Paraflow Plate Heat Exchanger

POWER INDUSTRY APPLICATIONS
About APV

SPX FLOW provides advanced APV heat transfer solutions for cooling, heating, condensing and evaporation of process fluids - designed to solve heat transfer process challenges in a vast array of industries. They are designed to meet demanding process conditions and to optimize the utilization of energy. APV heat transfer solutions have proven reliable and highly efficient helping customers worldwide to run their processes safely and economically. Since APV invented the plate heat exchanger in 1923 we have been pioneering applicable technology in pressing, shaping, welding, sealing and testing steel. Dedicated and specialized SPX FLOW staff around the world is committed to design and provide efficient and durable heat transfer solutions to help customers optimize energy utilization and minimize downtime for improved profitability.

APV Paraflow Plate Heat Exchangers
For Power Industry Applications

POWERFUL BENEFITS
- Protects equipment from damage caused by contaminants
- Highly efficient heat recovery
- Flow rates up to 20,000 GPM (75,708 LPM)
- Simplifies maintenance, saving time and money
- Modular design facilitates flexibility for reconfiguration
- Compact design saves space

EFFICIENT, COMPACT AND COST EFFECTIVE

Efficiency
- High thermal efficiency saves money through reduction in required heat transfer area
- Low liquid hold-up improves start-up time and reduces operating fluid costs
- Achieves up to 97% heat recovery

Maintenance
- Eliminates complicated maintenance such as x-ray, ultrasonic and other non-destructive test procedures
- 100% corrosion resistant material reduces inspection and maintenance while ensuring reliable operation
- No moving parts minimizes vibration, ensures reliable operation and reduces maintenance

Cost
- Lower capital costs when compared to traditional shell and tube
- Efficient design reduces weight
- Life cycle cost reduction
- Reduced fouling leads to higher thermal efficiency, and minimizes maintenance and operating costs
- Lower fluid velocity maximizes plate life and reduces maintenance

About SPX FLOW

Based in Charlotte, North Carolina, SPX FLOW is a leading global supplier of highly engineered flow components, process equipment and turnkey systems, along with the related aftermarket parts and services, into the food and beverage, power and energy and industrial end markets. SPX FLOW has more than $2 billion in annual revenues and approximately 8,000 employees with operations in over 35 countries and sales in over 150 countries around the world. To learn more about SPX FLOW, please visit our website at www.spxflow.com
As a world-leading supplier in the energy sector of both traditional and alternative energy sources, SPX FLOW has devoted itself to developing products and systems that improve energy efficiency. SPX FLOW engineers rely on their extensive experience in the power industry to deliver solutions customized to your specific application.

**Typical Power Industry Applications**

**Conventional Power Generation Stations**
- Coal
- Oil
- Fossil Fuels
- Natural Gas

**Nuclear Power Plants**
- Non-Nuclear
- Nuclear Island

**Peak Load Stations**

**Combined Heat & Power Stations**
- Co-Generation

**Incineration Plants**
- Waste-to-Energy

**Renewable Energy**
- Geothermal
- Hydro-Electric
- Solar

**District Heating**
Process Knowledge Serving a Wide Range of Applications for Electric Power Generation

**POWER GENERATION STATIONS**

Heat is produced and transformed into electric energy using different methods. Depending on the source of fuels used to produce the heat and the layout scheme of the power plant, thermal power stations can be split (for the most part) into the following types:

- Conventional power stations using coal, oil, fossil fuels, or natural gas
- Nuclear power stations
- Peak load and other types of electric energy producing power plants:
  - Diesel power
  - Gas turbines
  - Combined cycle power stations (gas turbines + thermal power section in combination)
  - Generation or co-generation
  - Incineration plants
  - Geothermal power stations
  - Hydroelectric power
  - Wind power

**PLATE HEAT EXCHANGER DUTIES**

**Conventional Thermal Power Plants**

Plant auxiliary cooling requirements contain a number of thermal applications ideal for plate heat exchangers (PHE).

- Most applications are related to removal of excess frictional heat from various components in the auxiliary system
- Needs are primarily liquid to liquid duties, water to water, glycol to water or oil to water
- Design pressures in the auxiliary system are seldom above 150 PSIG
- Typical application design temperatures are usually between 120°F (49°C) and 212°F (100°C)

**Auxiliary Cooling Duties**

- Central cooling
- Vacuum pump cooling
- Generator cooling
- Feed water pump (lube oil cooling)
- Seal water cooling
- Turbine cooling (lube oil cooling)
- Drainage cooling (heat recovery)
- Air compressor cooling
- Emergency diesel cooling
- Condensate cooling (regenerative heat recovery)
- Plant and office heating

**Hydro Power Stations**

Lubrication oil cooling for the turbine and generator are usually the only applications in a hydroelectric plant.

**Nuclear Power Plants**

Cooling requirements in a nuclear power plant can be divided into two main areas: non-nuclear and nuclear island.

**Non-Nuclear Area**

The major part of the heat exchanger duties in the non-nuclear area are the same for the auxiliaries in a conventional power plant. PHEs are used in the area where the production of electric energy starts (from the turbine, to the distribution of the electricity, to the grid).

**Nuclear Island**

The nuclear island contains all the systems involved with the reactor for production of steam and the safety systems for the reactor. The PHE duties in the nuclear island are related to the safety circuits or to the cooling of excess heat. The heat exchangers installed in safety circuits are stand-by units. Other than test runs performed on a scheduled basis, these systems are just taken into operation in case of an emergency. Types of emergency cooling systems vary, depending on the type of reactors.
**Cooling Applications**
- Seal water for steam turbines
- Turbine lubricating oils
- High-quality water used in stator cooling passages
- Gland sealing oils
- Transformer oils
- Spent fuel element pond water
- Neutron shield
- Energy stand by
- Closed loop cooling using sea, river or cooling towers
- Pressure vessel cooling

**Energy Recovery Applications**
- Boiler house feed water
- Blow-down heat and water
- Geothermal applications
- Pre-heater and/or coolers for scrubber systems

**Typical Auxiliary Cooling Duties For APV Paraflow Plate Heat Exchangers**

PLATE HEAT EXCHANGERS
1. Secondary Cooling
2. Compressor Motor Cooling
3. Main Turbine Oil Cooling
4. Sealing Water Cooling
5. Drainage Cooling

Water source: Ocean, river, lake, cooling tower
A WIDE RANGE OF PLATE HEAT EXCHANGERS FOR POWER GENERATION APPLICATIONS

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<th>MODEL TYPE</th>
<th>CONNECTION DIAMETER</th>
<th>MAXIMUM US GPM LPM</th>
<th>G GASKETED</th>
<th>W WELDED PLATE PAIR</th>
<th>D DUO-SAFETY</th>
<th>STANDARD FRAME LENGTH**</th>
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** 150# ASME Frame Design as Basis

* Wide Gap
Start Benefiting Today

APV plate heat exchangers minimize downtime while reducing maintenance time and expenses, delivering all the benefits you need to improve your profitability. SPX FLOW’s experienced engineers will work with you every step of the way from system design to implementation, to ensure you get the solution that best meets the needs of your process.

To learn more about how SPX FLOW can help you improve your profitability, call us today at +1-800-207-2708.
Global locations

USA
SPX FLOW
1200 W Ash St
Goldsboro, NC 27533
USA
+1 888-278-4321

EMEA
SPX FLOW
SPX Flow Technology
Hermana Frankego 9
85-862 Bydgoszcz
Poland

APAC
SPX FLOW
666 Fengjin Road, Xidu Industrial Park
Feng Xian District
Shanghai 201401
Peoples Republic of China
+86 21 67158181