Equation of state and phase diagram of quartz ALEXANDER PETROVTSEV, VLADIMIR DREMOV, VENER VILDANOV, MIKHAIL GOR-SHKOV, VLADIMIR ZAHIKIN, YURI ZHUGIN, RFNC-VNIITF — On the basis of the latest experimental data and ab-initio calculations the multi-phase equation of state of quartz has been constructed. Quartz is a basic rock forming mineral. This fact initiated a comprehensive investigation into its thermodynamic, mechanical and shock-wave properties. Quartz has complicated phase diagram and one of the very interesting problems having fundamental character is the study of the polymorphous and phase transformations in quartz at high pressures and temperatures realizing when dynamic loading. Numerical modeling of these processes requires multi-phase equation of state. Here we present such an equation of state including a-quartz, stishovite and liquid quartz. Calculations carried out with the equation of state are in good agreement with the experimental data on static and shock compression of solid and porous quartz including the temperature measurements along Hugoniots. On the basis of an analysis of the calculated phase diagram and porous quartz Hugoniots the conclusions about what phase the legs of the experimental Hugoniots belong to have been done.