



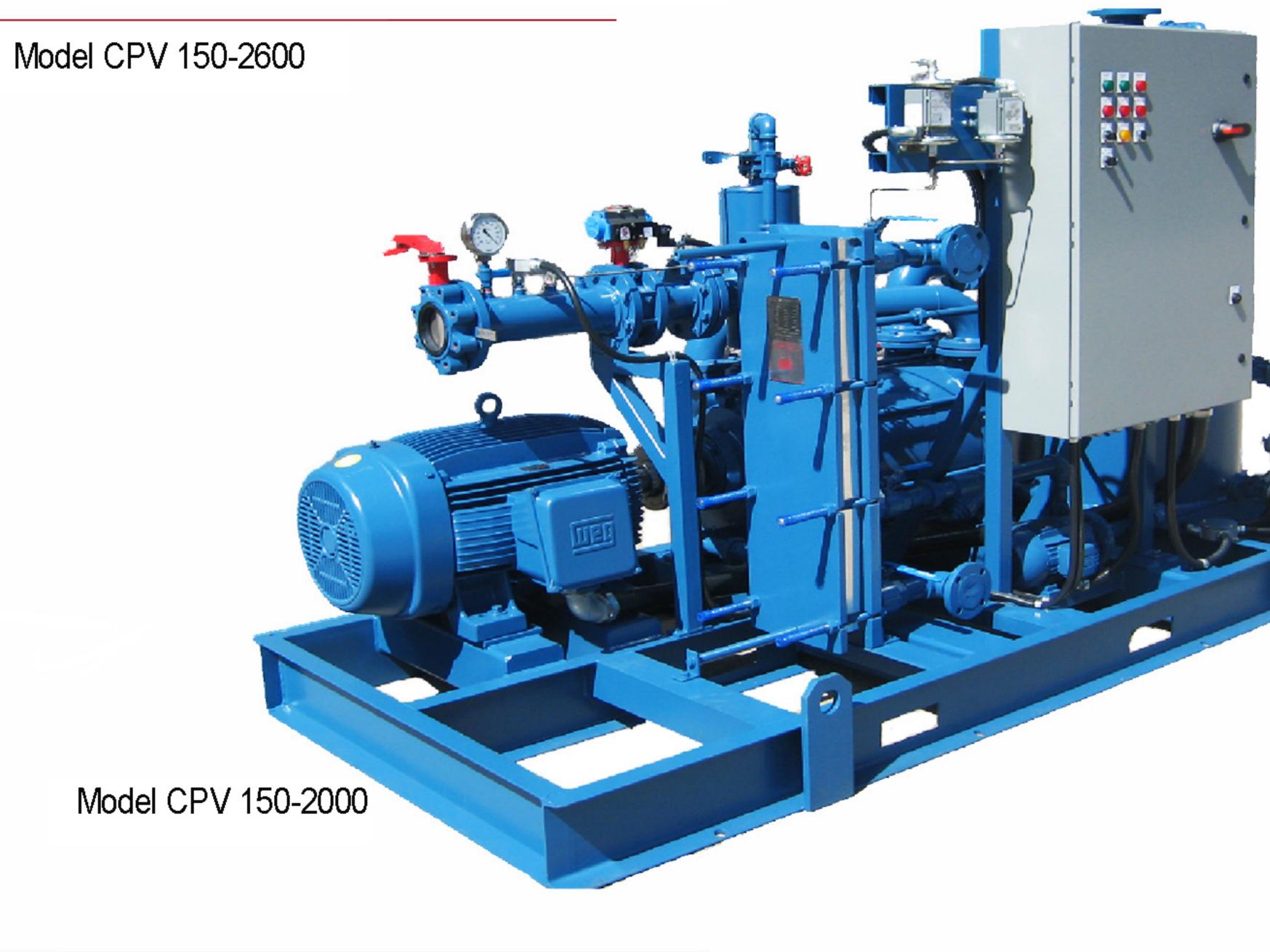
## VACUUM SYSTEMS FOR POWER PLANTS:

SOME EXAMPLES OF CONDENSER-EXHAUSTER PUMPS FOR TURBINE CONDENSERS

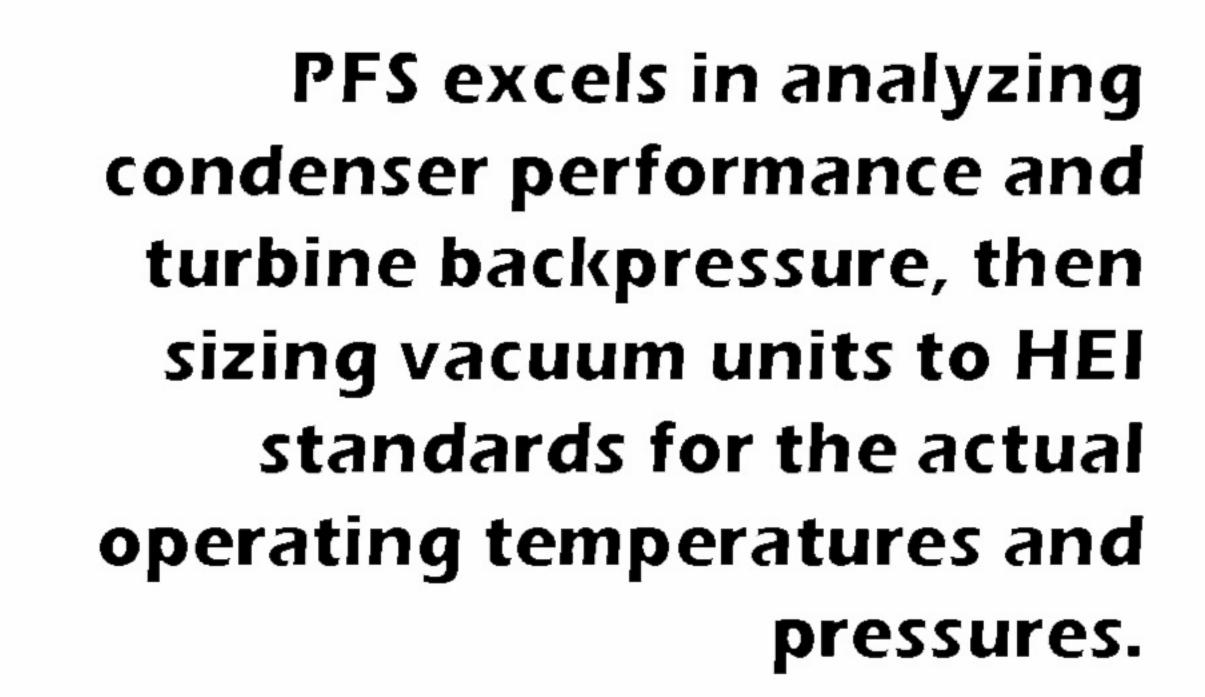


QUALITY FROM OVER 80 YEARS OF EXPERIENCE

As the Canadian Division of Travaini Group for over 25 years, Premier Fluid Systems Inc. has acquired expertise in engineering vacuum equipment that best suits client specifications.



Quality and reliability have led PFS to be trusted not only with North American clients, but abroad also. PFS is known to go the extra mile to deliver reliable condenser exhausters and water box vacuum pumps for the power industry. Satisfied clients include small to large power plants in multiple continents. (References Available)





Model CPV 150-2000

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## Premier Fluid Systems

Canadian Home Of Travaini Pumps

ISO 9001:2008 Certified Company





LIQUID RING VACUUM PUMPS FOR THE POWER INDUSTRY











## Premier Fluid Systems

\*2 - 50 HP DUPLEX

Canadian Home Of Travaini Pumps







## \*SUPERIOR HANDLING OF SATURATED AIR, VAPOURS, LIQUID SLUGS

Capability to handle large amounts of condensable vapours and entrained liquids in the incoming gas stream. Capacity can be greatly increased with no damage to the pump. Liquid ring pumps are ideal for condenser air extraction, where noncondensable air is fully saturated with steam.

### \*WIDER VACUUM RANGE ENHANCES TURBINE CONDENSERS **EFFICIENCY**

Two-stage pump breaks down the compression process to allow the first pump stage to operate cooler. This leads to maximum condensing and air handling capability. Vacuum ranges from atmosphere down to 25 TORR. The performance characteristics of the Travaini two-stage liquid ring vacuum pump closely matches turbine/condenser higher air/vapour loads experienced with the rise of condenser cooling water temperature.

#### \*TOLERANT OF SMALL PARTICLES IN GAS STREAM

Pump designed with clearances that allow small entrained particles to be handled without damaging effect. Seal liquid collects particulate that can then be filtered out of the water loop. Mechanical seals are standard features for Travaini pumps. These prevent water leakage from pumps to the environment for a cleaner installation and safe operation as well as preventing leakage of air from atmosphere into low pressure areas of the pumps.

#### \*SUPERIOR DESIGN & CONSTRUCTION FROM OVER 80 YEARS OF EXPERIENCE

Travaini has catered its pumps to be able to thrive in facilities such as power plants. Each pump stage sees a compression ratio of approximately 6:1, allowing more even distribution and performance which hold up better than single stage pumps with as much as 30:1 compression ratios. With Travaini pumps shaft length is shortened to minimize shaft deflections, as a result mechanical seals have durable life with minimum risk for leakages.

#### \*LOW MAINTENANCE & REDUCED COSTS

PFS exhauster vacuum units are engineered with maintenance accessibility in mind. The units are customised to client's specifications, adapted with power and controls to meet the site's requirements. Only reliable, economical and yet proven components are selected for these units that are guaranteed to work with lasting reliability. Variety of material options are available and selected depending on the site's conditions. Systems are designed, manufactured and tested under the ISO 9001-2008 standards.

# WATER BOX PUMP \*1 - 60 HP VACUUM CONDENSER PUMP condensing capability and air handling capacity from increased partial air pressure within its displacement. Warmed water cascades into the second stage where the temperature is far less critical. In addition, typical compression ratio from 1" HgA to 29.92" HgA (discharge) is distributed among the impellers, so each stage sees a compression ratio of less than 6:1, superior to single stage pumps with a



CONDENSATE OUTLET HOT WELL

Pump series

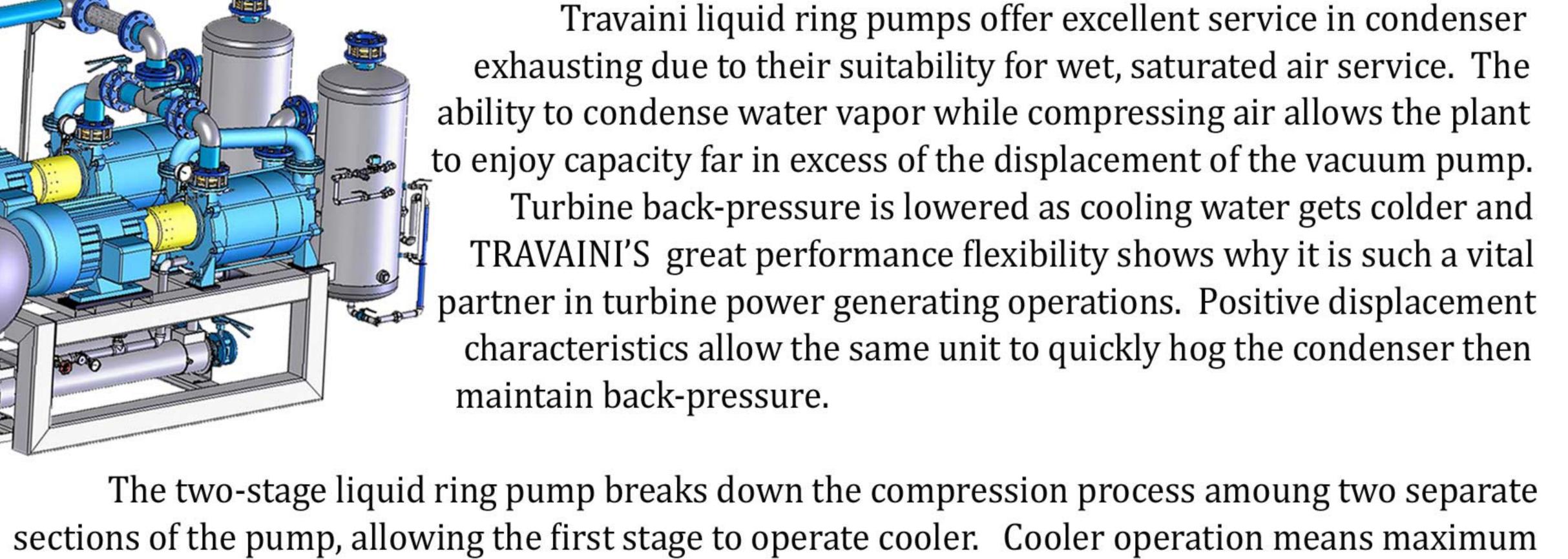
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6 KEY APPLICATIONS - OVER 80 YEARS OF EXPERTISE -1 RELIABLE NAME

### \*3 - Cooling Water Feed - For condensation of steam, heat is removed using cooling water pressurized with centrifugal pumps. Type depends upon type of water used

### \*4 & \*5 - Condensate Flow & Boiler Feed - Different pumps recycle water from condenser back to boiler for steam conversion. Sometimes requires very low NPSH. Travaini centrifugal pumps assure a superior range of flow rates & pressures

### **6 - Fuel Transfer** - To Heat oil and gas fired boilers. The reknown versatility of Travaini pumps can handle numerous fuels and burner ratings



PFS CONDENSER-EXHAUST

SYSTEM FEATURES

30:1 compression ratio. Both stages in the Travaini pump are hydraulically separated to prevent the warmed discharge compressant of the first stage from internal recirculation. The weakness in pump designs with two stages using only a single impeller will become more pronounced with normal wear. Travaini improved on two-stage pump technology by designing the pump specifically for mechanical seals. Shaft deflection varies as the cube of the unsupported shaft length, so small reductions in the distance between the bearings greatly improves shaft stiffness. Shaft length has been substantially reduced for a more rugged pump with greater dimensional stability during operation, which can be seen when comparing overall lengths with other pump makes. Mechanical seals prevent pump leakage for a cleaner installation and reduced threat of water contamination to the bearings. More importantly

however, the mechanical seal also pevents in-leakage of air from atmostpheric pressure into the low-pressure areas of the pump, assuring pump displacement is fully dedicated to draw from the condenser. This benefit is enhanced further with reduced maintenance.

If maintenance is required the Travaini pump will be easy to service. Detachable bearing brackets give easy access for seal replacement. There is no packing to wear the shaft and both bearings are outboard. Some competitor's pumps have a cantilevered second stage that must be removed to service packing areas or the bearings. The impellers on Travaini pumps are secured to the shaft by keyways assuring engagement, facilitating removal and reducing shaft stress under the impeller. Superior vacuum is maintained with the steam condenser as the pumping system acting as the process "workhorse" removes air leakage plus high vapor loads. Pumping speed is greatly improved via direct condensing action by both inlet water spray and contact with the pump seal water.

1 - Vacuum Condenser-Exhausting -Lowering of turbine back pressure and air leakages to allow maximum conversion and recycling of energy

Vacuum Box Priming - Removal of air from condenser to stop air locks and maintain strong cooling surface on condenser; Maintains vacuum in water box at required level