



Machine design

HPE Piston Cylinder Press System for HP / HT Experiments

The HPE piston-cylinder press system is designed specifically for high-pressure experiments up to approx. 3.8 GPa and 2000° C. The press is normally built with 320T in press force but can be adapted to different values. In the standard system, a maximum of 90T is available for the cell process pressure with the remaining force being used for the end-load. The press frame is stripwound, which enables a compact and strong press design with overall dimensions of W1450 x D700 x H1710 mm and a weight of approx. 1200 kg. These numbers include the electrical cabinet, the hydraulic power pack and the HP-vessel.

The cooling and cell heating systems are integrated into the HPE press, and a thermoelement is placed inside the center of the piston for temperature measurement. The vessel itself is positioned on a sliding table for an easy and safe setup of the experiment outside of the press.

Variants

The piston cylinder press system is offered in two variants regarding the press control:

1. Semi-automatic adjustment of process pressure using a pneumatic-hydraulic power pack solution; automatic heat adjustment with a Eurotherm PID controller.
2. Fully integrated PID-control of process pressure and temperature, mechanically implemented with a stepper motor. This allows for a fully automated operation of the press including programming and storing of pre-defined press cycles, data collection, storage, and export.

In both variants, the hydraulic pump is only activated when necessary, thus reducing the environmental impact and press noise compared to conventional hydraulic systems. The piston cylinder press is also available in a triaxial configuration with a movable sigma-3-piston, or with torsion on the sigma-1-piston.

Use in Industry

The press is CE certified and has a manually operated safety shielding system that automatically deactivates the press movement if the door is opened.

The press is built to order and based on a mutually approved equipment specification. Normally the equipment project includes both the press and the HP-vessel. Typical system sizes are 1/2", 3/4" and 1".



The Piston Cylinder Press machine



The HP-vessel positioned in the press



HP-vessel, here shown with quick-connecting external cooling rings