Presented are experimental data on compressibility of strongly non-ideal plasma of deuterium and helium, quasi-isentropically compressed up to densities $\rho \approx 14$ g/cc at pressures up to $P \approx 20000$ GPa (200 Mbar). The characteristics of experimental devices, methods of diagnostics and interpretation of experimental results are described.

Trajectories of metallic shells, compressing deuterium and helium plasma, were recorded by means of pulsed power sources of x-ray radiation with electrons boundary energy $\approx 60$ MeV. For the first time in the experiment a high-current accelerator as an additional source of x-ray radiation was applied with electron boundary energy $\approx 12$ MeV capable of examining of objects with surface densities up to $280$ g/cm$^2$.

Plasma densities up to $\rho \approx 14$ g/cc were determined by measured magnitude of the radius of the internal shell at the moment of its stop in each experiment. Compressed plasma pressure was obtained by means of gas-dynamic calculations, taking into account real characteristics of experimental devices.

The analysis of developed methodology allows us to rely on the possibility of investigating quasi-isentropic compressibility of deuterium and helium non-ideal plasma in RFNC-VNIIEF up to pressures $P \approx 25000$ GPa.