

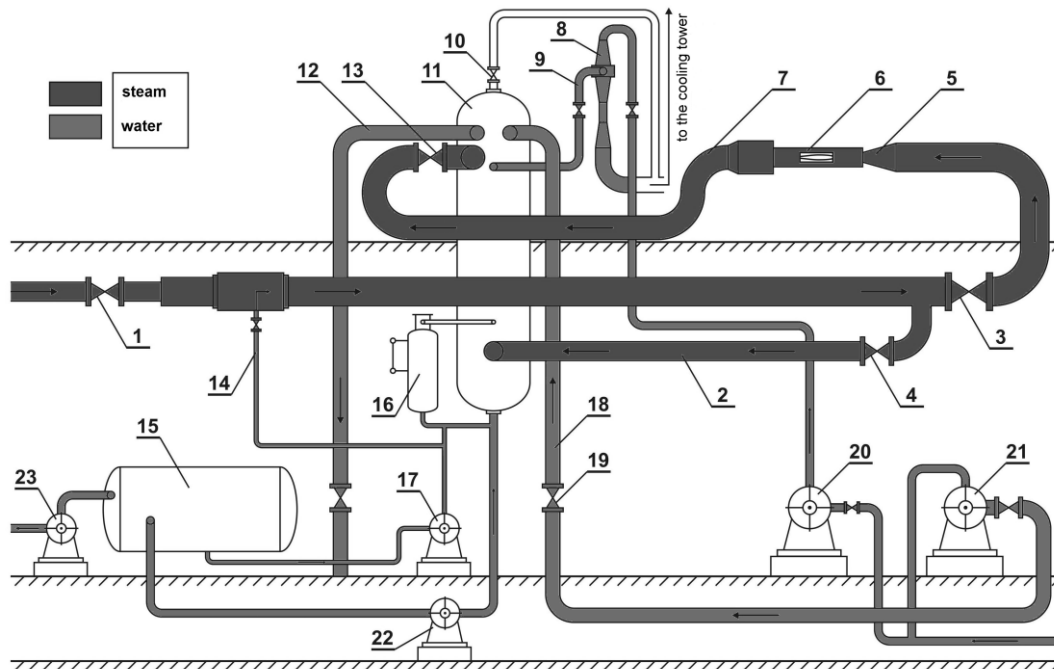
## EXPERIMENTAL RESEARCH ON THE STEAM CONDENSING FLOWS IN NOZZLES

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The presented work concerns a novel experimental research on transonic wet steam flow through Laval nozzles. The research were performed on the unique facility of a small scale steam power plant located in Machinery Hall of the Institute of Power Engineering and Turbomachinery (Dykas et al. 2011).

In the first part of this paper the experimental test rig was described. The steam tunnel (Fig. 1), which is an essential element of the test rig, comprises a test section using for nozzle as well as for blades cascade investigations in wide range of flow conditions, temperatures, pressures and outlet wetness (Smolka et al. 2011).



- 1) Control valve. 2) By-pass. 3) Stop gate valve. 4) Stop gate valve at by-pass. 5) Inlet nozzle. 6) Test section. 7) Outlet elbow. 8) Water injector. 9) Pipe. 10) Safety valve. 11) Condenser. 12) Suction line. 13) Throttle valve. 14) Desuperheater. 15) Condensate tank. 16) Control system of condensate level. 17) Condensate pump. 18) Discharge line. 19) Stop valve. 20) Water injector pump. 21) Cooling water pump. 22) Condensate pump. 23) Pump.

Fig. 1. Steam tunnel with auxiliary devices

In particular, it allows studying the phenomena occurring in the last stages of the condensing steam turbines, associated with the transonic wet steam flows. The measurement system including the pressure, temperature sensors and a data acquisition unit was also describes in details (Witkowski et al. 2007 and 2008). The applied measurement techniques

assure the high accuracy, what is crucial in measurements of such types of phenomena. The test sections and control panel of the measurement system is presented in Fig. 2.

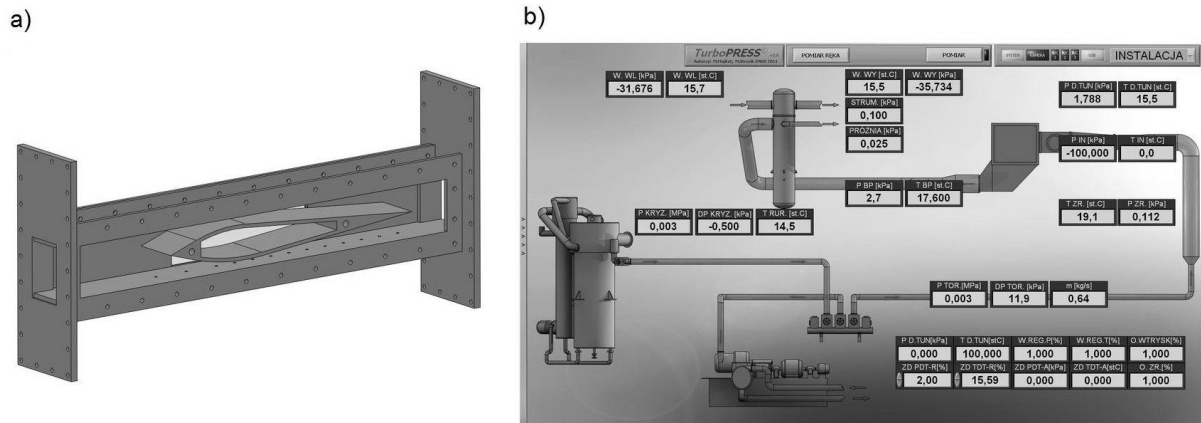


Fig. 2. Scheme of the test section (a) and measurement system (b)

The main part of the work deal with the experimental results presentation of the static pressure distributions along the Laval nozzles. The test section consists of two nozzle of different shape. For the same flow conditions (total parameters on inlet) the static pressure distributions in the top as well as bottom nozzle are measured simultaneously.

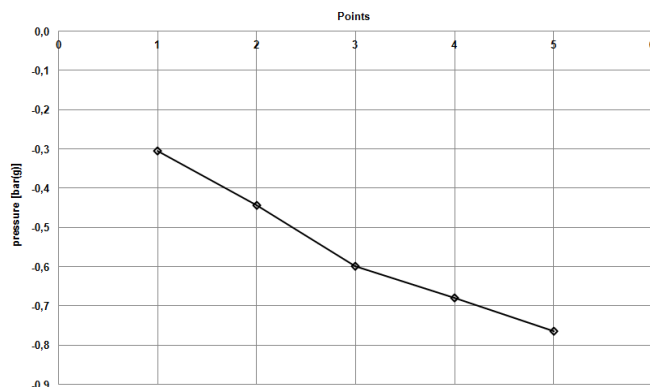
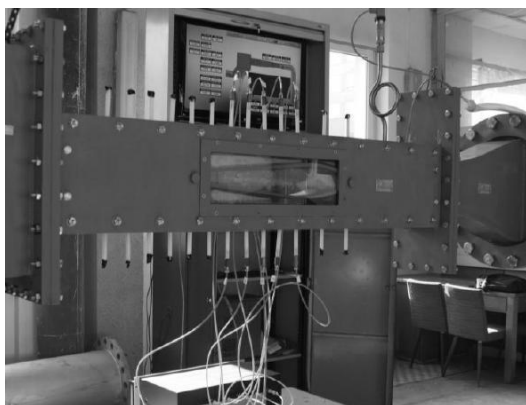


Fig. 3. Photo of the test section with two nozzle (left) and static pressure distribution along the nozzle (right)

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