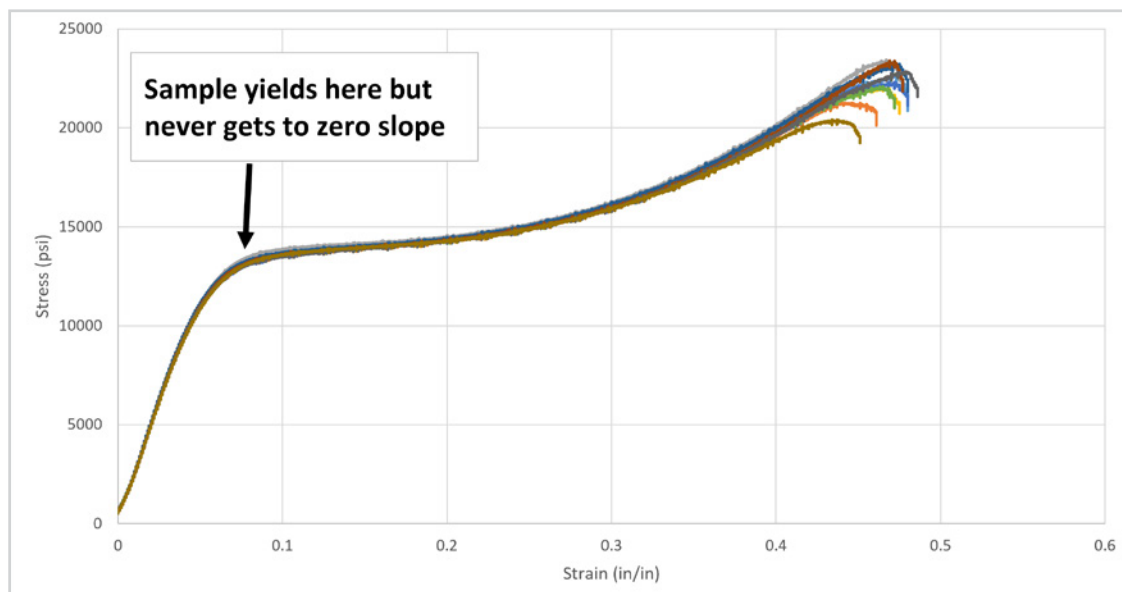


Refining Compressive Yield Stress Measurement for FDM Materials

Compression testing of 3D printed parts can often yield inconclusive results due to several inherent variables, including part porosity, inconsistent layer compression, and poor interlayer adhesion, all of which could compromise part ductility. To address these challenges and better represent the true compressive strength of FDM materials, Stratasys has refined its testing methodology.

Traditionally, compressive yield stress is identified at the point on a stress-strain curve where the slope reaches zero. However, with FDM-printed parts, this plateau may never occur. Instead, the curve often continues to rise gradually until rupture or peak stress is reached.

Stress vs Strain curve of 10 compression samples following ASTM D695



To accommodate this behavior, Stratasys now reports offset yield strengths at 0.2% and 1%, in alignment with ASTM D695 guidelines. One deviation from the standard with Stratasys' testing method is the termination point of the test. Rather than continuing to peak stress, the test is stopped once a 10% strain is reached. This adjustment shortens the test duration while still capturing all relevant compressive data.

This modified approach has demonstrated benefits, including reduced coefficient of variation (COV) in yield stress data and improved accuracy in compressive modulus measurements. Final reported values include offset yield strengths at 0.2% and 1%, as well as the compressive modulus. In some cases, previously recorded peak compressive stress values may still be available, but this will not apply to all materials.