Transporting fresh concrete constitutes a significant part of the production process. Transferring ready-mixed concrete on-site is done using concrete pumps. Recent developments in concrete technology, and in mineral and chemical additives, have resulted in new developments in pumping techniques and the use of different concrete mixtures and equipment. These developments required further knowledge of the behavior of fresh concrete under pressure. Two criteria were determined for the pumpability of concrete: the power required to move the concrete or of the repulsive force; and the cohesion of the fresh concrete. It would be insufficient to relate pumpability to these two criteria; the values of segregation pressure, diffusion ability, water retention capacity, and side friction of the mixture are significant parameters in ensuring that concrete is pumped freely along the pipe. To solve the pumpability problem, friction stresses should be determined as a function of the linear pressure gradient, the pressure leading to segregation of the fresh concrete should be determined, and tests for the bleeding of concrete under pressure should be examined. The scope of the research is the examination of the behavior of fresh concrete under pressure. To determine the segregation pressures, a test apparatus was designed for the bleeding of concrete under pressure. The main purpose of the study is to determine whether the concrete can be pumped easily and whether it will lose its cohesion during the pumping,