# Series of Powerful Water-cooled Turbine Generators

A1 Rotating Electrical Machines
PS3 Question 3.2: For what reasons have other manufacturers, who may have introduced fully water-cooled generators in the past, discontinued these products in favour of more traditional mixed cooling concepts?

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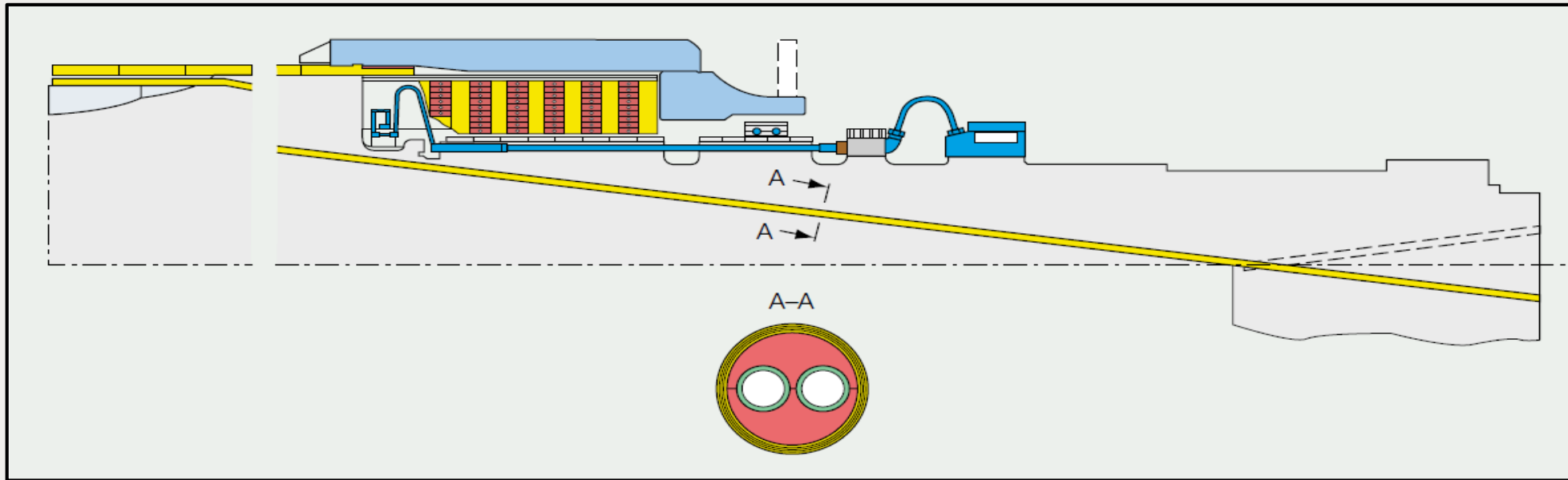
Design from other manufacturers of rotor cooling water connection
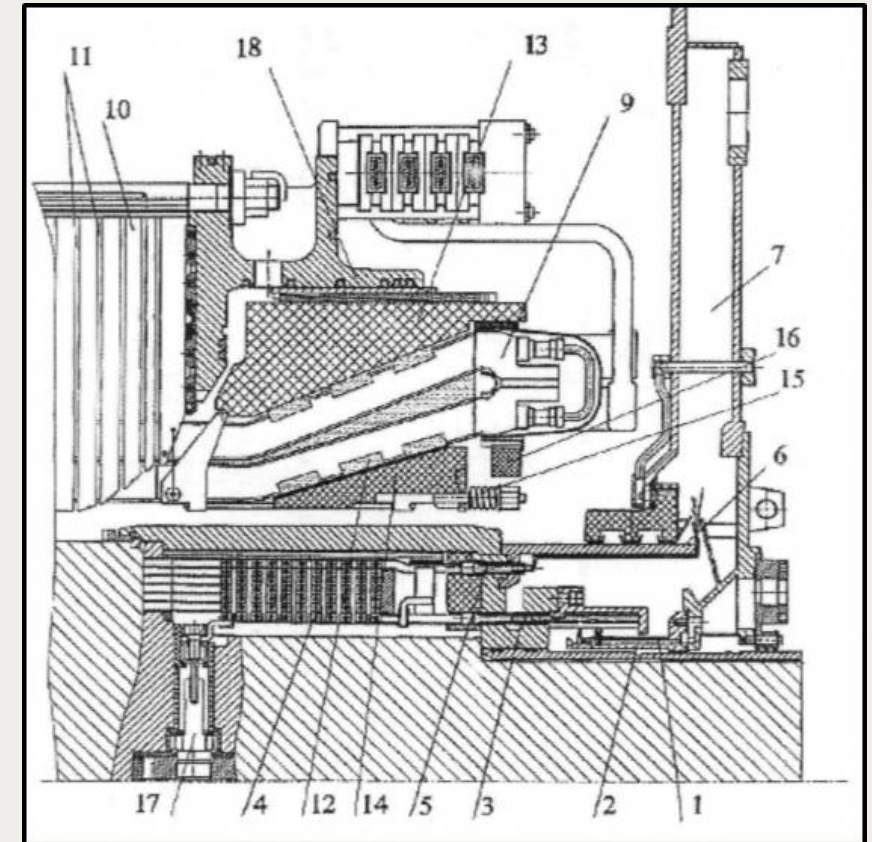
- Fully water-cooled turbine generators were discontinued by other manufacturers mainly due to the rotor problems.
- In designs of pressure cooling of the rotor, when distillate was supplied under pressure to the winding through the central hole of the rotor shaft, episodic leaks were observed.
- All connections of such cooling systems are subject to the action of centrifugal forces, variable forces during the rotation of a flexible rotor and have limited reliability.

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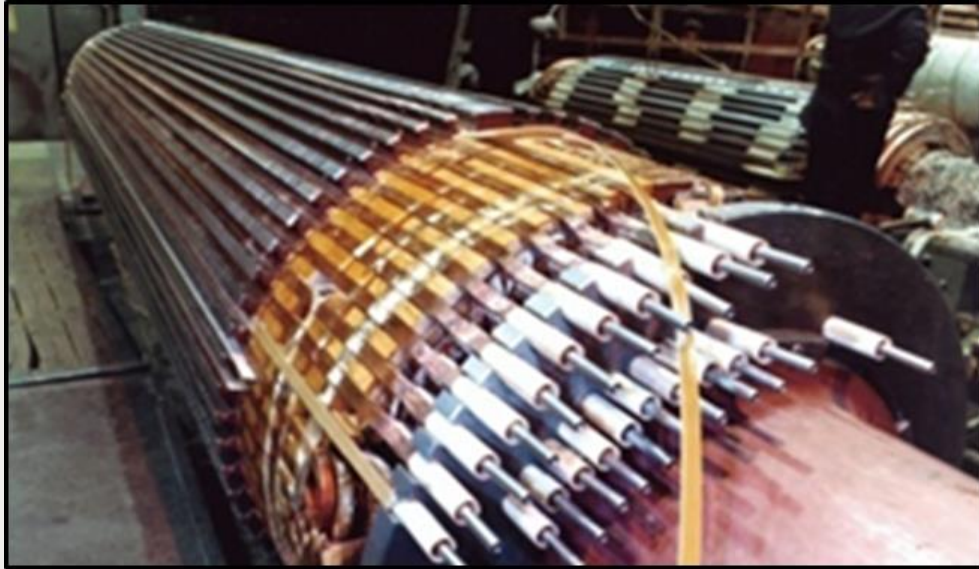
General view of the rotor winding of the T3B type turbine generator

End zone of the T3B type turbine generator

- A feature of the self-pressure rotor winding cooling system used by our company is the supply of distilled water in a unpressurised manner at the level of the lower winding turns and the discharge without back pressure at the level of the upper winding turns.

- The difference in water inlet and outlet levels determines the amount of useful head developed directly by the rotor and ensure turns of the field winding.

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Conclusions

- **The self-pressure water-cooled rotor design used in the T3B type turbine generators has eliminated the inconsistencies associated with the rotor and solved the problems of insufficient reliability of pressure cooling systems from other manufacturers.**

- **In addition, for high-power turbine generators with air-filled case, indirect water-cooling of the stator core and end zones is used.**

Thank you for your attention !