |
| 2016 | Condensate pumps КсВА650-135-8 | 3 | 650 | 135 |
| | Intermediate circuit pump АЦНА2000-40-3 | 1 | 2000 | 40 |
| | Hot water pump АКО250-61 | 3 | 250 | 61 |

# Some accompanying activities

- software module development for parametric 3D modeling




- remote access control systems



# Partners

## Research and design organizations

| | |
|---|---|
| • JSC “Kiev Research and Design Institute “Energoproekt” (JSC KIEP), Kyiv | www.kiep.kiev.ua |
| • JSC “Kharkiv Science-Research and Design Institute “Energoproekt” (JSC KI “Energoproekt”), Kharkiv | www.energoproekt.com.ua |
| • Sumy State University, Sumy | www.sumdu.edu.ua |
| • State Nuclear Regulatory Inspectorate of Ukraine, Kyiv | www.snrc.gov.ua |
| • Technical Committee for Standardization TK-79 “Atomic Power”, Kyiv | www.dcyakosti.org.ua |

## Enterprises

| | |
|---|---|
| • State Enterprise “National Nuclear Energy Generating Company “Energoatom” (NNEGC “Energoatom”), Kyiv | www.energoatom.kiev.ua |
| • SD “Zaporizhia NPP”, Energodar, Zaporizhia region | www.npp.zp.ua |
| • SD “South-Ukraine NPP”, Yuzhnoukrainsk, Mykolaiv region | www.sunpp.mk.ua |
| • SD “Khmelnitsky NPP”, Netishyn, Khmelnitsky region. | www.xaec.org.ua |
| • SD “Rivne NPP”, Varash, Rivne region | www.rnpp.rv.ua |
| • JSC “NASOSENERGOMASH Sumy”, Sumy | www.nempump.com |
| • Public JSC “Sumy Machine-Building Science and Production Association” (PJSC “Sumy NPO”), Sumy | www.snpo.ua |
| • JSC “Svessa Pump Plant”, Svessa, Sumy region | www.snz.com.ua |

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| • JSC “Turboatom”, Kharkiv | www.turboatom.com.ua |
| • LLC “Design engineering bureau “UKRSPETSMASH”, Sumy | www.kb-usm.com.ua |
| • LLC “Research and Development Enterprise “ATEN” (LLC “RDE “ATEN”), Kyiv | www.aten.ua |
| • CJSC “Haykakan Atomayin Elektrakayan” (Armenian NPP), Metsamor, Republic of Armenia | www.armeniannpp.am |
| • Neochim PLC, Dimitrovgrad, Bulgaria | www.neochim.bg |

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