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Nanofluids are suspensions of nanometer sized particles in any fluid base, where the nanoparticles effect the properties of the fluid base. Commonly, nanofluids are water based, however, other bases such as ethylene-glycol, glycerol, and propylene-glycol, have been researched to understand the rheological properties of the nanofluids. This work aims to understand the fundamental rheological properties of silica nanoparticles in brine based and brine-surfactant based nanofluids with temperature variations. This was done by using variable weight percent of silica nanoparticles from 0.001% to 0.1%. Five percent brine was used to create the brine based nanofluids; and 5% brine with 2CMC of Tween 20 nonionic surfactant (Sigma-Aldrich) was used to create the brine-surfactant nanofluid. Rheological behaviors, such as shear rate, shear stress, and viscosity, were compared between these nanofluids at 20[U+F0B0]C and at 60[U+F0B0]C across the varied nanoparticle wt%. The goal of this work is to provide a fundamental basis for future applied testing for enhanced oil recovery. It is hypothesized that the addition of surfactant will have a positive impact on nanofluid properties that will be useful for enhance oil recovery. Differences have been observed in preliminary data analysis of the rheological properties between these two nanofluids indicating that the surfactant is having the hypothesized effect.