Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions.

Our equipment, systems and services are dedicated to helping customers optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Up-to-date contact details for all countries are available on our website at www.alfalaval.com

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Equipment. Efficiency. And over 45 years of experience.

How Alfa Laval facilitates the nuclear renaissance

“Alfa Laval is a world-class supplier of heating, cooling and cleaning solutions to the nuclear power industry.

We have extensive nuclear know-how and experience. We can offer a wide range of efficient heat exchangers. And our products and product packages are certified for use in nuclear plants.

A rather nice combination, if you ask us”

Alfa Laval’s international nuclear team

The nuclear renaissance is all about experience. Yours and ours.

The nuclear renaissance is underway. New plants are being built, existing ones are being modernized and upgraded. Alfa Laval is ready to help make it happen – with more efficiency, safety and reliability than ever.

Nuclear partner since 1964

Alfa Laval has more experience of nuclear power than any other supplier of compact heat exchangers. One of the world’s very first commercial nuclear plants, Wylfa in the UK, picked plate heat exchangers from Alfa Laval for its central cooling system in 1964.

This was a breakthrough for plate technology in a very demanding and safety-focused industry. The installation was successful, and over the years, Wylfa has extended its use of Alfa Laval heat exchangers to other key positions.

More positions in more plants

Over the years, Alfa Laval has supplied over 2,000 heat exchangers to the nuclear power industry. Today, more than 140 nuclear plants in over 20 countries use Alfa Laval equipment in processes critical to safety and efficiency – inside the Nuclear Island, in the Turbine Island and in Auxiliary Systems.

Processes supported include central cooling, spent-fuel pool cooling, residual and emergency cooling, lube oil cooling and cleaning, pre-heating of feed water, desalination, waste-water treatment and more.

This wide variety of nuclear process applications has given Alfa Laval engineers – in design, manufacturing and maintenance – an unparalleled exposure to and experience with nuclear power technology. They have learned hands-on to understand all the stringent requirements on functionality, safety and reliability placed on all equipment used in a nuclear power plant.

Non-stop operation

Most of Alfa Laval’s plate heat exchangers installed 35-45 years ago are still doing active nuclear duty with minimal maintenance. Life cycle studies have shown that they have only needed regasketing every 15 years on average.

Powerful, self-cleaning Alfa Laval filters and superior plate technology virtually eliminate fouling and scaling in the various closed process loops. This reduces the need (and downtime) for cleaning and maintenance to rare incidents.

Alfa Laval’s experience with nuclear cooling goes back to 1964.

Alfa Laval engineers have unparalleled exposure to nuclear power technology and processes.

More than 140 nuclear power plants in over 20 countries use Alfa Laval equipment – inside and outside the Nuclear Island.

- Alfa Laval equipment operates reliably in the Nuclear and Turbine Islands.
- Compact heat exchangers save space and costs.
- Efficient heat transfer recovers excess heat and generates “free energy”.

Shikoku Electric Power Co.

With strict limits on fresh-water usage on the Japanese island of Shikoku, the nuclear power plant located there is confined to desalinating seawater for its cooling processes. After several decades with Multi-Stage Flash (MSF) desalination, the plant recently switched to Alfa Laval’s Multi-Effect Distillation (MED) technology. The new system has proved more fouling-resistant, more energy-efficient and capable of producing higher-quality water than the old one.

Familiar positions. Unexpected efficiencies.

Alfa Laval equipment plays a prominent role in dozens of positions around the nuclear power plant – in cooling, heating, filtration, separation and desalination.

This chart shows, at a glance, the dozens of positions in the nuclear power generation process where Alfa Laval equipment plays a prominent role – in cooling, heating, filtration and separation duties. Alfa Laval products are found in the Nuclear Island as well as the Turbine Island, regardless of reactor type – PWR, BWR or Candu.

The common denominator is cost efficiency, energy efficiency and space efficiency – whether the job is in central cooling, fuel pond cooling or waste-water treatment.

Efficient heat recovery

Alfa Laval heat exchangers allow energy from steam and hot water already in the system – and already paid for – to be recovered and transferred to other processes. This saves energy and costs, while reducing the overall environmental impact of the power production process. This is a prime example of how Alfa Laval heating and cooling solutions help optimize heat transfer to the high standards of the nuclear power sector.

Less is more

Thanks to their close temperature approach and high turbulence, Alfa Laval heat exchangers perform better and require less maintenance than traditional shell-and-tube heat exchangers. Their compact design also require far less installation and maintenance space. In fact, shell-and-tube heat exchangers need more than twice the heat-transfer area of the Alfa Laval equipment to achieve the same effect. At the same time, the Alfa Laval equipment can operate with smaller temperature differences, and therefore requires less cooling water and less pump capacity.

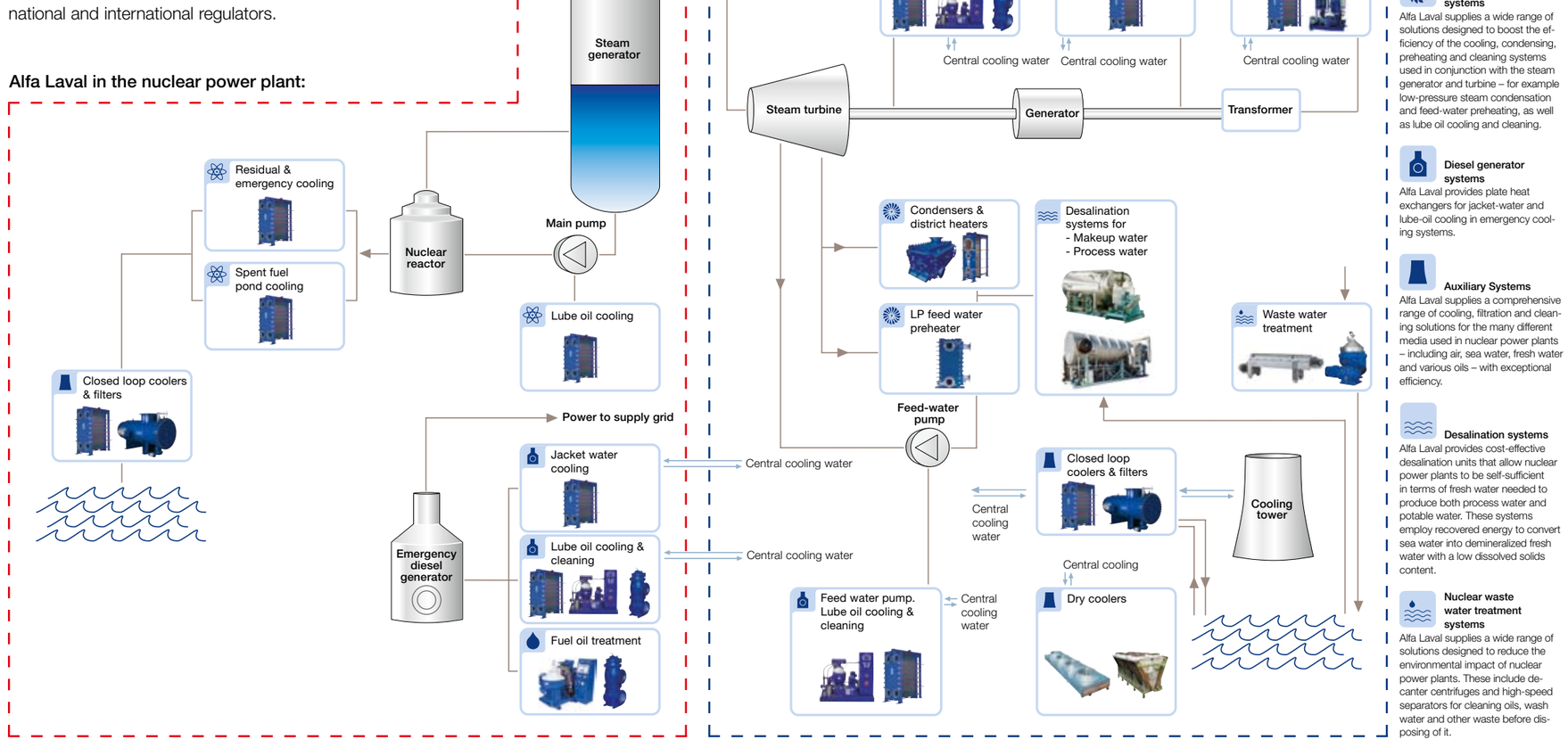
Many positions, one promise

Though process cooling is the predominant nuclear application for Alfa Laval equipment, it is far from the only one.

Cleaning waste water and lube oils, air conditioning the physical plant space, and producing process water for closed cooling loops are other important duties performed by decanters, separators, air coolers, filters and desalination systems from Alfa Laval.

What they have in common is exceptional quality in every detail, fully documented and certified by national and international regulators.

Alfa Laval in the nuclear power plant:



Nuclear Island cooling systems
Alfa Laval is a certified supplier of plate heat exchanger solutions for use in nuclear reactor cooling systems, where safety is a prime concern. Spent fuel cooling and emergency cooling are examples of such positions.

Turbine Island systems
Alfa Laval supplies a wide range of solutions designed to boost the efficiency of the cooling, condensing, preheating and cleaning systems used in conjunction with the steam generator and turbine – for example low-pressure steam condensation and feed-water preheating, as well as lube oil cooling and cleaning.

Diesel generator systems
Alfa Laval provides plate heat exchangers for jacket-water and lube-oil cooling in emergency cooling systems.

Auxiliary Systems
Alfa Laval supplies a comprehensive range of cooling, filtration and cleaning solutions for the many different media used in nuclear power plants – including air, sea water, fresh water and various oils – with exceptional efficiency.

Desalination systems
Alfa Laval provides cost-effective desalination units that allow nuclear power plants to be self-sufficient in terms of fresh water needed to produce both process water and potable water. These systems employ recovered energy to convert sea water into demineralized fresh water with a low dissolved solids content.

Nuclear waste water treatment systems
Alfa Laval supplies a wide range of solutions designed to reduce the environmental impact of nuclear power plants. These include decanter centrifuges and high-speed separators for cleaning oils, wash water and other waste before disposing of it.

- Alfa Laval products meet national and international nuclear industry standards.
- Extensive testing of materials, components, factories and technicians.
- Full documentation – tests, inspections, quality assurance, material tracing.

A cool Chinese choice

The twin-reactor nuclear power plant in Tianwan is China's third largest. In operation since 2006/2007, the plant quickly set a national record for continuous operation through the nuclear fuel cycle. Emissions of nuclear wastewater, gas and residue are also at record lows. And compared with coal plants, Tianwan reduces CO_2 emissions by 16 million tonnes a year. The plant uses 46 Alfa Laval gasketed plate heat exchangers to cool a variety of systems, including reactors and turbines. The PHEs are compact, corrosion-resistant and maintenance-friendly, and use much less cooling media than shell-and-tube heat exchangers.

Refined technologies. State-of-the-art equipment.

Rigourous testing of designs, materials and manufacturing assures that Alfa Laval equipment meets virtually all prevailing national and international industry standards.

Heat transfer, separation and fluids handling are Alfa Laval's core technologies. For more than 125 years, we have continuously developed and refined these technologies – improving designs, materials and manufacturing methods.

By retrofitting new heat exchangers in hundreds of existing nuclear plants, we have had to understand and apply the regulations as they have evolved. And adapt our products and solutions accordingly.

No stone unturned

When it comes to meeting the nuclear industry standards, Alfa Laval leaves nothing to chance.

We thoroughly test every component, every material, every seam. We submit our design and manufacturing processes to rigorous regulatory inspections. We train and retrain every engineer and technician involved in our nuclear power operation.

The result is arguably the world's best-performing and most reliable products in their respective categories – ready for nuclear operation anywhere.

Certified and documented

The high quality of Alfa Laval products and manufacturing methods is not lost on the nuclear regulatory world. Alfa Laval meets virtually all prevailing national and international industry standards. As a result, our heat exchangers and other products are pre-qualified for installation in most nuclear power plants worldwide.
Their compliance with the various standards and regulations is also fully documented – including tests and inspections, quality assurance, tracing of materials and components, and more.

Whether you are retrofitting an existing plant or building a brand new one, Alfa Laval is ready when you are, and can save you considerable time and trouble.

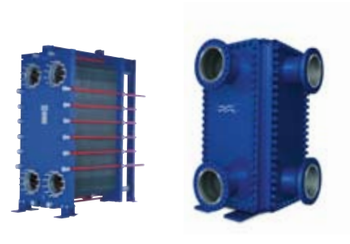
Some of the nuclear industry and other international standards met by Alfa Laval:

- ISO 9001 & ISO 14001
- ASME Section III, N-stamp
- ASME Section III, NPT-stamp
- ASME Section III, NS-stamp
- 10CFR50, Appendix B
- NQA-1
- RCC-M
- KTA 1401
- ASME Section VIII U-stamp
- PED

NIST Center for Neutron Research

The National Institute of Standards and Technology in Maryland, USA, operates a research reactor licensed by the Nuclear Regulatory Commission (NRC). Built in 1965, the plant first used shell-and-tube heat exchangers for its heat-transfer needs. The shell-and-tubes were replaced in 1994 with five semi-welded plate heat exchangers from Alfa Laval. The heat exchangers are used for cooling both purification water and the reactor water.

Alfa Laval products for nuclear power plants



Compact heat exchangers

Gasketed and welded heat exchangers are used in dozens of cooling positions around the nuclear power plant – in the nuclear as well as Turbine Islands. They are exceptionally efficient, reliable and compact, thus saving energy, operating costs and installation space.

High-speed separators

Alfa Laval's lube-oil treatment equipment, for example the OCM oil-cleaning module, quickly and effectively separates oil, water and sludge components in contaminated lubrication and hydraulic oils – all at the same time and regardless of the type or quantity of contaminants.

Decanter centrifuges

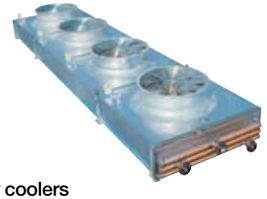
Decanters are used to treat radioactive wastewater from washing machines, showers and equipment cleaning before it leaves the plant. The centrifuge system removes all undissolved solids from these water streams. The result is high decontamination and considerably lower volumes.

Filters

Alfa Laval's high-performance ALF filters remove small particles debris, sand and biological matter from external water flows, prior to using it in various closed-loop cooling duties. This saves heat exchangers and other equipment from fouling and wear. The filters are self-cleaning and virtually maintenance-free.

Desalitination units

Alfa Laval's desalination systems produce demoralized/fresh water from seawater by evaporation. The water produced is used as process water in various cooling/heating positions. The desalination technologies include Multi-Effect Destillation (MEP), Thermal Vapour Compression (TVC) and Vacuum Vapour Compression (VVC). They all reduce manual operation, maintenance costs and downtime, compared to other technologies.



Air coolers

Alfa Laval's wide range of air coolers are used for space cooling in various parts of the Turbine Island and, increasingly, for liquid cooling duties.