

## ABSTRACT

Dale, Natalie A. M.S., Purdue University, December 2002. The Effects of Rheological Properties of Powders on Their Granulation and Compaction Characteristics. Major Professor: Dr. Martin R. Okos.

Granulation is a particle size enhancement technique that has been widely researched due to its importance in many powder processing industries. An easy method of determining an optimal granulation endpoint is highly sought after. It has been stated that this endpoint can be found by closely monitoring the power or torque requirement during granulation, but this is not true for all materials. It is known that many factors influence granule growth including particle properties, binder properties, temperature, moisture, binder addition rate, and mixing speed. This paper looks at the importance of strain, strain rate, temperature, and moisture on binding characteristics during granulation and/or compaction of microcrystalline cellulose and introduces a mathematical to relate these parameters to their compaction and relaxation curves. It was found that temperature had a significant effect during granulation; as the temperature increased, less time and binder were required to reach endpoint granulation. Temperature effects, however, were masked by the effect of strain during compaction studies. The strength of the compacts was also highly reliant upon strain. Strain rate was found to have little or no bearing on compaction and relaxation curves.