

## APV PLATE HEAT EXCHANGERS

### For the Power Industry

#### Efficient, Compact and Cost Effective

APV plate heat exchangers offer the most cost-effective solutions for heat transfer applications in the power industry that historically were served by shell and tube technology. Plate heat exchangers play an increasingly important role in helping power producers meet stringent water environmental and energy conservation regulations. Whether you are recovering waste heat or isolating the cooling system from the cooling source, APV has the application knowledge and products to improve your efficiency and performance. Advances in PHE technology have helped it supplant the shell and tube as the technology of choice in this demanding industry.

#### POWERful Benefits

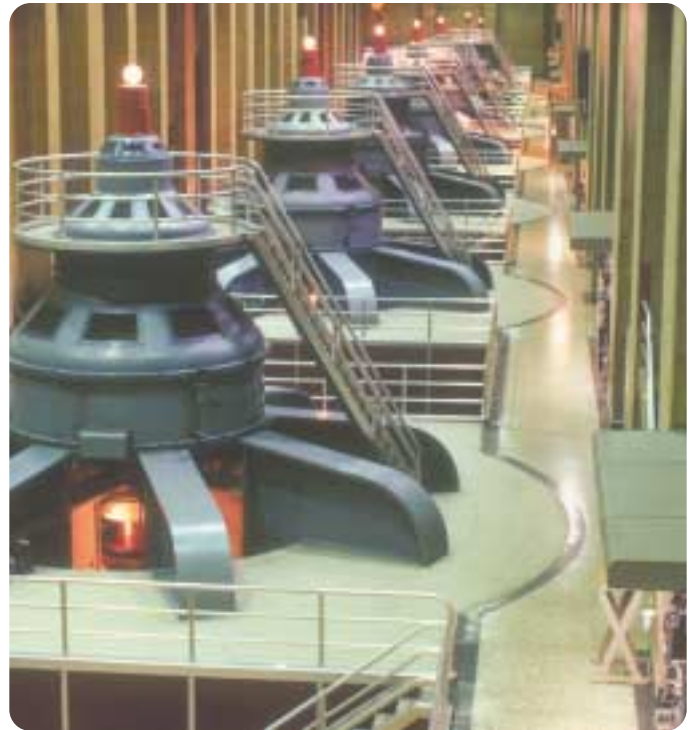
- Protects equipment from damage caused by contaminants
- Highly efficient heat recovery
- Flow rates up to 11,000 GPM
- Simplifies maintenance, saving time and money
- Modular design facilitates flexibility for reconfiguration
- Compact design saves space

#### 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

# Process Knowledge Serving a Wide Range of Applications for Electric Power Generation

As a world leading supplier in the energy sector of both traditional and alternative energy sources, APV has devoted itself to developing products and systems that improve energy efficiency. APV engineers rely on their extensive experience in the power industry to deliver solutions customized to your specific application.

## 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
  - Hydro electric power
  - Wind power

## Primary Applications

- Nuclear and conventional power stations
- Peak load stations
- Combined heat and power stations
- Incineration plants
- Geothermal schemes

## 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 (see diagram)

- 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 hydro-electric 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

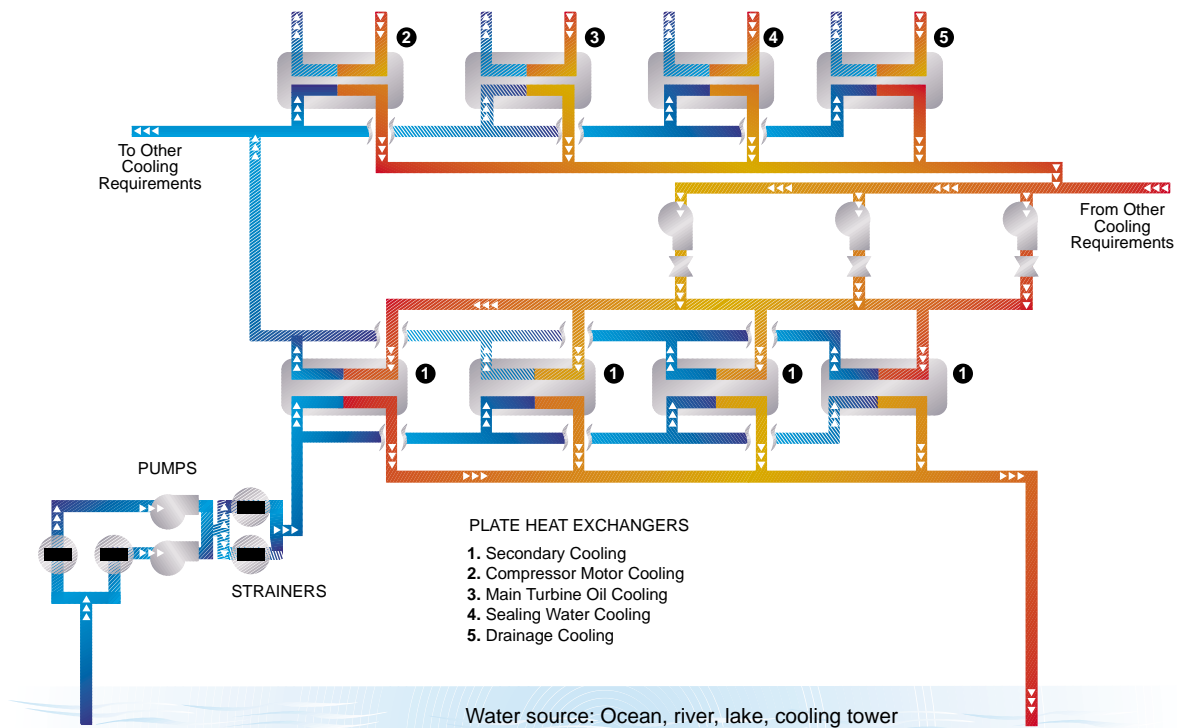
## Energy Recovery Applications

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

## Start Benefiting Today

APV plate heat exchangers reduce maintenance and operating expenses while minimizing down time, delivering the benefits you need to improve the profitability of your process. APV's knowledgeable engineers will work with you every step of the way from system design to implementation and beyond, to ensure you get the optimal performance from your system. To learn more about how APV can help improve your profitability, call us today at **888-278-9087**.

### TYPICAL AUXILIARY COOLING Duties for APV Paraflow Plate Heat Exchangers



# A Wide Range of Plate Heat Exchangers for Power Generation Applications

Model Type	Connection Diameter (Inches)	Maximum US GPM	Active Area Per Plate ft <sup>2</sup>	G	W	D	Standard Frame Length (Inches)**		Maximum Plate Capacity***
							Minimum	Maximum	
APV - TR1	1.5	125	0.65	X		X	17	31	178
APV - SR1	1.5	125	0.92	X			17	31	128
APV - SR2	2.0	200	1.87	X	X		20	59	335
APV - N35	3.0	460	3.75	X		X	16	98	507
APV - Q030	4.0	800	3.12	X			40	104	486
APV - SR6GH	4.0	800	3.62	X		X	40	104	388
APV - LR4	4.0	800	4.05		X		24	66	304
APV - R5*	4.0	800	5.60	X			37	220	700
APV - ER5*	4.0	800	5.67	X			37	220	700
APV - Q055	4.0	800	5.92	X			40	104	475
APV - SR6GL	4.0	800	6.00	X		X	40	104	396
APV - Q080	4.0	800	8.83	X			40	104	471
APV - SR6AG	4.0	800	9.57	X			40	104	415
APV - SR6AA	4.0	800	10.77	X			40	104	413
APV - A055	6.0	1800	5.92	X			30	98	453
APV - A085	6.0	1800	9.15	X			30	98	453
APV - A145	6.0	1800	15.63	X			30	98	441
APV - J060	8.0	3100	5.64	X			39	136	692
APV - TR9GL	8.0	3100	5.77	X	X		46	110	530
APV - SR9*	8.0	3100	8.69	X			46	136	365
APV - J092	8.0	3100	9.00	X			39	136	692
APV - TR9GN	8.0	3100	9.10	X	X		46	110	554
APV - J107	8.0	3100	10.67	X			39	136	692
APV - TR9AV	8.0	3100	12.50	X	X		46	110	536
APV - TR9AL	8.0	3100	15.75	X	X		46	110	551
APV - J185	8.0	3100	19.91	X			39	136	692
APV - B063	12.0	7000	6.78	X	X		46	197	899
APV - B110	12.0	7000	11.84	X	X		46	197	896
APV - B134	12.0	7000	14.42	X	X		46	197	889
APV - B158	12.0	7000	17.00	X	X		46	197	883
APV - B205	12.0	7000	22.06	X	X		46	197	718
APV - P105	14.0	9600	11.30	X			58	179	541
APV - P190	14.0	9600	20.50	X			58	179	541
APV - SR23AO	16.0	11000	15.40	X			127	244	740
APV - SR23AN	16.0	11000	19.30	X			127	244	735
APV - SR23PV	16.0	11000	23.30	X			127	244	735
APV - SR23PD	16.0	11000	27.30	X			127	244	730
APV - SR23VA	16.0	11000	31.20	X			127	244	730
APV - SR23VO	16.0	11000	35.20	X			127	244	727
APV - SR23VN	16.0	11000	39.20	X			127	244	727

- \* Wide Gap
- \*\* 150# ASME Frame Design as Basis
- \*\*\* Based on Standard Plate Thickness
- G - Gasketed
- W - Welded Plate Pair
- D - Duo-Safety

