



# B.A.T (U.K. and Export) Limited

## RESEARCH & DEVELOPMENT CENTRE

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15th July, 1986

Dr. A. Porter,  
Imperial Tobacco Limited,  
PO Box 6500,  
Montreal,  
P.Q.,  
CANADA, H3C 3L6.

Dear Andrew,

Following your recent visit to R&D, I have extracted some information on the Filtrona filters that we discussed. This information has been taken from a report I am writing and represents an overall view of the effectiveness of these filters, particularly for reducing the CO/tar ratio. Delivery measurements were made but we did not undertake any sensory evaluation of these filters.

In total, eight of the speciality filters were studied:

SCS III	LRY
TCT	COD
RATIO	ASTRA
COSTAR	CPF

and the physical parameters (Table 1) show a range of both filter weight and pressure drop. Each filter was used to manufacture an 84 mm cigarette (flue-cured blend, 50 CU cigarette paper) and smoked under standard smoking conditions in unventilated and ventilated (40%) versions. A standard reference cigarette was also used as a control. In the unventilated filter cigarettes the range of tar deliveries (Table 2) was 10.6 to 21.6 mg whilst the CO deliveries were between 16 and 22 mg indicating that each filter has very different filtrational properties. For example, the Ratio filter has a tar efficiency of 37% (PD = 160) whilst the control filter was 54% efficient at half the pressure drop. By changing the PD-efficiency characteristics of the filter, a change in the CO/tar ratio is achieved.

When the ventilated cigarettes were smoked, there was a similar CO delivery for each product but a wide range of tar deliveries (Table 3) was obtained. Thus, the lower CO/tar ratios are due to a higher tar delivery at a given ventilation and pressure drop relative to a conventional product. If the CO/tar ratio was determined at comparable delivery levels, I would expect the COSTAR and COD filters to provide the best ratio, but these are low PD filters and similar ratios could be obtained by conventional cigarette design with low PD CA filters.

/Continued ...

A Member of the B A T Industries Group

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Dr. A. Porter

15th July, 1986

A further factor in a decision to use these filters is the cost and I enclose (Table 4) some relative cost data for these filters, based on a unit cost for BAT in-house mono acetate filters. You will see that some filters are very expensive, at present, and these costs are only a guide!!

I hope you find this information useful and that it will save you the problem of having to carry out the tests yourself. Should you require any further information, please let me know.

Kind regards,

Yours sincerely,



M.G. DUKE (Dr.)

CC: Dr. T. Hirji  
Mr. J.A. Luke  
Mr. P.R. White

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TABLE 1

PHYSICAL PARAMETERS OF FILTRONA FILTERS

Filter	Length (mm)	Weight (mg)	Pressure Drop (mm H <sub>2</sub> O)
CA Control	20	135	85
SCS III	20	260	72
TCT	25	400	120
RATIO	25	260	162
COSTAR	25	260	45
LRV	25	380	73
ASTRA	25	280	50
CPF	25	195	100
COD	20	200	65

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TABLE 2  
SMOKE ANALYSIS FOR UNVENTILATED FILTERS

Filter	TPM (mg)	Nicotine (mg)	H <sub>2</sub> O (mg)	CO (mg)	PMWNF (mg)	PN	CO/PMWNF
CA Control	18.6	1.2	3.2	18.4	14.3	9.1	1.3
SCS III	21.4	1.4	3.9	20.0	16.1	9.3	1.2
TCT	23.1	1.5	4.1	19.9	17.5	9.0	1.1
RATIO	25.5	1.7	3.8	21.1	19.9	8.9	1.1
COSTAR	31.0	1.8	7.6	22.1	21.6	8.9	1.0
LRV	23.6	1.6	3.1	16.9	18.9	8.7	0.9
COD	26.5	1.8	3.7	16.9	21.0	9.1	0.8
ASTRA	21.3	1.4	2.8	16.8	17.1	8.5	1.0
CPF	13.2	1.0	1.7	16.0	10.6	8.5	1.5

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TABLE 3  
SMOKE ANALYSIS FOR VENTILATED (40%) FILTERS

Filter	TPM (mg)	Nicotine (mg)	H <sub>2</sub> O (mg)	CO (mg)	PMWNF (mg)	PN	CO/PMWNF
CA Control	11.6	1.0	1.0	10.4	9.6	9.9	1.1
SCS III	14.6	1.0	1.8	11.8	11.7	11.1	1.1
TCT	16.0	1.1	2.0	11.7	12.9	10.7	0.9
RATIO	16.2	1.1	1.6	12.5	13.5	10.5	0.9
COSTAR	18.2	1.3	2.7	10.5	14.2	10.4	0.7
LRV	15.6	1.2	1.5	10.0	12.9	9.9	0.8
COD	18.4	1.4	2.0	10.7	15.0	10.5	0.7
ASTRA	11.6	0.9	1.1	9.6	9.7	10.0	1.0
CPF	8.3	0.7	0.7	9.9	7.0	10.1	1.4

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TABLE 4  
RELATIVE COST OF FILTERS

<u>Filter</u>	<u>Relative Cost</u>
CA 400 mm PD	1
Filtrona mono acetate (PD = 360)	1.4
Filtrona mono acetate (PD = 500)	1.6
CPF	1.6 - 1.8
ASTRA	2.9 - 3.2
RATIO/LRV	3.4 - 3.5
SCS III	4 - 4.3
TCT	5.8 - 6

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