

## Size and shape distributions by transmission electron microscopy: a carbon black aggregate case study

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Carbon black aggregate size and shape distributions affect its performance in many applications. This case study was part of a series of interlaboratory comparisons to develop a generic protocol for measuring such distributions by transmission electron microscopy (TEM) and has been coordinated through ISO/TC229 Nanotechnologies. This team compared data for an industry reference carbon black, SRB8, analyzed with a protocol based on ASTM D3849-14a. Multiple descriptor types (such as size, elongation, surface ruggedness plus ASTM D3849-14a-derived descriptors) were compared for repeatability, reproducibility and measurement uncertainties. Some derived descriptors had low interlaboratory reproducibilities and high measurement uncertainties. SRB8 aggregates were self-affine, i.e., their width and length descriptors scale anisotropically. SRB8 shape categories (spheroidal, ellipsoidal, branched, and linear) map non-uniformly into size distributions, leading to multi-modal behaviors. These findings illustrate the importance of assessing data quality for particle size and shape distributions.

Note: These results have previously been reported in *Carbon*, 2018, [130](#), 822-833.