

Mr. H. D. Anderson,

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November 26, 1959.

to preserve new smoke by dilution and thus prevent its agglomeration, showed that the average particle size of new cigarette smoke is much smaller than was previously thought. A value was obtained for mass mean diameter of  $0.2\mu$  as opposed to  $0.92\mu$  for undiluted smoke, and  $2.0\mu$  for undiluted smoke aged 2 minutes. Your findings, then, are consistent with this picture of smaller smoke particles.

With best regards,

Yours sincerely,

*L. C. Laporte*  
L. C. Laporte - MANAGER  
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*P.O.*

Research & Development
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Mr. H. D. Anderson,  
Research & Development Establishment,  
British-American Tobacco Co. Ltd.,  
Regent's Park Road,  
Southampton, England.

Dear Hugh:

In reply to your letter of October 20, we do not see how it would be possible to form K-389 into a filter plug. The K-389 is a very finely divided powder, fibrous rather than granular. The fibres are curled, a few microns in length and a fraction of a micron in diameter. When compressed, the material forms a hard cake rather than a loose coherent mass and to act as a filter it must be supported by some other material such as tobacco.

You consider it likely that since a mixture of K-389 (4%) and tobacco has about the same coefficient of retention as does tobacco alone (about 4.0), the retention coefficient of K-389 is also of the same order. We have no other information on this matter, and have wondered whether you have any experimental evidence that the retention coefficient of a mixture is additive with respect to the retention coefficients of the individual components. We would be very hesitant to draw such a conclusion on the basis of our work since K-389 was present in the mixture to the extent of only 4%, and its coefficient of retention could in actual fact be appreciably different from 4, yet have an immeasurable influence on the coefficient of the mixture. Unfortunately we do not see how we can make a filter from 100% K-389 to prove this point.

With regard to the question of the retention coefficient depending on air velocity, and increasing at low velocities, it is well known (Handbook on Aerosols, U. S. Atomic Energy Commission, 1950) that small particles are removed more effectively by a filter at low velocities by the process of diffusion, whereas large particles are best removed at high velocities by inertial deposition. It has been suggested that at particles sizes around  $1\mu$ , velocity has little effect. Some work recently published by Philip Morris Inc., (Determination of Particle Size and Electric Charge Distribution in Cigarette Smoke, by Holmes, Hardcastle, Mitchell, Tobacco Science 3, 148, 1959) in which great care was taken

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