An investigation on the effect of different cutting fluids in reaming is presented. The performance of three water based cutting fluids and one cutting oil was compared to that of a reference water based commercial product by measurement of cutting forces, surface roughness and part accuracy. Three subsequent reaming operations were carried out on austenitic stainless steel using high-speed-steel and solid carbide tools. The tested fluids were all significantly different from the reference fluid in at least some of the tested conditions. Significant differences down to 2 percent in cutting forces and 6 percent in roughness parameters were detected at 95% confidence level.