Swedewater Cooling Systems
Solutions for reliable energy supply
Swedewater cooling systems from ABB

- Market leader with more than 5000 cooling systems installed worldwide
- Delivering approximately 700 cooling systems in a year
- Driving technology and innovation since 1980
- Cooling capacity from 2 kW to several megawatts

ABB is a leading global technology company in power and automation that enables utility, industry, and transport and infrastructure customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in roughly 100 countries and employs about 135,000 people.

ABB delivers the complete value chain in low, medium and high voltage technologies for electrical power transmission, distribution and usage. The comprehensive range of products help enhance safety, reliability and efficiency of power networks. Our technology leadership continues to facilitate developments in areas such as ultra-high-voltage power transmission, enabling smart grids and enhancing eco-efficiency. With a large network of factories and service centers across the world offering life-cycle support, ABB remains a technology leader in the market for power grids.

Swedewater cooling systems from ABB help to control the temperature of the converters in the electrical network for its optimal performance and ensure uninterrupted and reliable energy supply in the network.

The cooling system consists of a coolant (usually pure water) that helps control the temperature of power electronic components to ensure their optimal performance.

Different types of equipment and loads connected to an electrical network may cause overheating of the electrical equipment leading to failure, downtime and even flashovers that may cause an explosion.

Swedewater cooling systems from ABB help to control the temperature of the converters in the electrical network for its optimal performance and ensure uninterrupted and reliable energy supply in the network.

Over 35 years of experience in pure water cooling systems technology

ABB is the global market leader in pure water cooling systems for power transmission and industrial processes. Our mission is to deliver reliable and energy efficient solutions with optimized lifecycle cost. Our offering covers all important areas – from development, design, sales and production, to assembly, testing, installation, commissioning, training and service.

We provide cooling solutions for new constructions as well as upgrades for existing systems in all types of environments, from deserts to tropical climates, offshore and onshore. Our solutions are available for all kinds of applications including nuclear power, wind power, HVDC and SVC projects, industries, non-electrical environment as well as medical and research applications.
Optimized operational performance
Swedewater cooling systems from ABB are designed with high redundancy, both in components and control.

Flawless quality and reliability
Swedewater cooling systems from ABB are of flawless quality and reliability to achieve the stable conversion of alternating current to direct current and vice versa.

Custom solutions
Custom solutions for different voltage levels, cooling capacity and different dimensions can also be developed. Modular design for different units to be used in HVDC cooling system are also available which ensure robust solutions.

Proven Technology
Swedewater cooling systems from ABB are custom made solutions for various industrial and power transmission applications. ABB Swedewater’s pure water cooling systems are reliable and energy efficient solutions with optimized life cycle cost. They have a cooling capacity from 2 kW to several megawatts. The cooling media used is water. The specific application determines when to use tap water, glycol water, or deionized water.

How Swedewater cooling systems from ABB work
The principle of all pure water cooling systems is fundamentally the same. There is a main loop cooling the object. Water transfers the heat to water-to-water or water-to-air heat exchangers. From the main loop a small part of the flow passes through a water-treatment circuit. The water is filtered mechanically and is also continuously purified from ions and oxygen. The conductivity of the cooling water can hence be maintained as low as < 0.1μS/cm (at 25°C).

Object to be cooled
Semiconductor valves for HVDC and SVC applications, converters, rectifiers, stirrers, generators, etc.

Pump
Pumps the water through the system. Normally we supply a redundant system with double pumps and motors

By pass
To bypass warm water in order to keep the cooling water at the desired temperature, if required.

Heat exchanger
The unit where the temperature of the cooling water is decreased by means of raw water supply, dry liquid cooling (free cooling, fans), chillers or evaporate cooling units. They can be made of different material such as aluminum, copper, stainless steel or titanium depending on the quality of the cooling water or the environment where the coolers are placed.

Make up water
Possibility to fill up water when necessary. Can be manual or automatic.

ION Exchanger
Polystyrene bottles containing a chemical resin that deionizes the water to a defined level.

Filter
Fine filtering of the water to avoid small particles to circulate in the system.

Strainer
Mechanical filtering of the main cooling water.

Expansion vessel
To handle the volume variations of the cooling water caused by temperature variations.

UMD – Uninterruptible motor drives
Battery based supply when interrupted power supply may cause damage in production.

The cooling systems can be designed on the following principles:
- Open single circuit
- Closed single circuit
- Single circuit with dry air-water heat exchanger
- Single circuit with adiabatic air-water heat exchanger
- Two-circuit system with dry air-water heat exchanger
- Two-circuit system with water-water heat exchanger

The cooling media used is water. The specific application determines the quality of water needed:

Pure water – when water with low conductivity is needed
Power electronic applications such as:
- Cooling of semiconductors in electrical devices such as HVDC, SVC, converters, drives etc.
- Cooling where pure water without chemicals is essential, for applications such as food and medical industry
- Cooling of magnetic coils such as generators and motors

Tap water – when conductivity is not an issue
Applications include:
- Room cooling
- Energy storage
- Cooling in metalurgical processes and other industry applications

Glycol-water mixture – when freezing of the media is a risk
Applications include:
- When ambient temperature is below 0 degree celsius

Why ABB

Solutions that meet all types of requirements
Prefabricated Systems
Our cooling systems are prefabricated and assembled in one or several units. Most of the systems include control equipment with PLC and software. The systems are tested and verified before delivery.

As we deliver systems globally, we have developed design standards and control routines for efficient onsite installation and start up. Most of our customers can easily set up the systems themselves by following our manuals.

Scope of supply
ABB Swedewater cooling systems can supply a completely engineered system optimized for your needs, including coolers, pump skid, water treatment unit, connecting pipes, MCC, CPC and UMD (uninterruptible motor drive).

Built-in Container Cooling Solutions
A time-saving and cost-effective way to get a pure water cooling system into operation, is to build the cooling plant directly into a container. ABB customizes the plant according to your requirements. In a regular container solution the cooling system pump unit, treatment circuit, motor starters as well as the protection and system control are mounted into an enclosure or container. Optional equipment for the container may include insulation, ventilation, lighting, heating and air conditioning.

HVDC cooling system, Jingzhou Huizhou, China
All types of application
Power transmission and industries

Pure water cooling systems for HVDC
HVDC systems require flawless quality and reliability to achieve the stable conversion of alternating current to direct current and vice versa. To optimize operational performance, all our cooling systems for HVDC are designed with high redundancy, both in components and systems. The water purity in general and low conductivity in particular are other important quality factors we put much effort into to secure flawless quality and highest availability.

Pure water cooling systems for SVC
Layouts for cooling systems for FACTS are often complex and have short lead times. High quality in components and workmanship are equally important for SVC installations. ABB’s vast experience combined with modular concept helps deliver efficient solutions at optimized costs.

Pure water cooling for rectifiers and converters
Large consumers of direct current, e.g. aluminum smelters and chemical processing industries, use high power rectifiers with pure water cooling. Converters for different industrial areas such as oil, gas, railway systems and offshore constructions need pure water cooling for temperature control.

Pure water cooling for metallurgic processing
ABB has developed several pure water cooling systems for furnaces and stirrers, as well as for electromagnetic brakes for moulds. Our cooling systems are specially designed for high performance, year after year, in very demanding environments. Components are selected not only for precise function and reliability, but to withstand rough handling, dust and high ambient temperature.

Pure water cooling for research and medical applications
Electromagnets in accelerator rings and cyclotrons for research or medical use are often cooled with low conductivity water. Such projects can be extremely customer-specific, when a research facility is to be equipped with a custom-made cooling system. Our exceptional system design capability is demonstrated by these projects. We also make customized customized standard units which are produced in small series over a number of years. Well-proven design and short lead times are our key success factors.

Pure water cooling for non-electrical environments
Pure water cooling can also be used for exact temperature control and to minimize contamination or scaling on heat transferring surfaces. With very pure water, the growth of microorganisms is inhibited without using chemicals. We have developed standardized cooling units for food packaging machines, some of which are now in serial production for major food packaging companies. With relatively large series, cost-effective production can be maintained, and with all material and components in stock, delivery time per unit can also be brought down to one week.

1 Longquan converter station, Three Gorges, China  |  2 Borwin 1, Nennet, Germany, Swedewater cooling systems from ABB installed both - at the platform Borwin1 and in the lifting vessel Thialf

3 ±800 kV North-East Agra HVDC link, PGCIL, India

4 | Swedewater cooling systems from ABB – Solutions for energy efficiency
As an integral part of the cooling system, we offer a large range of service offerings to optimize the efficiency of the equipment and increase its productivity.

Installation and commissioning
To ensure that the starting up and operation of the cooling system run smoothly, our professional supervisors are present on site. Being specialists in pure water cooling, they are able to guide you along the way and are experienced troubleshooters.

System condition diagnosis
Our specialists help you assess the condition of your cooling system and can give you professional advice for measures to be taken to ensure the functioning and enhanced life time of your equipment.

Service and Maintenance
We provide contract programs including status control, service and follow-up. As we keep the most frequently used spare parts in stock, they can be delivered within 24 hours. We guarantee 20 years of availability and keep all orders since 1960 on file.

Training
As several pure water cooling systems are customized, we provide tailor-made courses on site or on video. To make learning easy, your staff will be able to practice on equipment for realistic hands-on training.

Upgrading and Retrofitting
In order to find the best solutions for upgrading, modernizing or retrofitting a pure water cooling system, we document and evaluate important functional values. ABB experts focus on reliability for your refurbishment program, whether it concerns upgrading existing cooling systems with improved functionalities, new operating mechanisms, upgrading cooling controls or designing an upgrading kit for better performance.

The advantages of retrofitting are:
- reduced operating costs and maintenance
- increased availability, safety and reliability
- prolonged service life
- optimized operations
ABB’s commitment

Quality assurance
We are committed to provide the best products and services. Our products comply with or exceed the latest international standards. In addition to type tests in independent laboratories, our certified design and manufacturing process guarantee the highest quality. We are certified according to ISO 9001:2008.

Sustainability
For ABB, sustainability is about balancing economic success, environmental stewardship and social progress to benefit all our stakeholders.

Sustainability considerations cover how we design and manufacture products, what we offer customers, how we engage suppliers, how we assess risks and opportunities, and how we behave in communities where we operate and towards one another, while striving to ensure the health, security and safety of our employees, contractors and others affected by our activities. We are certified according to ISO 14001:2004 and OHSAS 18001:2007.

ABB facility for Swedewater cooling systems at Landskrona, Sweden

Troll A, Statoil, Norway
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