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Screening Smoke Performance of Commercially Available Powders. 3. Infrared and Visible Screening by Carbon Black

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Abstract: This is the third in a series of reports that evaluate the smoke screening performance of commercially available powders. The first report described performance parameters and developed figures of merit to compare the ability of smoke materials, to attenuate electromagnetic radiation in the visible infrared and microwave spectral regions. This report investigates carbon black pigments. Many of them attenuate visible radiation better than titanium dioxide described in the second report and a few of them attenuate infrared radiation better than graphite flake described in the first report of the series. Coagulation leads to the formation of large carbon black chain aggregates which govern the screening properties. An additional criterion, contrast reduction, must be included when comparing a white visible screening smoke such as titanium dioxide with a black visible screening material such as carbon black. Results from modeling the contrast transmittance of white and black smokes indicate that the tabulated carbon black figures of merit based on attenuation of radiation should be divided by 1.5 to compare its contrast reduction capability with that of a white smoke. (jg)

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