

## KONSTRUKTION DER REAKTOREINBAUTEN DES THTR-300-MWE-PROTOTYP-KERNKRAFTWERKES

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The reactor components of the THTR (Thorium High-Temperature Reactor) form a system which has to meet a number of different requirements. - In addition to the physical requirements as to shield, reflecting and thermalizing of the neutrons, they must meet all static and dynamic requirements, which arise due to fuel elements and operation. Furthermore they had to be constructed under consideration of an optimal cooling gas ducting. - No one of the reactor components can be disassembled. This had to be considered during construction in terms of strength, durability, and wear.

In the course of development a core-model of graphite in the scale 1:1.5 was built, to test the cooperation of all single components. Using the graphite structure, which was built in accordance to the drawing, and the operability, construction and assembling was tested.

The influence of the graphite shrinking to the stability and operability of the side-reflector was tested using a 1:10 aluminium model. The Wigner-shrinkings were performed in excess and in a decreasing linear line. This was done to demonstrate the free deformability under extreme conditions.

To determine the durability in the original scale (1:1), components of special importance were subjected to demolishing tests.

It was guaranteed by computation that the elements of the thermal shield - first of all bottom-plates and side-shield- will support the graphite components. Furthermore it had to be made sure that the bottom plates will adapt elastically to the deformations of the prestressed concrete pressure vessel and the tolerances of the roller bearings, which arise during construction and assembling.

The basic concept for the construction of the reactor components was to avoid for the complete installation as far as possible any loading effects due to Wigner shrinkings, thermal influences, and mechanical stressing in the components, as well as due to deformation of the prestressed concrete pressure vessel.

After the completion of the concept, numerous tests were performed partially in an own plant, partially by research institutes and companies in Germany and in some other countries.

To the major proportion the results of the developmental works are available and were taken into consideration during construction; some other results will be used for the manufacture of the equivalent parts.

The developmental investigations concentrated on computation and durability tests (abrasion, statical and dynamical strength) at the graphite components including thermal shields (side and bottom shield), flow tests at the gas-ducts and extended theoretical research and experimental tests at the hot gas insulation.