

FROM Dr. C.G. Miller

TO Mr. L.C. Laporte

February 29, 1960.

Temperatures in the Smoke of Gold Crest Cigarettes.

Reference: Memorandum K. Woolrich to Research & Development
Jan. 9, 1959

In view of certain comments that Gold Crest seems to give a "cool" smoke we undertook to compare this brand to Players Mild and Matinee with respect to its smoke temperature.

Experimental

The procedure for determining smoke temperature was identical with that outlined in detail in the reference memorandum. Ten cigarettes from each brand were selected by weight within ± 15 mg. of the target weight for the brand and smoked under standard conditions on our smoking machine. The temperatures in the smoke at a distance of 1 mm. behind the cigarette were measured by means of a thin (0.002" diameter) thermocouple connected to a potentiometric recorder. The butt length at the beginning of each puff was recorded.

Results

For each cigarette the recorder trace was a series of peaks corresponding to the temperatures occurring in the smoke at the times of the individual puffs. The temperature corresponding to each peak height was plotted against the butt length and a composite curve drawn to fit the points obtained from all ten cigarettes from each brand.

In general, the curve exhibits a long period during which the smoke is at room temperature, followed by a period of relatively sharp temperature rise as the butt length becomes shorter and shorter.

Three numbers are taken to characterize such a curve.

They are:

LTR : Length of first temperature rise (in mm.)

LBT : Length at which the rising temperature curve passes body temperature (in mm.)

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T_{25} : Temperature at a butt length of 25 mm. (in deg.F)

It is to be noted that a higher value for any of these criteria indicates a "hotter" smoke.

TABLE OF RESULTS

Brand	Selection Weight	L_{TR} mm.	L_{BT} mm.	T_{25} deg. f.
Gold Crest	1135±15 mg.	28.5	27.0	116
Player's Mild	1125±15 mg.	32.0	29.3	134
Matinee	1070±15 mg.	37.0	34.5	188

Comment

It is evident from the table that Gold Crest does in fact give a smoke which is somewhat cooler (for a given butt length) than Player's Mild, and considerably cooler than Matinee.

It is well established that weight has a large effect upon smoke temperature and the trend of the present results can probably be adequately accounted for by the differences in weight between the brands selected. An additional effect may be that the fine-cut tip of Gold Crest acts as a better heat-exchange medium than does the more coarsely cut tobacco in Player's Mild. The cellulose acetate tipping material of Matinee is known to be relatively poor as a heat-exchange medium.

Although it is not possible to make direct comparisons over extended periods of time, it is possible to compare indirectly the smoke temperatures of Gold Crest with those of "overweight" cigarettes put out about a year ago by Rothmans. In the case of both Consulate and Rothman's an increase in weight of approximately 100 mg. reduced L_{TR} and L_{BT} by about 4 mm. and T_{25} by approximately 40°F.

The temperature reduction brought about in Gold Crest by slightly higher weight and an all-tobacco tip (as compared with Player's Mild) are not so dramatic as those cited above and it is my opinion that the temperatures in the smoke of Gold Crest are probably not as low as were those in Rothman's (King Size plain) cigarettes. The figures actually obtained for Rothman's are given below.

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Selection Weight

1200 mg.

L_{TR}

27 mm.

L_{BT}

25 mm.

T₂₅

99°F

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