

ONLY THE TITLE PAGE AND THE SUMMARY PAGE ARE HELD ON THIS FILE

THE FULL REPORT CAN BE SEEN ON APPLICATION TO CENTRAL FILING

THEORY OF SELECTIVE FILTRATION PART I

REPORT NO. RD.304-R

20.10.1964

AUTHOR: R. G. Hook

ISSUED BY: D. G. Felton

PROJECT NO: 3400

DISTRIBUTION:

D. S. F. Hobson, Esq.	Copy No. 1
Sir Charles Ellis	" " 2
K. E. Haines, Esq.	" " 3
H. D. Anderson, Esq.	" " 4
J. H. Maslen, Esq.	" " 5
M. M. Gilliam, Esq.	" " 6
R. A. Boothroyd, Esq.	" " 7
T. M. Wade Jnr., Esq.	" " 8, 9, 10
L. C. Laporte, Esq.	" " 11, 12, 13
W. W. Reid, Esq.	" " 14, 15
Herrn E. W. Söring	" " 16, 17, 18
E. C. Fieldsend, Esq.	" " 19
R. & D.E. Library	" " 20, 21
<u>R. & D.E. File No. 46S-11</u>	" " 22

COPY NO: 22

File 46S-11

100057873

Research & Development Establishment,
British-American Tobacco Co. Ltd.,
Southampton.

RGH/VEC/463-11

25th August, 1964.

THEORY OF SELECTIVE FILTRATION PART I

(Report No. RD.304-R)

CONCLUSIONS

By making simplifying assumptions the following conclusions may be drawn:

(1) Selective filtration of smoke would occur even if the filter material were perfectly sorbing for all smoke constituents, i.e., completely non-selective.

(2) The number of filter channels is more important than their size alone, in the following cases:- (a) particulate filtration by Brownian diffusion, (b) vapour filtration, and (c) filtration by a distillation mechanism when evaporation from the droplets is very rapid.

(3) In case (c) the ratio of gas space to total filter volume is unimportant but when evaporation from the smoke droplets is the rate controlling factor the filtration efficiency of the filter increases as the ratio of gas space to total volume increases.

(4) For all mechanisms considered here, the filtration efficiency per unit pressure drop increases as the ratio of gas space to the total volume of the filter increases.

(5) In filtration by distillation mechanisms the "effective diffusivity" (i.e., the product of the diffusivity and the proportion of the substance, in the vapour phase at equilibrium) is a very important factor.

(6) The pH of smoke affects the filtration efficiency for acids and bases even if the sorbent is neutral.

(7) Selective filtration of substances of molecular weight over 250 is not really practicable by the distillation mechanism, even if a suitable sorbent could be found.

100057874