

FROM Dr. C.G. Miller

TO Mr. L.C. Laporte

March 23, 1960.

Comparison of Gold Crest to Other Brands
With Respect to Smoke Temperature.

This is further to my memorandum of February 29, 1960 in which were reported the results of a study of temperature in the smoke of Gold Crest cigarettes as compared to Player's Mild and Matinee.

The present work extends the study to cover certain competitive brands which might be expected to have relatively low smoke temperature. The brands chosen for this comparison were: Gold Crest, Player's Mild, Sweet Caporal, Export, Rothman's (plain), Rembrandt, and Peter Stuyvesant. Although it is well established that filter tipped cigarettes exhibit higher smoke temperatures than plain cigarettes, the filter brand Rembrandt was included because of a possible effect of the highly porous cigarette paper "cooling" the smoke and the filter brand Peter Stuyvesant was included because the tobacco portion is rather more heavy than normal cigarettes, and weight is known to affect smoke temperature markedly.

Experimental

The procedure used for the present experiments was identical with that used earlier (see my memorandum Feb. 29, 1960 and a memorandum: K. Woolrich to Research & Development Jan. 9, 1959) with the exception of one detail. At the beginning of this experiment the thermocouple wire (0.002" dia. platinum vs. 13% rhodium, 87% platinum) used previously was found to be giving an incorrect E.M.F. for a known temperature. Because of the urgency of the work it was decided to discard the offending wire and replace it by wire of different composition (chromel-alumel) which we had on hand. Unfortunately the wire is of slightly larger diameter, 0.003", and the increased mass of the wire leads to a slower response to temperature changes.

This change in procedure leads to results which appear to indicate cooler smoke temperatures (or shorter butt length for a given temperature). The present results are therefore not comparable with results obtained previously, although valid comparisons may be made among the seven brands tested in this experiment.

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All samples were conditioned for several days at 70°F and 65% R.H. A sample of ten cigarettes was selected by weight within ±15 mg. of the average weight of the cigarettes submitted (the target weight in the case of Imperial brands).

The results quoted were read from a curve obtained by plotting the experimental values of smoke temperature against butt length and are a graphical average of such experimental values for ten cigarettes.

The experiments on individual cigarettes were carried out in random order over a period of some three days.

Results

The results are summarized in the following table. The three symbols: L_{TR} , L_{BT} , and T_{25} , which have been explained fully in previous reports, characterize the shape of the curve of smoke temperature vs. butt length. A low value for each symbol represents a "cool" smoke. The brands are arranged in the order of increasing smoke temperature.

TABLE OF RESULTS

Brand	Selection Weight mg.	L_{TR} mm.	L_{BT} mm.	T_{25} deg.F
Gold Crest	1135	24.2	22.8	88
Export	1135	25.2	24.4	95
Sweet Caporal	1125	26.	25.6	102
Player's	1125	27	25.5	102
Rothman's	1168	26.4	26.1	104
Peter Stuyvesant	1261	27.6	26.8	122
Rembrandt	1159	32.8	31.3	164

Comment

The present results confirm that Gold Crest gives a cooler smoke (for a given butt length) than either filter tipped cigarettes or plain cigarettes of conventional design. The cigarettes which

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approach this brand most closely are the plain-end regular size cigarettes: Export, Sweet Caporal and Player's Mild. A king-size cigarette (Rothman's), although heavier, gives smoke of about the same temperature as the regular-size cigarettes.

The considerable increase in weight does not overcome the effect of the filter tip on Peter Stuyvesant, and the results for Rembrandt confirm some previous work in this laboratory that an increase in the porosity of the cigarette paper has little effect on smoke temperature.

It is pointed out once more that the data obtained in this experiment are perfectly self-consistent although they should not be compared with data obtained previously with thermocouple wire of smaller diameter.

C. G. Miller

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