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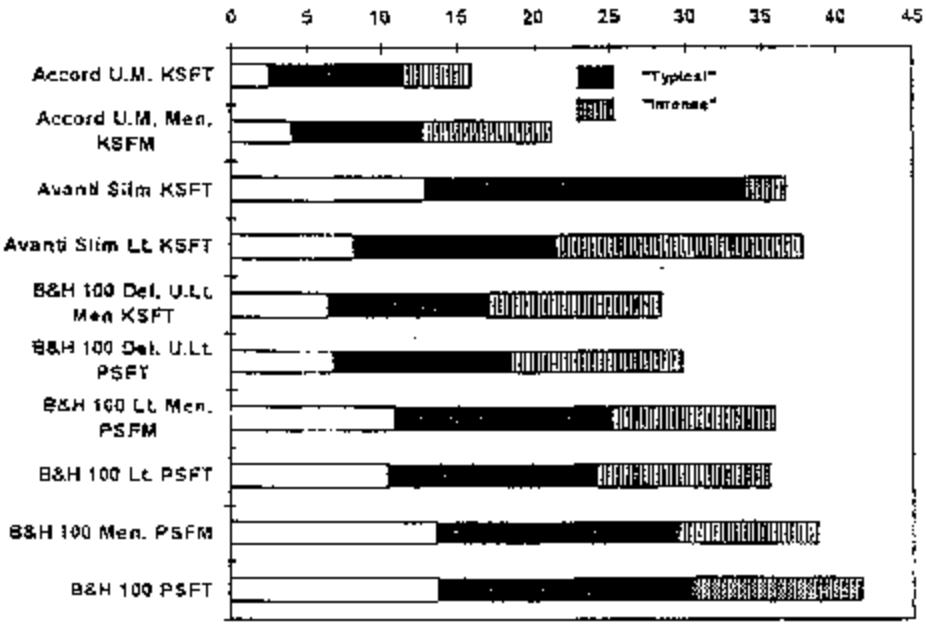
CANADA

# Smoking Under Realistic Conditions: Development of Minimum and Maximum Values for Toxic Constituents in Tobacco Smoke

## Project Report: DSS File No 35SS.H4078-5-C105





by

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# 1. Background

## 1.1 Origins of the Standard Smoking Machine Protocol

In Canada the first report on the tar and nicotine deliveries of cigarettes appeared in 1969 (1) followed by yearly press releases from the Minister of Health until 1989. At that time it became mandatory to include yields on all packages of cigarettes sold in Canada.

The key parameters in the standard method used both in Canada and in the US originated in the laboratories of the American Tobacco Company in the 1930s (2,3). These parameters are: 35 ml puffs taken over 2 seconds 1 minute apart until a specific butt length has been reached. The parameters were "arbitrarily selected" (3) after consideration of a set of measurements reported by Pfyl in 1933. The "arbitrary" nature of the values set for the parameters was not a problem for the original authors since the goal of the testing protocol was to control cigarette variability and to allow for comparisons among various types of cigarettes.

## 1.2 Smoking Machine Yields as Indicators of "Risk to Health"

In 1964, Dr. Luther Terry issued the first Surgeon General's report on the health risks of smoking. The report concluded, among other things, that cigarette smoking was a cause of lung cancer in men. Two years later, the Public Health Service stated that, "***The preponderance of scientific evidence strongly suggests that the lower the tar and nicotine content of cigarette smoke, the less harmful would be the effect.***" (( *see reference 10, U.S. Dept. of Health and Human Services, The Health Consequences of Smoking: The Changing Cigarette (1981) (quoting 1966 Public Health Service statement)).* Because of this statement, for many smokers, a linkage was created between a machine determined tar value and risk to health. Expressing the opinion held at that time by many people in the U.S. government, Senator Magnuson stated that "***By encouraging smokers to switch to low tar/nicotine cigarettes, we can contribute meaningfully to the physical health of our nation***". The US Federal Trade Commission expressed its views concerning dissemination of tar and nicotine figures in an October 1967 letter to the National Association of Broadcasters which stated "The Commission favours giving smokers as much information about the risks involved in smoking as is possible and to that end favours mandatory disclosure of tar and nicotine content, as measured by a standard test.

## 1.3 The Variable Nature of Human Smoking Behaviour

An extensive presentation of the variation in smoking topography is presented in the Surgeon General's report on nicotine dependence (DHHS 1988, ref 8). There is relative uniformity in the mean values for the measures of smoking topography across these studies; but there is a substantial variation in the measures of smoking topography among individual smokers (4 - 8). The variation in pattern of smoking is much less for two cigarettes smoked by the same smoker (4), suggesting that it is differences between smokers in the way that they smoke, rather than differences in the way a specific smoker smokes sequential cigarettes, that produced the variation in smoking topography found in these studies.

## 1.4 The Need for Modifications to the Smoking Machine Protocol

In 1979, ***Labstat personnel,*** investigated the relationship between the machine determined yield and the concentration of tobacco smoke related constituents in biological fluids. The result was published in 1981 and was the first scientific article to seriously question the use of machine determined yields as predictors of health outcomes. Part of the first page from this historical paper has been reproduced below.

ESTIMATING THE HAZARDS OF LESS HAZARDOUS CIGARETTES.
II. STUDY OF CIGARETTE YIELDS OF NICOTINE, CARBON MONOXIDE, AND HYDROGEN CYANIDE IN RELATION TO LEVELS OF COTININE, CARBOXYHEMOGLOBIN, AND THIOCYANATE IN SMOKERS

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*Yields of chemical constituents such as tar, nicotine, CO, and HCN defined by smoking machines are commonly assumed to provide a reasonable indication of the relative hazard associated with smoking a given brand of cigarette. Results reported here suggest that this assumption should be carefully re-examined. A total of 240 subjects, representing a wide range of smoking and brand characteristics, were recruited for an investigation of possible relations between brand yields and exposure levels of carboxyhemoglobin, breath CO, plasma cotinine, plasma thiocyanate, and saliva thiocyanate). Exposure was highly correlated with consumption (number of cigarettes per day), but there was no correlation between any estimate of exposure and brand yield when level of consumption was held constant. In addition, a comparison of levels of carboxyhemoglobin and plasma thiocyanate for 16 smokers of "low-hazard" and 15 smokers of "high-hazard" cigarette brands revealed little difference between the two groups, even though average cigarette yields differed as much as 2- to 3-fold. A possible explanation for the results may be that current values for average puff volume, duration, and interval differ significantly from those used in programming smoking machines, particularly in the case of brands with low nicotine delivery.*

Journal of Toxicology and Environmental Health, 7:391–403, 1981


*Labstat personnel* continued to investigate the "less hazardous" cigarette claim in a series of scientific articles which all lead to the same conclusion; namely that there is strong evidence for a marked smoker/product interaction which is highly dependent on cigarette characteristics. In a practical sense, if someone smokes for nicotine, they will obtain whatever amount is necessary to satisfy their need independent of what the smoking machine number happens to be. A selection of relevant publications resulting from *Canadian Government sponsored research* carried out by *Labstat Incorporated* are as follows:

**Rickert, W.S., Robinson, J.C., and Lawless, E., [1988]:** Limitations to Potential Uses for Data Based on the Machine Smoking of Cigarettes. Independent Scientific Committee on Smoking and Health Symposium, "Nicotine Smoking and the Low Tar Programme;" *London, England* Oxford Press; 85-99.

**Rickert, W.S., Collishaw, N.E., Bray, D.F., and Robinson, J.C., [1986]:** Estimates of Maximum or Average Cigarette Tar, Nicotine and carbon Monoxide Yields can be Obtained From Yields Under Standard Conditions; *Prev. Med.*; 15(1): 82-91.

**Rickert, W.S., Robinson, J.C., Bray, D.F., Rogers, B., and Collishaw, N.E., [1985]:** Characterization of Tobacco Products. A comparative Study of the Tar, Nicotine and Carbon Monoxide Yields of Cigars, Manufactured Cigarettes and Cigarettes Made From Fine-Cut Tobacco; *Prev. Med.*; 14: 225-235.

**Rickert, W.S., [1983]:** "Less Hazardous Cigarettes, Fact or Fiction? *NY. State J. Med.*; 83: 1268–1272.

**Rickert, W.S., Robinson, J.C., Young, J.C., Collishaw, N.E., and Bray, D.F., [1983]:** A Comparison of the Yields of Tar, Nicotine and Carbon Monoxide of 36 Brands of Canadian Cigarettes Tested Under Three Conditions; *Prev. Med.*; 12: 582-654.

**Rickert, W.S., Robinson, J.C., Bray, D.F., and Collishaw, N.E., [1983]:** Estimating the Hazards of "Less Hazardous" Cigarettes. III. A Study of the Effect of Various Smoking Conditions on Yields of Hydrogen Cyanide and Cigarette Tar; *J. Toxicol. and Environ. Health*, 12: 39-54.

Rickert, W.S., and Robinson, J.C., [1981]: Yields of Selected Toxic Agents in the Smoke of Canadian Cigarettes, 1968 and 1978. A Decade of Change? *Prev. Med.*; 10: 353-363.

Rickert, W.S., and Robinson, J.C., [1981]: Estimating the Hazards of Less Hazardous Cigarettes. II. Study of Cigarette Yields of Nicotine, Carbon Monoxide and Hydrogen Cyanide in Relation to Levels of Cotinine, Carboxyhemoglobin and Thiocyanate in Smokers; *J. Toxicol. and Environ. Health*; 7: 391-403.

Rickert, W.S., Robinson, J.C., and Young, J.C., [1980]: Estimating the Hazards of Less Hazardous Cigarettes. I. Tar, Nicotine, Carbon Monoxide, Acrolein, Hydrogen Cyanide and Total Aldehyde Deliveries of Canadian Cigarettes; *J. Toxicol. and Environ. Health*; 6: 351-365.

## 1.5 Responses to Deficiencies in the Testing System

### 1.5.1 FTC Request to the US National Cancer Institute

On July 20, 1994 Janet Steiger Chairman of the US Federal Trade Commission wrote to Samuel Broder, M.D. Director of the US National Cancer Institute in regard to the cigarette testing issue. Part of that letter is as follows

> *"Over the past few years, public and private health groups and others have questioned the usefulness of these ratings and have suggested that they may mislead consumers with respect to the relative risks of continuing to smoke and of smoking cigarettes with various levels of tar and nicotine ratings. The commission understands that, on June 7, 1994, Henry A. Waxman, Chairman of the Subcommittee on Health and the Environment of the House Committee on Energy and Commerce, asked the National cancer Institute (NCI) to "sponsor a scientific conference which would review and make recommendations on the accuracy and appropriateness of the Federal Trade Commission's method for determining the relative 'tar' and 'nicotine' content of cigarettes." We also understand that you informed Chairman Waxman by letter of June 22, 1994, of NCI's willingness to sponsor such a conference.*

In response to this letter, a committee was formed and convened from December 4 to 6 , 1994, to consider the issues raised in the FTC letter. Dr Rickert of ***Labstat Incorporated*** was a member and a spokesperson for that committee.

**Statement from the Ad Hoc Committee of the President's Cancer Panel to Consider the FTC Test Method for Determining Tar, Nicotine, and Carbon Monoxide Levels in Cigarettes**

**December 6, 1994, 2:30pm**

A. The smoking of cigarettes with lower machine-measured yields has a small effect in reducing the risk of cancer caused by smoking, no effect on the risk of cardiovascular diseases, and an uncertain effect on the risk of pulmonary disease. A reduction in machine-measured tar yield from 15 mg tar to 1 mg tar does not reduce relative risk from 15 to 1.

*B. The FTC test protocol was based on cursory observations of human smoking behaviour. Actual human smoking behaviour is characterized by wide variations in smoking patterns which result in wide variations in tar and nicotine exposure. Smokers who switch to lower tar and nicotine cigarettes frequently change their smoking behaviour which may negate potential health benefits.*

C. Accordingly, the committee recommends the following changes to the FTC protocol:

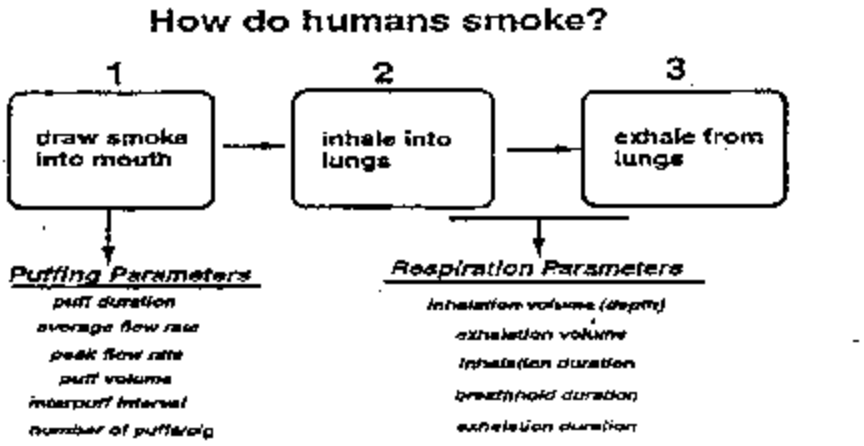
*1. This system should also measure and publish information on the range of Tar, Nicotine, and Carbon Monoxide yields that most smokers should expect from each cigarette sold in the U.S.*

2 This information should be clearly communicated to smokers.

# 2. Machine Protocols based on Human Smoking Behaviour

As noted above, there is consensus from a committee of experts that the testing system should "*..also measure and publish information on the range of tar, nicotine and carbon monoxide yields that most smokers should expect...*" This goal requires that several different smoking machine protocols be used based upon observations of human smoking behaviour.

## 2.1 Values for Machine Settings




The range of *mean* puff volumes observed in 18 studies conducted between 1978 and 1986 was 21-66 ml, the range of *mean* puff durations in 27 studies was 1.0-2.4 sec, and the range of *mean* interpuff intervals in 24 studies was 18-64 sec (US DHHS 1988, ref. 8). The ranges of these puffing behaviours are wide, and they are skewed toward values that would result in higher deliveries of smoke than the values used in the "standard" machine-based test.

The following table is a summary of the results of the many studies noted in Appendix 1 and values reported in the US Surgeon's General Report of 1988 (see ref 8)

**A Summary of Smoking Parameters**

| | Machine | Human |
|---|---|---|
| Puff Duration (sec) | 2 | 1.8 (1-2.4) |
| Puff Volume (ml) | 35 | 43 (21-66) |
| Interpuff Interval (sec) | 60 | 28 (18-64) |
| Number of Puffs | ? | 11 (8-16) |

*Surgeon General's Report, 1988 (see ref. 8)*

■ Humans take more rapid and larger puffs

The obvious consequence of taking more puffs of a larger volume is that the smoker tends to inhale a larger volume of smoke per cigarette than is analyzed by the smoking machine. Thus total volume is also dependent on type of cigarette smoked as summarized in the following table

**Humans take more and larger puffs from low-yield cigarettes and therefore obtain higher cumulative puff volumes from these cigarettes.**

| | LO | HI |
|---|---|---|
| Puff volume (ml) | 56.0 | 43.7 |
| Number of puffs/cig | 15.5 | 12.5 |
| Cumulative puff volume (ml) | 868 | 546 |

*(see reference 8 and tables appendix 1)*

## 2.2 Yields Under Non Standard Conditions

*Labstat Incorporated was the first organization to determine non standard cigarette yields* for a wide range of brands and conditions. The original Labstat paper has been widely cited and provided the basis for initial assessments of the potential effects of modifying smoking machine protocols.

## 2.3 *Selection of Non Standard Conditions*

### 2.3.1 Using the Existing Published Data as a Basis

It is clear from the work carried out and published by Labstat, that it is the volume of smoke per cigarette which should be used as the defining variable for the choice of smoking machine parameters. The following is from reference 9 and is also found on page 9 of this document

> It is evident from Table I that per cigarette yields vary as a result of modification to current standard smoking conditions. It is also clear that, in this experiment, ***increases or decreases in per cigarette yields are due primarily to increases or decreases in the volume of smoke collected for analysis***. As illustrated in Figs. 1A and B and shown in Table 2, the variation in total volume accounts for up to 95% of the variation in tar yields (range 55-95%). Consequently, when the results are expressed as concentration per unit volume, this variability in tar yield is decreased dramatically

Interpuff interval, puff duration, and puff volume and butt length (or number of puffs) are variables which can be modified on standard smoking machines. Of these, there is no compelling reason to change the current ISO standard butt length which, for most cigarettes is filter overwrap plus 3 mm for those cigarettes whose filter length is greater than 20 mm and 23 mm for all other cigarettes. Although smokers will sometimes discard less than fully smoked cigarettes, this is most often done in situations in which there was not sufficient time to fully smoke the cigarette. This is a general statement applicable to the vast majority of smokers. Since the Labstat studies have demonstrated that puff duration has little effect on the total volume of smoke per cigarette, this leaves two parameters to be altered in specifying conditions for "average" and "maximum" yields.

### 2.3.2 Definition of Behaviourally Defined Smoking Conditions

The 1981 report of US Surgeon General (10) contains the following statement on page 185 as a recommendation

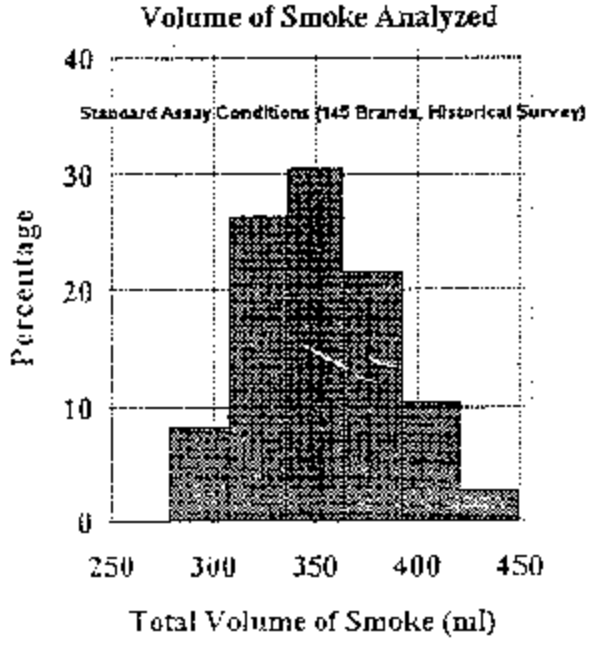
> *In addition to the standard assays, there should be maximum-yield assays of "tar" nicotine and carbon monoxide. These assays would be based on puffing parameters of volume, rate, and duration for the 95th or even the 75th percentile of heavy smokers smoking lower "tar" and nicotine ventilated cigarettes up to the tip overwrap. These parameters would be used in smoking-machines, with these same ventilated brands, to derive yields with ventilation holes in both blocked and unblocked conditions.*

#### *2.3.2.1 Total Volume of Smoke Per Cigarette*

Percentiles for Total Smoke Volume per Cigarette ***(Human Smoking)***

1.0% = 263.0 ml
**5.0% = 263.0 ml**
10.0% = 278.0 ml
25.0% = 452.0 ml
**50.0% = 509.0 ml**
75.0% = 579.0 ml
90.0% = 619.0 ml
**95.0% = 639.0 ml**
99.0% = 639.0 ml

The following is a histogram of the total volume of smoke analyzed when cigarettes are ***machine smoked*** under standard conditions.



It is clear ***in the current standard assay, the amount of smoke taken for analysis is less than that which is inhaled by 75% of smokers.*** Consequently, it is reasonable to use yields under current standard conditions as estimates for the minimum amount of chemical constituents to which a smoker might be exposed.

*Thus "Minimum" = "Current ISO Standard Conditions"*

This then leaves only "Average" and "Maximum" to be defined

### *2.3.2.2 Interpuff Interval*

Percentiles for the interval puff Interval

1.0% = 18.0 seconds
**5.0% = 18.7 seconds**
10.0% = 21.3 seconds
25.0% = 24.35 seconds
**50.0% = 25.9 seconds**
75.0% = 41.1 seconds
90.0% = 48.4 seconds
**95.0% = 50.3 seconds**
99.0% = 64.0 seconds

With respect to interpuff interval, very conservative estimates would be; ***"average", 26 seconds, and "maximum", 50 seconds.***

***Note: It is important to emphasise that, considering inter puff interval alone use of the minimum interval results in the highest constituent yield. This results from the fact that a decrease in this interval results in an increased number of puffs per cigarette and more smoke per cigarette.***

### *2.3.2.3 Volume per Puff*

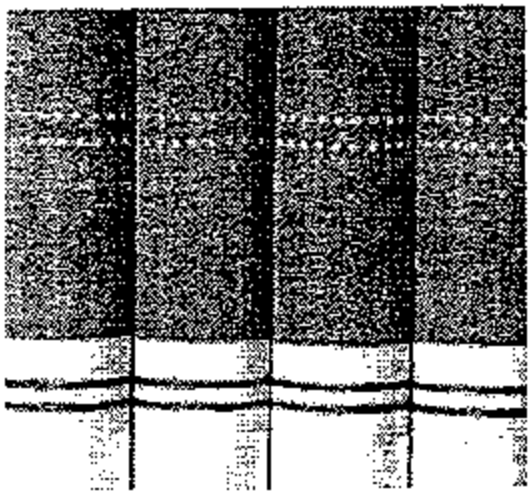
Percentiles for Puff Volume

1.0% = 25.4 ml
**5.0% = 30.3 ml**
10.0% = 32.0 ml
25.0% = 38.5 ml
**50.0% = 42.1 ml**
75.0% = 43.7 ml
90.0% = 63.7 ml
**95.0% = 65.6 ml**
99.0% = 85.4 ml

With respect to volume per puff, reasonable estimates would be: ***"average", 44 ml*** (from the above table and the Report of the US Surgeon General, reference 8) ***and "maximum", 56 ml*** (Report of the US Surgeon General, reference 8).

### *2.3.2.4 Hole Blocking*

Most, if not all, Canadian cigarettes "benefit" from using air dilution as a method for the reduction of "tar" yields. Often air dilution is accomplished using a series of small holes around the base of the filter as illustrated below.



Studies involving this and other laboratories (see reference 11 for example) have demonstrated that 50% or more of smokers either purposely or unintentionally block these vents during smoking resulting in dramatic increases in "tar" yield (11)

### *2.3.2.5 Summary of Non Standard Conditions*

| Variable | Amount of Smoke | | | |
|---|---|---|---|---|
| | "Average" (1) | "Average" (2) | "Maximum" (1) | Maximum (2) |
| Puff Volume (ml) | 44 | 44 | 56 | 56 |
| Interval (sec) | 50 | 26 | 26 | 26 |
| Vents | "open" | "open" | "open" | "all blocked" |
| Estimated Total Volume (ml) | 440 | 880 | 1170 | 1170 |

Recall that it was noted that the ***minimum*** inter puff interval leads to the ***maximum*** constituent yield. Similar when all other parameters are fixed, setting the smoking machine at the ***maximum*** inter puff interval reduces constituent yields

# 3. Methods

## 3.1 Rejection of Outliers

Data are collated then examined on a brand by brand basis. Using 20 observations as *an example*, results which deviate more than 2.539 standard deviations from the mean ($\alpha$ = .02, two tailed test, 19 degrees of freedom) are displayed. It is then up to the data analyst to accept or reject that particular result based upon notes in the run log book (assignable cause). Different samples sizes require alternative cut off points but are still based on the same P value (i.e. .02).

## 3.2 Investigation of Aberrant Results

Significant departures from the expected results for QC samples or replicates are viewed seriously and require investigation. This is a documented procedure which, at a minimum, consists of the following elements:

- Review of all associated calculations to ensure that arithmetic errors have not been made
- Review of linearity range for any standards
- Assessment of instrument status
- Review of reagents, columns, standards etc. to ensure that contamination or decomposition has not occurred
- Review of sample preparation and handling procedures as they relate to the result in question.

# 4. Experimental Design

As in the past, the survey was designed to be completed in a number of blocks. *ISO 3308-1986* (FTC or Canadian Test Method) consisted of three of these representing groupings of 35 (Part A), 40 (Part C) and 40 (Part E) Brands. Segments B, D and F were carried out under *ISO 3308-1991*

Experience gained in the analysis of thousands of brands over the past 16 years has demonstrated that significant port-to-port variations do not exist for the variables of interest. Consequently, cigarettes are analyzed in a completely randomized design with 2 randomly placed control cigarettes for every group of 20 (a smoking machine smokes 20 cigarettes at a time; one in each of 20 ports).

# 5. Methods

## 5.1 Cigarette Conditioning (ISO 3402: 1991)

This document specifies (section 4.2)

*"...the test atmosphere shall be the same as the conditioning atmosphere but wider tolerances are permissible as follows:*

- *Temperature 22° C ± 2° C*
- *Relative Humidity (60 ± 5) %*

This laboratory has 2 controlled environment rooms strictly for the testing of cigarettes under the conditions as specified in this document (ISO 3402).

## *5.2 Standard Machine Smoking Conditions (ISO 3308:1991)*

Smoking of test cigarettes were carried out on a linear Filtrona Model 400 smoking machine. The smoking parameters are as stated in section 5.3.1 below and the smoking machine specifications which were used are as set out in the International Organization for Standardization standard ISO 3308, Third Edition 1991-10-15, ***Cigarettes-Routine analytical cigarette-smoking machine-Definitions and standard conditions, 1991 (E).***

## *5.3 Standard Machine Smoking Conditions (ISO 3308: 1986)*

Smoking of test cigarettes were carried out on a linear Filtrona Model 300 smoking machine. The smoking parameters are as stated in section 5.3.1 below and the smoking machine specifications which were used are as set out in the International Organization for Standardization standard ISO 3308, Second Edition 1986, ***Cigarettes-Routine analytical cigarette-smoking machine-Definitions and standard conditions, 1986 (E).***

### 5.3.1 Smoking Parameters

All cigarettes were smoked using the machine settings as summarized in the following table. 115 brands were evaluated and 5 observations per brand obtained for "tar" nicotine and carbon monoxide under the two smoking machine specifications noted in sections 5.2 and 5.3.

| Variable | Amount of Smoke "Average" (1) | "Average" (2) | "Maximum" (1) | Maximum (2) |
|---|---|---|---|---|
| Puff Volume (ml) | 44 | 44 | 56 | 56 |
| Interval (sec) | 50 | 26 | 26 | 26 |
| Vents | "open" | "open" | "open" | "all blocked" |
| Estimated Total Volume (ml) | 440 | 880 | 1170 | 1170 |

## *5.4 Determination of Total Particulate Matter (TPM: ISO 4387: 1991)*

The determination of the total particulate matter present in the smoke produced by the combustion of cigarettes and cigarette tobacco is set out in the International Organization for Standardization standard ISO 4387, *TPM: Cigarettes - Determination of total and nicotine-free dry particulate matter using a routine analytical smoking machine. ISO 4387, 1991-10-15*

## *5.5 Moisture (ISO 10362-1: 1991)*

The moisture content of the total particulate matter was determined by gas chromatography as specified in *Water: Cigarettes - Determination of water in smoke condensates - Part 1: Gas-chromatographic method. ISO 10362-1, 1991-09-15*

## *5.6 Nicotine (ISO 10315: 1991)*

The nicotine content of the total particulate matter was determined by gas chromatography as per *Nicotine: Cigarettes - Determination of nicotine in smoke condensates - Gas-chromatographic method. ISO 10315, 1991-08-01*

## *5.7 PMWNF (Tar)*

The tar delivery is determined by subtracting the water content and the nicotine content from the total particulate matter. This is referred to as particulate matter, water and nicotine free (PMWNF).

### 5.8 Carbon Monoxide (ISO 8454: 1995)

The determination of carbon monoxide present in the smoke produced by the combustion of cigarettes and cigarette tobacco is set out in the International Organization for Standardization standard publication entitled *Carbon Monoxide: Cigarettes - Determination of carbon monoxide in the vapour phase of cigarette smoke - NDIR method ISO 8454, 1995-11-15*

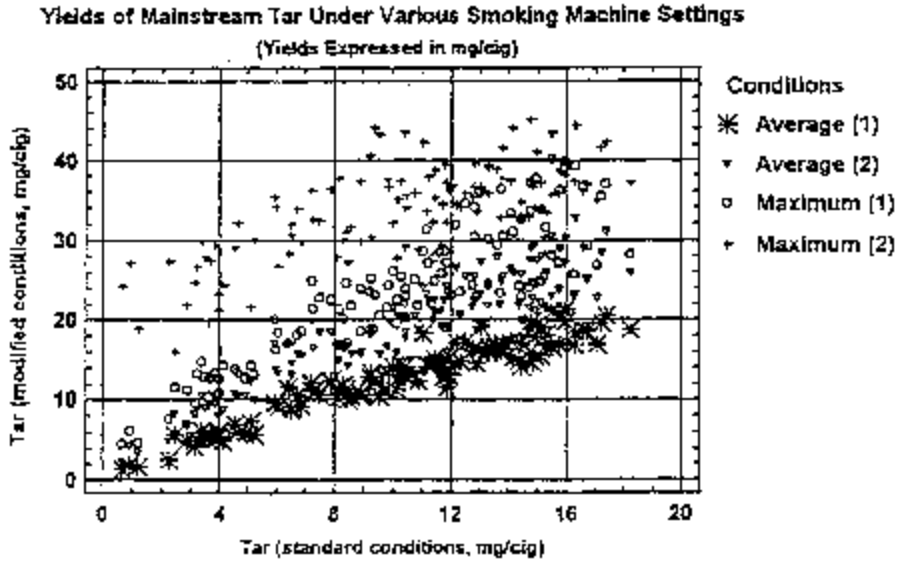
## 6. Results

### 6.1 Tar, Nicotine and CO in Mainstream Tobacco Smoke

Individual results and summary statistics may be found in Appendix one Tables 1 to 4

#### 6.1.1 Tar

Tar yields under standard conditions are compared with yields under modified conditions in the following figure.




Clearly, the tar yields on the one scale are related to yields on the other but with an increase in scatter with an increase in yield. Maximum (2) is an exception due to the blocking of the ventilation holes. This has two important consequences

- The trend line does not pass through the origin. Thus the intercept is a measure of the magnitude of the whole blocking effect independent of yield.
- The relationship has an unusual amount of scatter since not all brands are ventilated to the same degree and, consequently, do not exhibit the same response to 'hole blocking'.

### *6.1.1.1 Regression of Yields under Average (1) Conditions on Standard Conditions*

The following regression analysis suggests that, ***on average***, values on the one scale are equal to values on the other with an overall increase of about 2 mg in moving from one to the other.

Dependent variable: Av1
Independent variable: StdCon

| Parameter | Estimate | Standard Error | T Statistic | P-Value |
|---|---|---|---|---|
| Intercept | 2.06256 | 0.343889 | 5.99774 | 0.0000 |
| Slope | 1.04537 | 0.0305312 | 34.2393 | 0.0000 |

Analysis of Variance

| Source | Sum of Squares | Df | Mean Square | F-Ratio | P-Value |
|---|---|---|---|---|---|
| Model | 2419.05 | 1 | 2419.05 | 1172.33 | 0.0000 |
| Residual | 233.17 | 113 | 2.06345 | | |
| Total (Corr.) | 2652.22 | 114 | | | |

Correlation Coefficient = 0.955037
R-squared = 91.2085 percent
Standard Error of Est. = 1.43647

### *6.1.1.2 Regression of Yields Under Average (2) Conditions on Standard Conditions*

The following regression analysis suggests that yields on the average (2) scale are relatively higher by 40% and, in addition, are about 4.5 mg higher in the absolute sense.

Regression Analysis - Linear model: Y = a + b*X

Dependent variable: Av2
Independent variable: StdCon

| Parameter | Estimate | Standard Error | T Statistic | P-Value |
|---|---|---|---|---|
| Intercept | 4.5368 | 0.59591 | 7.61324 | 0.0000 |
| Slope | 1.40551 | 0.0529061 | 26.566 | 0.0000 |

Analysis of Variance

| Source | Sum of Squares | Df | Mean Square | F-Ratio | P-Value |
|---|---|---|---|---|---|
| Model | 4372.9 | 1 | 4372.9 | 705.75 | 0.0000 |
| Residual | 700.157 | 113 | 6.19608 | | |
| Total (Corr.) | 5073.06 | 114 | | | |

Correlation Coefficient = 0.928432
R-squared = 86.1985 percent
Standard Error of Est. = 2.48919

### *6.1.1.3 Regression of Yields Under Maximum (1) Conditions on Standard Conditions*

Yields on this scale are increased by about 63 % in the relative sense and, in addition, by about 6.8 mg in the absolute sense.

Regression Analysis - Linear model: Y = a + b*X

Dependent variable: Max1
Independent variable: StdCon

| Parameter | Estimate | Standard Error | T Statistic | P-Value |
|---|---|---|---|---|
| Intercept | 6.76814 | 0.936901 | 7.22397 | 0.0000 |
| Slope | 1.63646 | 0.0831801 | 19.6737 | 0.0000 |

Analysis of Variance

| Source | Sum of Squares | Df | Mean Square | F-Ratio | P-Value |
|---|---|---|---|---|---|
| Model | 5928.08 | 1 | 5928.08 | 387.05 | 0.0000 |
| Residual | 1730.7 | 113 | 15.3159 | | |
| Total (Corr.) | 7658.78 | 114 | | | |

Correlation Coefficient = 0.879786
R-squared = 77.4024 percent
Standard Error of Est. = 3.91356

### *6.1.1.4 Regression of Yields Under Maximum(2) Conditions on Standard Conditions*

Maximum (2) conditions are the same as maximum (1) except that any ventilation holes have been blocked. This has the effect of increasing tar yields by about 24 mg, ***on average*** in the absolute sense. Given the size of the standard error for the slope, it appears as though values on the one scale are the same as the values on the other in the relative sense (i.e. the hypothesis that the slope, $\beta_1 = 1$ is accepted)

Regression Analysis - Linear model: Y = a + b*X

Dependent variable: Max2
Independent variable: StdCon

| Parameter | Estimate | Standard Error | T Statistic | P-Value |
|---|---|---|---|---|
| Intercept | 24.2529 | 1.0079 | 24.0629 | 0.0000 |
| Slope | 0.899481 | 0.0894832 | 10.052 | 0.0000 |

Analysis of Variance

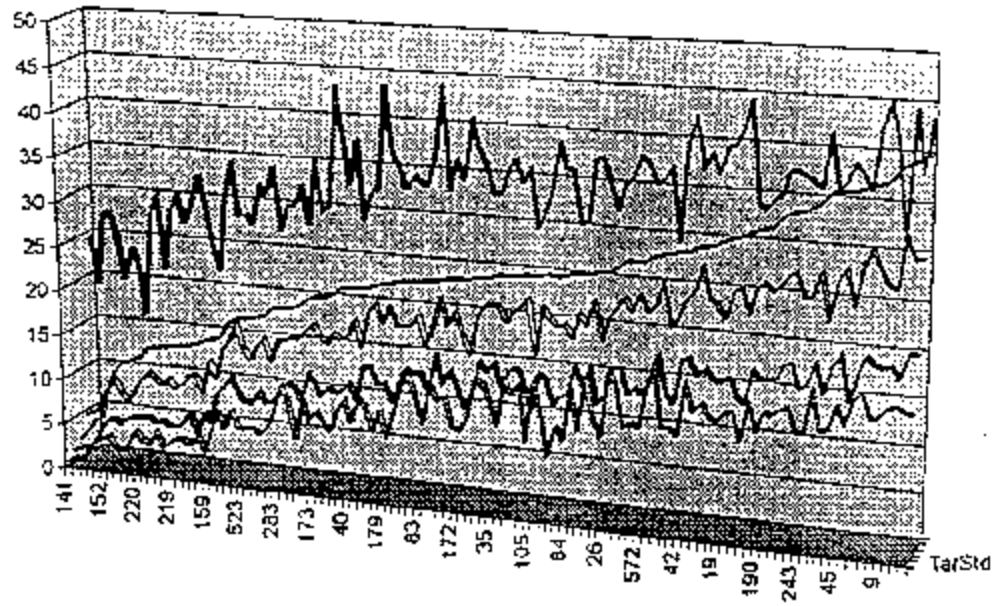
| Source | Sum of Squares | Df | Mean Square | F-Ratio | P-Value |
|---|---|---|---|---|---|
| Model | 1790.97 | 1 | 1790.97 | 101.04 | 0.0000 |
| Residual | 2002.93 | 113 | 17.7251 | | |
| Total (Corr.) | 3793.9 | 114 | | | |

Correlation Coefficient = 0.68707
R-squared = 47.2066 percent
Standard Error of Est. = 4.21011

#### *6.1.1.5 Relative Rankings Based on Yields*

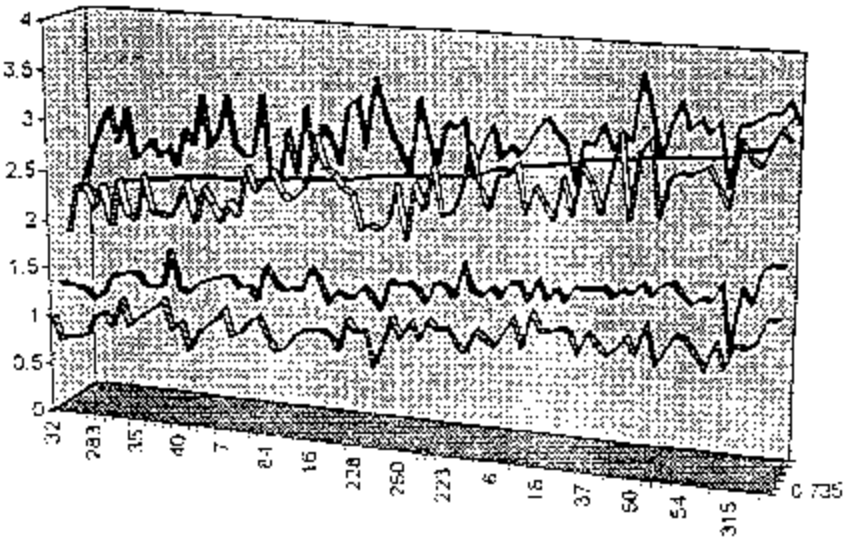
##### 6.1.1.5.1 "Tar"

It has often been stated that it makes no sense to test cigarettes under conditions which are non standard since values on the one scale may be easily converted to values on the other. This statement is true ***on average*** but individual smokers smoke individual brands and are not interested in 'average' yields in this sense. Consequently, it is extremely important to examine how individual rankings would change in response to changes in test parameters.

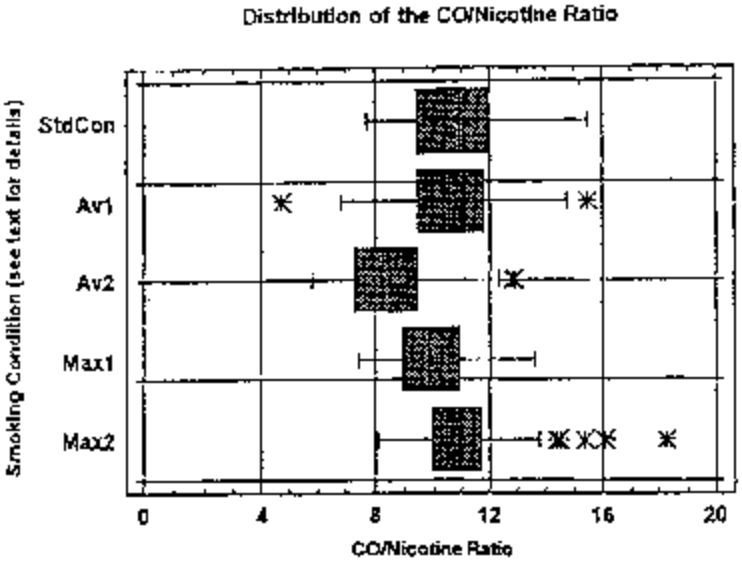



In this plot, tar yields have been arranged in ascending order when determined under the set of conditions defined as maximum (1). If the ranking under all sets of conditions was the same the other lines in this figure would all resemble the smooth curve traced by yields under maximum (1). This is clearly not the case. The degree of spiking indicates ***that there are radical changes in rank for specific brands*** even though the general trend, as described in the regression analysis, remains.

### 5.1.1.5.2 Nicotine




As for "tar", the degree of spiking indicates *that there are radical changes in rank for specific brands* even though the general trend, as described in the regression analysis, remains.




The data suggest that, unlike the "tar"/nicotine ratio, the CO/nicotine ratio may be largely independent of smoking conditions.

## 6.2 Graphical Presentation of Information on Yields

In June 1994 the Chairman of the House Subcommittee on Health and the Environment wrote the Director of the National Cancer Institute (NCI), asking him to convene a meeting of experts to ". . . review and make recommendations on the accuracy and appropriateness of the Federal Trade Commission's method for determining the relative 'tar' and nicotine content of cigarettes." It was clear that the intent of the meeting was not to redesign the FTC testing protocol but, rather, to examine the protocol and make suggestions for improvement.

The committee met on December 5 and 6, 1994 and recommended the following changes to the FTC protocol. Since the FTC protocol is equivalent to the current Canadian "ISO" method, the recommendations are also applicable in Canada

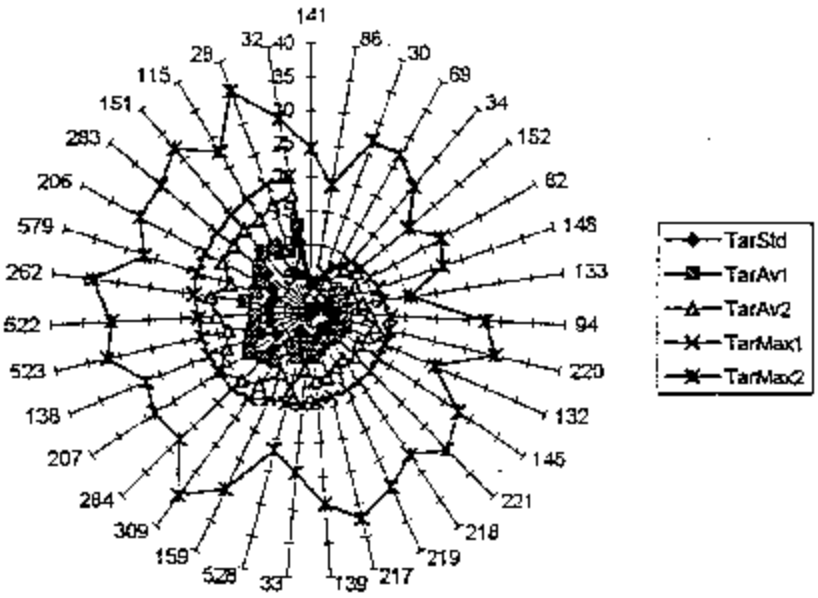
1. This system should also measure and publish information on the range of tar, nicotine, and carbon monoxide yields that most smokers should expect from each cigarette sold in the United States.
2. This information should be clearly communicated to smokers.
3. A simple graphic representation should be provided with each pack of cigarettes sold in the United States and in all advertisements. The representation should not imply a one-to-one relationship between measurements and disease risk.
4. The system must be accompanied by public education to make smokers aware that individual exposure depends on how the cigarette is smoked and that the benefits of switching to lower yield cigarettes are small compared with quitting.

The following sections illustrate two ways in which a *"simple graphic"* could be used to *"publish information on the range of tar, nicotine and carbon monoxide yields"*

### 6.2.1 'Radar' Plots

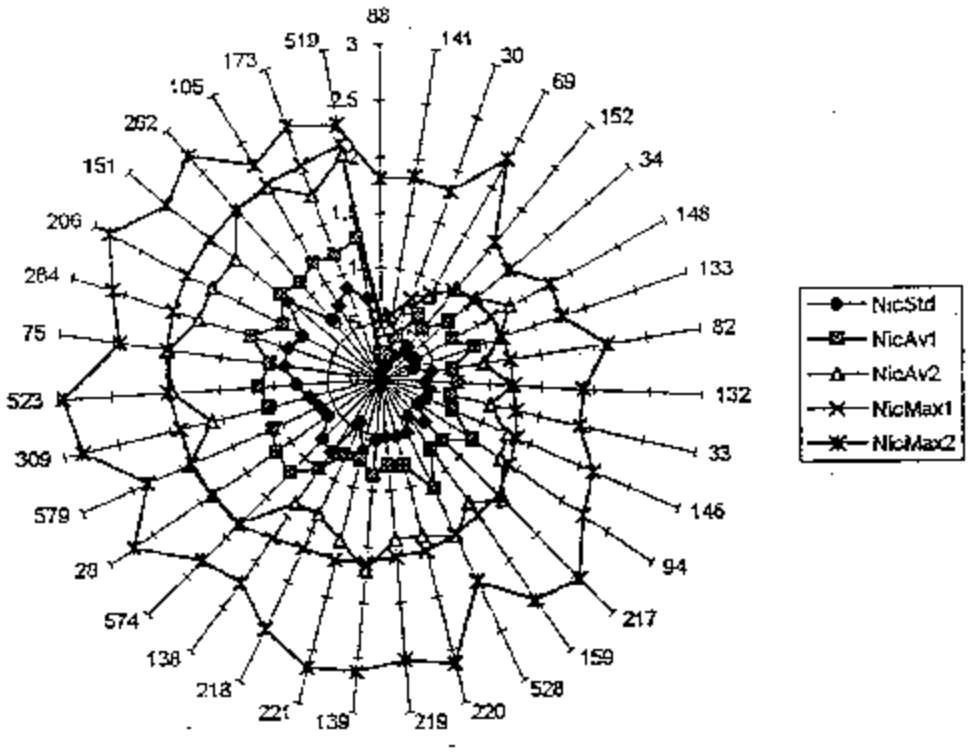
It is difficult to display multivariate information in a manner which conveys underlying patterns in complex data sets. A number of different methods were investigated using this data set and the one with the most 'visual appeal' and overall clarity is the so called 'radar' plot. The following examples are for the first 20 brands of the data set (see appendix 1, tables 1 - 4) and the variables "tar", nicotine and CO.

#### *6.2.1.1 'Radar' Plot for Mainstream "Tar" Yields Under Various Smoking Conditions*



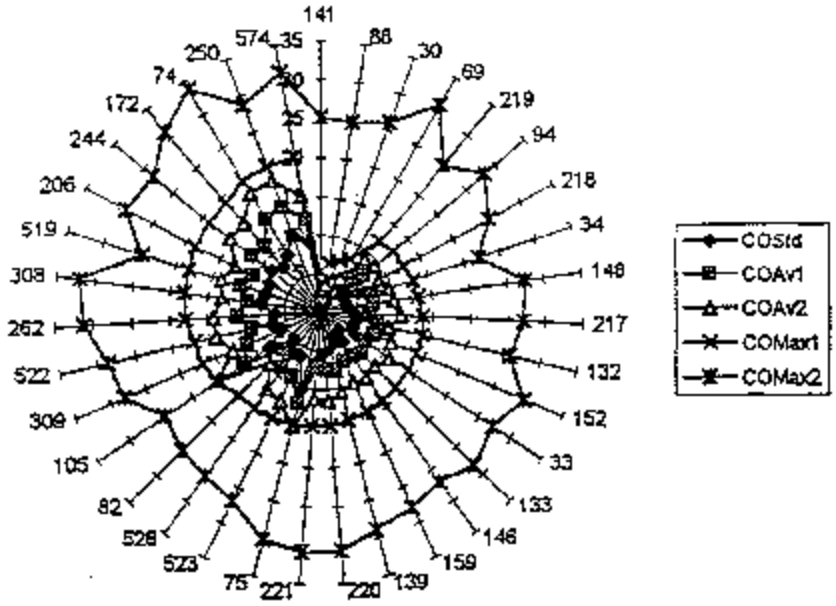

In this representation, the numbers at the edge of the 'radar' represent brand numbers (see appendix 1 and tables 1 - 4 for the brand names corresponding to the codes) and the dotted lines represent yields from the centre outwards in the order, standard conditions, average (1), average (2), maximum (1) and maximum (2) (see the table in section 5.3.1 for a definition of these conditions.)

### 6.2.1.2 'Radar' Plot for Mainstream "Nicotine" Yields Under Various Smoking Conditions




In this representation, the numbers at the edge of the 'radar' represent brand numbers (see appendix 1 and tables 1 - 4 for the brand names corresponding to the codes) and the dotted lines represent yields from the centre outwards in the order, standard conditions, average (1), average (2), maximum (1) and maximum (2) (see the table in section 5.3.1 for a definition of these conditions.)

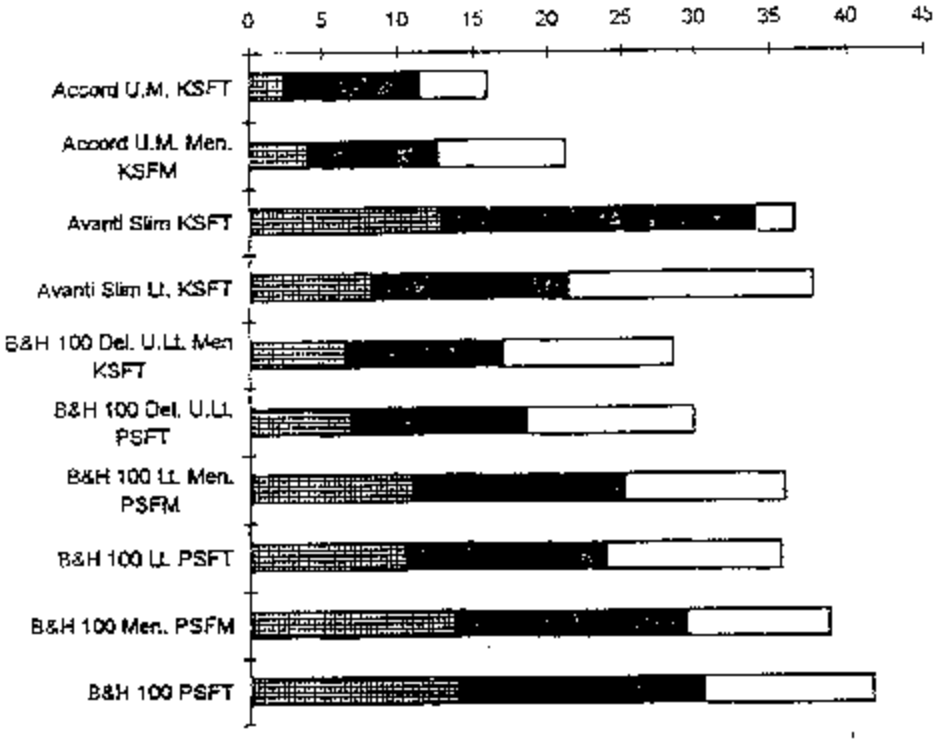
*6.2.1.3 'Radar' Plot for Mainstream "CO" Yields Under Various Smoking Conditions*




In this representation, the numbers at the edge of the 'radar' represent brand numbers (see appendix 1 and tables 1 - 4 for the brand names corresponding to the codes) and the dotted lines represent yields from the centre outwards in the order, standard conditions, average (1), average (2), maximum (1) and maximum (2) (see the table in section 5.3.1 for a definition of these conditions.)

## 6.2.2 Bar Graphs

Bar graphs have been constructed illustrating the range of yields for typical smokers. The lower limit for a "typical" smoker has been arbitrarily defined to been the yield as determined under current standard test conditions. The upper limit for the "typical" smoker has been defined to be values determined under maximum (1) conditions (see Section 5.3.1 for details). Intense smoker has been defined to be the range between the upper limit of "typical" and yields determined under hole blocking (maximum (2)). This form has the advantage of being readily understood but suffers from the difficulty of not accommodating more than about 10 brands on one page. A typical example for "tar" yields is shown below. Similar graphs could easily be constructed for yields of other constituents.




This type of representation has the advantage of demonstrating that a range of yields are possible from any cigarette and that, when expressed in this way, most cigarettes are equivalent with only the lowest yield cigarettes being truly different. Graphical representations for all of the brands tested in this project may be found in Appendix one.

## 6.3 Alternative Forms For the Numerical Expression of Yields

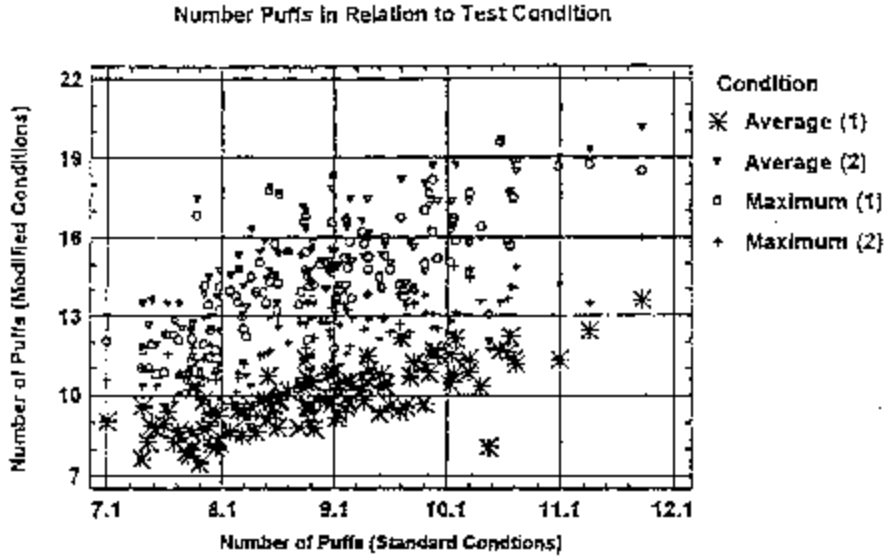
Page 273 in monograph 7 of the NCI document entitled "*The FTC Cigarette Test Method for Determining Tar, Nicotine, and Carbon Monoxide Yields from US Cigarettes*" contains three proposals for modifications to the FTC test method. The second one of these reads as follows "*Rickert and colleagues (1986) proposed an estimate based on average yields of tar, nicotine and carbon monoxide per litre of smoke*".

The rationale for, and advantages of such a system have been illustrated in the following sections.

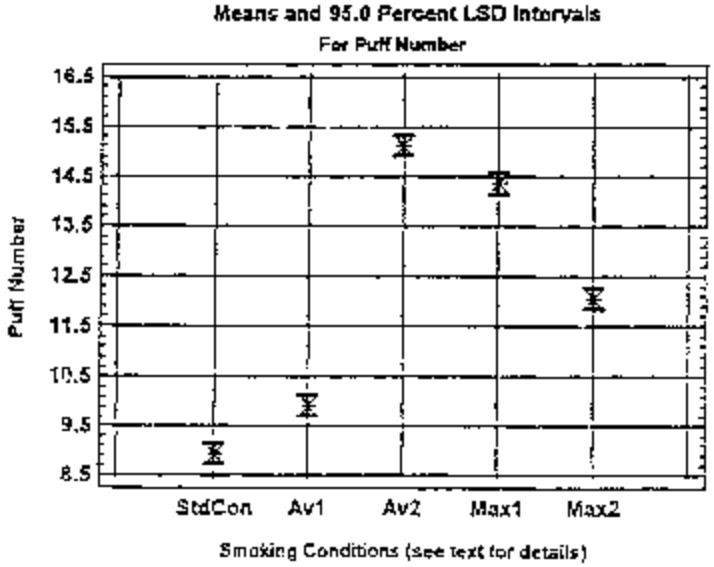
### 6.3.1 Yields Per Litre

#### *6.3.1.1 The Role of Puff Count in Determining Yields*

Clearly, the number of puffs taken per cigarette taken under standard conditions is related to the number taken under modified conditions.




It is also clear that the slope of the trend line is dependent on test condition with the lowest slope being that for average (1). The relationship among all conditions is best understood from an examination of the average number of puffs taken for all brands under each smoking condition.

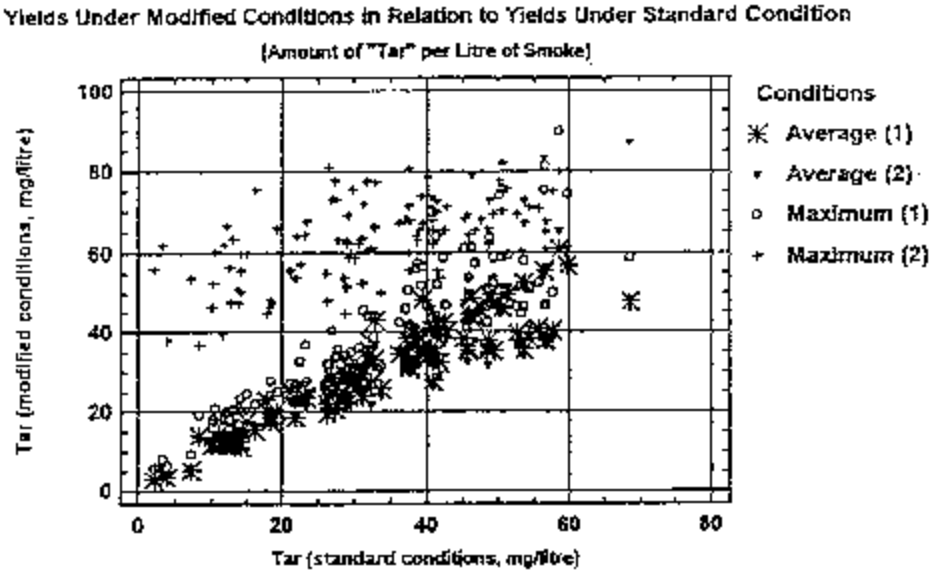



The average number of puffs taken under maximum (2) smoking conditions is less than that taken under average (2) and maximum (1). Yields expressed per mg do not take into account differences in the number of puffs which is misleading. From a toxicological standpoint, two of the critical variables are concentration and duration. Yields expressed in units of mg per cigarette do not express concentration in mainstream smoke which is the toxicological agent.

### *6.3.1.2 "Tar" Yields Per Litre of Mainstream Smoke*

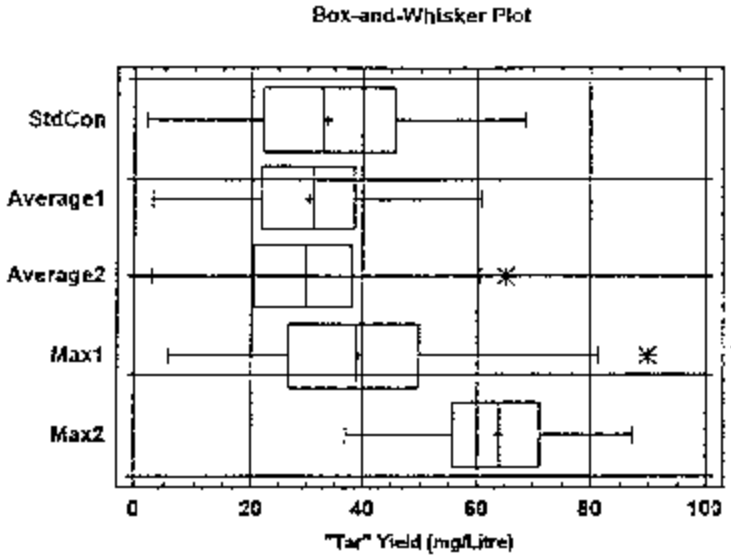
"Tar" yields (mg/litre) for all of the brands which were tested in this survey, may be found in Appendix 1 table 5.

Yields, expressed in this way, have been plotted in the following figure.




With the exception of the hole blocking condition (maximum (2)) yields under standard conditions appear to be strongly related to yields under the modified conditions. This suggest that one can be predicted from the other with a reason degree of precision.

Another way of looking at how testing conditions affect yields, is to compare averages for all brands under each condition. This comparison is reasonable since all brands were represented in each of the 5 testing protocols.




When yields are expressed on a per litre basis, four of the five testing conditions appear to be virtually equivalent. Whole blocking would appear to affect both the quality and quantity of the mainstream smoke which is produced. ***Thus it would appear that only two conditions are needed to express the range of "tar" yields which might be experienced by individual smokers: standard and maximum (2)*** (see Section 5.3.1 for definitions)

Consequently the results from this present investigation supports earlier conclusions from a limited investigation of only 10 brands but under a much wider range of conditions. The summary from that paper has been reproduced below.

PREVENTIVE MEDICINE 15, 82–91 (1986)

# Estimates of Maximum or Average Cigarette Tar, Nicotine, and Carbon Monoxide Yields Can Be Obtained from Yields under Standard Conditions*

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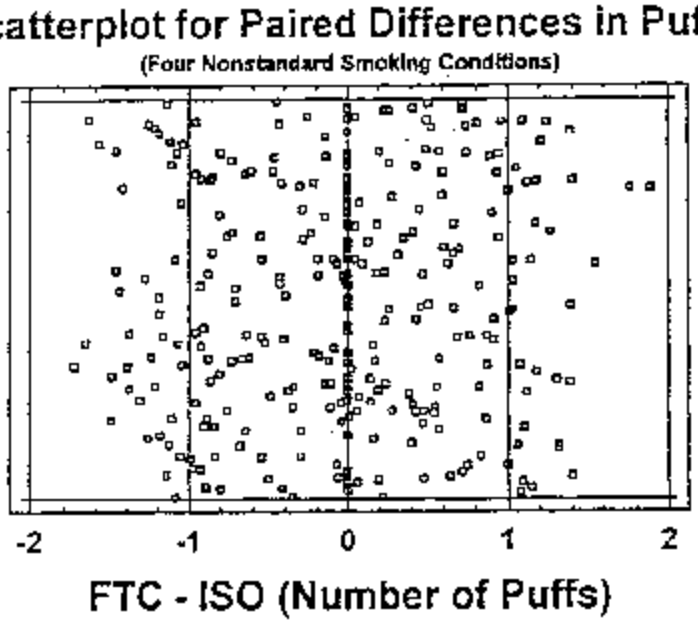
*Department of Statistics and Actuarial Science, University of Waterloo, Waterloo, Ontario N2L 3G1, and †Bureau of Tobacco Control & Biometrics, Laboratory Centre for Disease Control, Department of National Health and Welfare, Ottawa, Ontario K1A 0L2, Canada*

Average yields of tar, nicotine, and carbon monoxide per liter of smoke and per cigarette were determined for 10 brands of cigarettes smoked under 27 different conditions (one standard and 26 nonstandard). Per cigarette yields were highly variable across smoking conditions due to differences in the total volume of smoke taken for analysis. The results of a simple linear regression analysis indicated that up to 89% of the variation in tar yield per cigarette could be explained by variations in the total volume of smoke produced per cigarette. Per liter yields for tar, nicotine, and carbon monoxide were almost constant over the conditions investigated. Since most smokers inhale less than this amount, yields per liter provide a rough estimate of the maximum amount to which a smoker might be exposed. Yields per liter, taken over all 26 conditions, are highly correlated with per cigarette yields under standard conditions. Consequently, values on one scale can be converted to the other, at least for the 10 brands investigated. The average conversion factor for tar, nicotine, and carbon monoxide is 2.5 when proceeding from milligrams per king-size cigarette under standard conditions to milligrams per liter. This relationship is true for both vented and nonvented cigarettes when ventilation holes are not blocked. © 1986 Academic Press, Inc.

## 6.4 Yields Under "ISO" in Relation to Yields Under "FTC"

Yields for all 5 conditions (one standard and one non standard) have been determined for all brands under current Canadian test conditions ("FTC") and under conditions specified in the 1991 revision of ISO 3308 which Canada has yet to adopt. Each of the variables, puff count, "tar" yield, nicotine yield and CO yield were examined to determine if there was any evidence for a difference and, if so, what was its magnitude and direction.

### 6.4.1 Differences in Puff Count

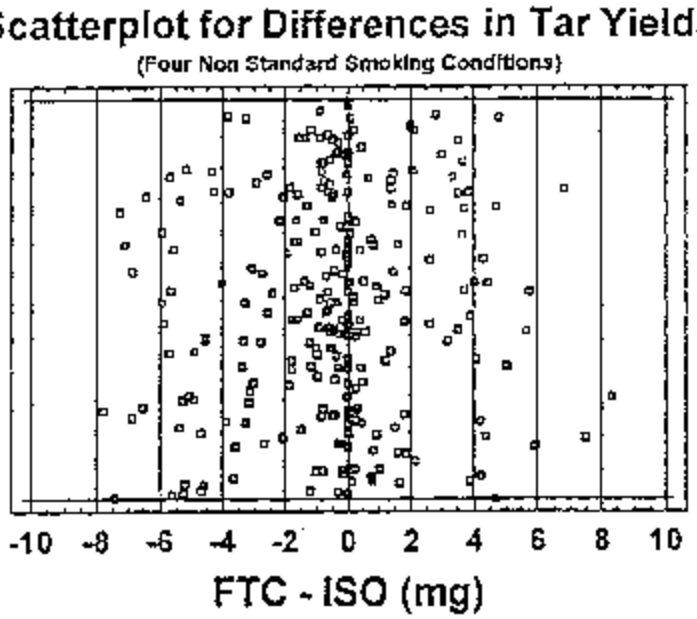



95.0% confidence interval for mean: -0.0453512 +/- 0.0907 [-0.136051,0.0453488]

95.0% confidence interval for standard deviation: [0.737772,0.866512]

The classical interpretation of these intervals is that, in repeated sampling, these intervals will contain the true mean or standard deviation of the population from which the data come 95.0% of the time. In practical terms, we can state with 95.0% confidence that the true mean FTCPuff-ISOPuffs is somewhere between -0.136051 and 0.0453488, while the true standard deviation is somewhere between 0.737772 and 0.866512. Since the interval does not capture "0", there is no evidence for a difference in puff count between the two conditions

### 6.4.2 Differences in "Tar" Yield

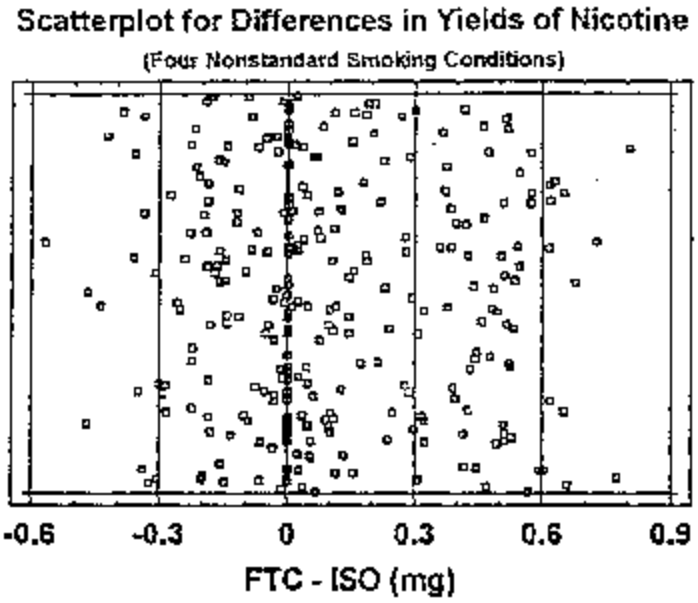



95.0% confidence interval for mean: -0.476787 +/- 0.323899 [-0.800686,-0.152888]

95.0% confidence interval for standard deviation: [2.52773,2.98761]

In practical terms, it can be stated with 95.0% confidence that the true mean FTCTar-ISOTar is somewhere between -0.800686 and -0.152888, while the true standard deviation is somewhere between 2.52773 and 2.98761. This difference is in keeping with that reported earlier when the "ISO" and "FTC" smoking conditions were compared.

### 6.4.3 Differences in Nicotine Yield

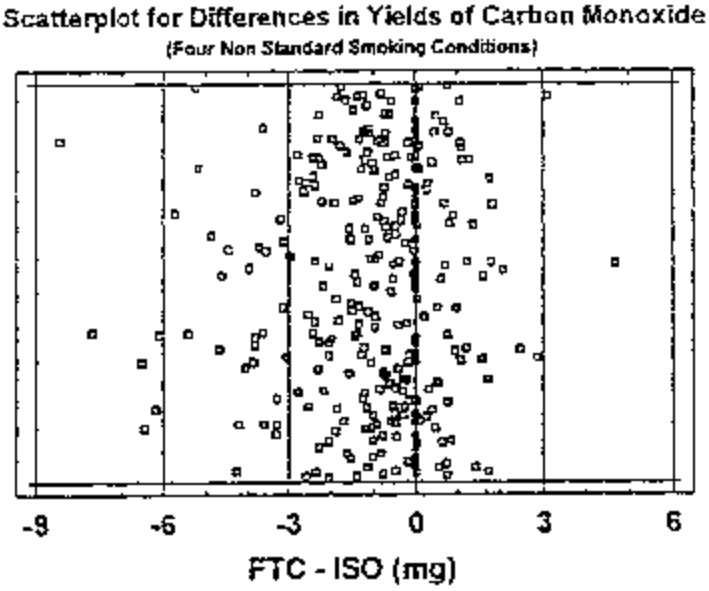



95.0% confidence interval for mean: 0.0990936 +/- 0.030678 [0.0684156,0.129772]

95.0% confidence interval for standard deviation: [0.249541,0.293085]

Again, in practical terms, it can be stated, with 95.0% confidence, that the true mean FTCNic-ISONic is somewhere between 0.0684156 and 0.129772, while the true standard deviation is somewhere between 0.249541 and 0.293085. This difference is very small and is equivalent to about one standard deviation when cigarettes are tested under normal (standard) Canadian test conditions

### 6.4.4 Differences in CO Yields




95.0% confidence interval for mean: -1.00147 +/- 0.202404 [-1.20388,-0.799068]

95.0% confidence interval for standard deviation: [1.64639,1.93369]

It can be stated, with 95.0% confidence that the true mean FTCCO-ISOCO is somewhere between -1.20388 and -0.799068, while the true standard deviation is somewhere between 1.64639 and 1.93369. This effect is significant in the statistical sense but given the much larger effect of the choice of conditions, a one mg average difference may have little practical significance.

# Characterization of Cigarette Mainstream Constituent Yields

## 7. Appendix One

## Individual results and Summary Statistics

Table 1: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 44 ml; Puff Interval, 50 sec; Ventilation, Unobstructed.
(Condition Code: Average 1)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 133 | Accord U.M. | KSFT | 9.19 | 0.21 | 7.65 | 0.48 | 0.900 | 0.350 | 5.64 | 0.69 |
| 132 | Accord U.M. Men. | KSFM | 9.72 | 0.62 | 7.78 | 0.41 | 0.709 | 0.050 | 6.09 | 0.52 |
| 243 | Avanti Slim | KSFT | 9.62 | 0.20 | 19.34 | 0.85 | 1.740 | 0.074 | 16.52 | 0.89 |
| 244 | Avanti Slim Lt. | KSFT | 9.80 | 0.42 | 11.89 | 0.28 | 1.250 | 0.027 | 11.56 | 0.43 |
| 11 | B&H 100 | PSFT | 9.74 | 0.20 | 16.54 | 0.55 | 1.762 | 0.076 | 17.20 | 0.63 |
| 206 | B&H 100 Del. U.Lt. | PSFT | 11.38 | 0.45 | 10.23 | 0.59 | 1.027 | 0.063 | 9.15 | 0.69 |
| 207 | B&H 100 Del. U.Lt. Men | KSFT | 11.36 | 0.46 | 12.03 | 0.57 | 1.322 | 0.065 | 11.47 | 0.69 |
| 154 | B&H 100 Lt. | PSFT | 11.21 | 0.58 | 12.82 | 0.77 | 1.467 | 0.086 | 13.13 | 0.55 |
| 24 | B&H 100 Lt. Men. | PSFM | 10.38 | 0.21 | 12.77 | 0.56 | 1.551 | 0.035 | 13.28 | 0.72 |
| 12 | B&H 100 Men. | PSFM | 10.47 | 0.47 | 17.75 | 0.64 | 1.779 | 0.057 | 16.80 | 1.08 |
| 250 | B&H Sp. | KSFT | 9.78 | 0.54 | 14.78 | 0.31 | 1.530 | 0.096 | 13.70 | 2.06 |
| 251 | B&H Sp.Lt. | KSFT | 9.04 | 0.43 | 13.93 | 0.26 | 1.434 | 0.034 | 13.38 | 0.20 |
| 3 | Belmont Milds | KSFT | 8.20 | 0.10 | 17.71 | 0.48 | 1.450 | 0.077 | 14.51 | 0.55 |
| 7 | Belvedere | RSFT | 8.51 | 0.99 | 17.04 | 0.72 | 1.512 | 0.048 | 15.36 | 0.68 |
| 9 | Belvedere | KSFT | 8.65 | 0.20 | 20.74 | 0.47 | 1.677 | 0.060 | 19.30 | 1.01 |
| 6 | Belvedere X.M. | KSFT | 9.51 | 0.15 | 14.45 | 0.68 | 1.576 | 0.053 | 14.32 | 0.73 |
| 10 | Belvedere X.M. | RSFT | 8.80 | 0.63 | 17.05 | 1.65 | 1.331 | 0.118 | 14.86 | 1.58 |
| 25 | Cameo Men. | KSFM | 11.25 | 0.57 | 24.64 | 0.63 | 1.793 | 0.055 | 18.65 | 0.74 |
| 26 | Cameo Men. X.M. | KSFM | 10.86 | 0.37 | 15.84 | 0.45 | 1.462 | 0.040 | 14.09 | 0.39 |
| 180 | Canadian Classic | RSFT | 7.96 | 0.19 | 15.76 | 0.14 | 1.440 | 0.053 | 14.30 | 0.80 |
| 190 | Canadian Classic | KSFT | 9.99 | 0.50 | 19.88 | 1.09 | 1.700 | 0.047 | 17.16 | 0.20 |
| 32 | Craven A | RSFT | 8.94 | 0.65 | 14.58 | 0.47 | 1.292 | 0.087 | 12.83 | 0.75 |
| 31 | Craven A | KSFT | 10.69 | 0.38 | 16.34 | 1.00 | 1.635 | 0.072 | 15.82 | 0.45 |
| 578 | Craven A Extra Lt. KS | KSFT | 10.35 | 0.31 | 12.90 | 0.81 | 1.240 | 0.580 | 10.70 | 2.06 |
| 519 | Craven A Extra Lt. RS | RSFT | 8.72 | 0.25 | 11.29 | 0.55 | 1.260 | 0.129 | 11.03 | 0.62 |
| 105 | Craven A Lt. | RSFT | 8.28 | 0.24 | 12.02 | 0.57 | 1.210 | 0.059 | 11.34 | 0.75 |
| 179 | Craven A Lt. | KSFT | 9.85 | 0.15 | 12.76 | 0.42 | 1.437 | 0.027 | 12.76 | 0.81 |
| 34 | Craven A Sp.M. | RSFT | 8.29 | 0.67 | 7.14 | 0.72 | 0.800 | 0.393 | 4.24 | 1.54 |
| 33 | Craven A Sp.M. | KSFT | 8.67 | 0.16 | 7.16 | 0.31 | 0.653 | 0.036 | 4.79 | 0.61 |
| 38 | Craven A Sp.M. 100 | PSFT | 11.20 | 0.06 | 13.78 | 0.73 | 1.415 | 0.057 | 12.35 | 0.86 |

Table 1: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 44 ml; Puff Interval, 50 sec; Ventilation, Unobstructed.
(Condition Code: Average 1)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 579 | Craven A U. Lt. KS | KSFT | 10.57 | 0.64 | 12.45 | 0.59 | 1.100 | 0.106 | 8.98 | 1.38 |
| 30 | Craven A U.M. | KSFT | 10.42 | 0.24 | 3.01 | 0.26 | 0.410 | 0.153 | 1.86 | 0.87 |
| 528 | Craven A Ultra Lt RS FT | RSFT | 9.35 | 0.11 | 8.74 | 0.10 | 1.030 | 0.275 | 7.25 | 1.09 |
| 35 | Craven Men. | KSFM | 10.57 | 0.54 | 17.40 | 0.99 | 1.335 | 0.107 | 16.10 | 2.82 |
| 152 | Craven Men. Sp.M. | KSFM | 9.70 | 0.32 | 7.64 | 0.48 | 0.580 | 0.023 | 5.16 | 0.37 |
| 28 | Craven Men. Sp.M. 100 | PSFM | 12.46 | 0.57 | 12.05 | 0.56 | 1.170 | 0.244 | 9.68 | 1.35 |
| 39 | Du Maurier | RSFT | 8.07 | 0.42 | 19.39 | 3.38 | 1.456 | 0.051 | 14.18 | 0.57 |
| 37 | Du Maurier | KSFT | 10.80 | 0.74 | 20.49 | 3.55 | 1.743 | 0.093 | 16.78 | 0.82 |
| 151 | Du Maurier Lt. | RSFT | 9.45 | 0.39 | 16.23 | 0.94 | 1.208 | 0.055 | 11.55 | 0.49 |
| 153 | Du Maurier Lt. | KSFT | 12.23 | 0.64 | 17.58 | 0.54 | 1.779 | 0.082 | 15.11 | 0.61 |
| 40 | Du Maurier Sp.M. | KSFT | 11.66 | 0.71 | 16.45 | 2.10 | 1.297 | 0.127 | 12.32 | 1.04 |
| 41 | Du Maurier Sp.M. | PSFT | 13.63 | 0.72 | 17.74 | 1.34 | 1.420 | 0.092 | 13.14 | 0.85 |
| 522 | Du Maurier U.Lt. | KSFT | 10.77 | 0.24 | 9.45 | 0.30 | 1.219 | 0.041 | 8.78 | 0.58 |
| 523 | Du Maurier U.Lt. | RSFT | 8.76 | 0.21 | 9.13 | 0.46 | 1.140 | 0.036 | 9.01 | 1.14 |
| 284 | Du Maurier X.Lt. | RSFT | 10.52 | 0.72 | 12.22 | 1.01 | 1.258 | 0.102 | 10.23 | 1.00 |
| 283 | Du Maurier X.Lt. | KSFT | 12.20 | 0.52 | 12.78 | 0.59 | 1.215 | 0.059 | 10.52 | 0.63 |
| 45 | Dunhill | KSFT | 9.37 | 0.15 | 22.03 | 0.59 | 2.089 | 0.046 | 20.59 | 0.72 |
| 52 | Export A | RSFT | 9.61 | 0.37 | 20.11 | 3.26 | 1.734 | 0.109 | 16.05 | 0.61 |
| 51 | Export A | KSFT | 9.35 | 0.31 | 19.23 | 0.68 | 1.722 | 0.048 | 16.15 | 1.41 |
| 158 | Export A Lt. | RSFT | 9.44 | 0.71 | 17.55 | 0.85 | 1.483 | 0.042 | 14.53 | 0.43 |
| 42 | Export A Lt. | KSFT | 9.63 | 0.12 | 18.36 | 0.21 | 1.863 | 0.034 | 18.28 | 0.25 |
| 56 | Export A Med. | RSFT | 9.04 | 0.46 | 18.18 | 2.50 | 1.411 | 0.086 | 14.38 | 0.72 |
| 54 | Export A Med. | KSFT | 8.81 | 0.19 | 17.74 | 0.49 | 1.678 | 0.144 | 17.74 | 0.99 |
| 43 | Export A Mild | KSFT | 11.56 | 0.22 | 12.08 | 0.34 | 1.340 | 0.139 | 12.24 | 0.64 |
| 49 | Export A Mild | RSFT | 8.46 | 0.31 | 14.64 | 0.63 | 1.505 | 0.253 | 12.76 | 0.81 |
| 569 | Export A Smooth | KSFT | 10.44 | 0.36 | 18.18 | 0.82 | 1.730 | 0.264 | 15.28 | 4.24 |
| 570 | Export A Smooth | RSFT | 7.81 | 0.19 | 23.12 | 0.55 | 1.900 | 0.406 | 15.78 | 0.63 |
| 574 | Export A Smooth Lt. | RSFT | 9.80 | 0.52 | 12.33 | 0.46 | 1.180 | 0.260 | 10.34 | 1.02 |
| 573 | Export A Smooth Lt. | KSFT | 10.53 | 0.15 | 13.53 | 0.44 | 1.140 | 0.245 | 10.99 | 3.27 |
| 572 | Export A Smooth Med. | RSFT | 9.24 | 0.34 | 17.00 | 0.65 | 1.410 | 0.052 | 14.49 | 0.47 |
| 571 | Export A Smooth Med. | KSFT | 10.80 | 0.69 | 15.85 | 0.80 | 1.430 | 0.382 | 14.98 | 0.62 |
| 309 | Export A U.Lt. | RSFT | 10.71 | 0.32 | 10.57 | 1.79 | 1.076 | 0.144 | 9.56 | 1.54 |
| 308 | Export A U.Lt. | KSFT | 11.51 | 0.20 | 9.83 | 0.66 | 1.440 | 0.303 | 10.49 | 0.45 |
| 173 | Export A X.Lt. | RSFT | 9.45 | 0.52 | 14.34 | 0.97 | 1.189 | 0.035 | 11.75 | 0.37 |
| 172 | Export A X.Lt. | KSFT | 10.91 | 0.64 | 11.40 | 0.33 | 1.400 | 0.170 | 12.79 | 0.72 |
| 50 | Export Plain | RSPT | 8.61 | 0.30 | 17.50 | 0.90 | 1.660 | 0.089 | 21.05 | 1.14 |
| 68 | John Player Special | KSFT | 9.56 | 0.25 | 23.37 | 0.49 | 2.134 | 0.036 | 19.58 | 0.86 |
| 75 | Macdonald Men. | RSFM | 9.72 | 0.58 | 12.14 | 1.16 | 1.050 | 0.395 | 11.26 | 0.44 |
| 74 | Macdonald Men. | KSFM | 11.72 | 0.50 | 14.35 | 0.60 | 1.330 | 0.432 | 14.09 | 0.51 |
| 262 | Macdonald Men. Lt. | RSFM | 10.17 | 0.29 | 11.06 | 0.48 | 1.140 | 0.044 | 10.45 | 0.38 |

Table 1: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 44 ml; Puff Interval, 50 sec; Ventilation, Unobstructed,
(Condition Code: Average 1)

| Brand Number | Brand Name | Filter Type | Puffs | | Carbon Monoxide | | Nicotine | | Tar | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Number | Std.Dev | (mg/cig) | Std.Dev | (mg/cig) | Std.Dev | (mg/cig) | Std.Dev |
| 69 | Macdonald Select U.M. | KSFT | 10.84 | 0.47 | 3.12 | 0.23 | 0.660 | 0.576 | 2.55 | 0.66 |
| 78 | Mark Ten | RSFT | 8.96 | 0.77 | 20.01 | 1.45 | 1.574 | 0.100 | 18.77 | 1.60 |
| 76 | Mark Ten | KSFT | 9.20 | 0.16 | 23.21 | 1.01 | 1.731 | 0.075 | 19.74 | 1.19 |
| 73 | Mark Ten Lt. | KSFT | 8.85 | 0.32 | 18.50 | 0.82 | 1.671 | 0.069 | 17.30 | 1.33 |
| 72 | Mark Ten Lt. | RSFT | 7.94 | 0.15 | 20.62 | 0.57 | 1.650 | 0.057 | 21.23 | 1.94 |
| 79 | Mark Ten Plain | KSPT | 10.90 | 0.57 | 18.95 | 1.13 | 1.690 | 0.270 | 18.45 | 9.96 |
| 84 | Matinee | RSFT | 8.53 | 0.20 | 16.75 | 0.60 | 1.507 | 0.076 | 13.44 | 1.00 |
| 83 | Matinee | KSFT | 11.62 | 0.68 | 17.98 | 1.07 | 1.589 | 0.067 | 14.09 | 0.89 |
| 218 | Matinee Slims X.M. | KSFT | 9.91 | 0.26 | 5.51 | 0.34 | 0.751 | 0.055 | 5.17 | 0.30 |
| 220 | Matinee Slims X.M. | PSFT | 11.35 | 0.06 | 7.47 | 0.14 | 0.801 | 0.030 | 5.84 | 0.45 |
| 221 | Matinee Slims X.M. Men | PSFM | 11.73 | 0.38 | 7.10 | 0.62 | 0.738 | 0.266 | 5.66 | 1.09 |
| 219 | Matinee Slims X.M. Men. | KSFM | 9.60 | 0.30 | 5.63 | 0.40 | 0.771 | 0.032 | 5.23 | 0.45 |
| 82 | Matinee X.M. | KSFT | 9.64 | 0.54 | 6.96 | 1.13 | 0.653 | 0.035 | 5.46 | 0.38 |
| 217 | Matinee X.M. | RSFT | 8.66 | 0.24 | 6.58 | 0.47 | 0.790 | 0.053 | 5.92 | 0.65 |
| 88 | Medallion U.M. | KSFT | 10.35 | 0.40 | 2.79 | 0.99 | 0.231 | 0.037 | 1.68 | 0.45 |
| 18 | Number 7 | KSFT | 10.43 | 0.90 | 21.05 | 1.15 | 1.586 | 0.077 | 16.61 | 0.32 |
| 223 | Number 7 | RSFT | 8.12 | 0.50 | 20.34 | 0.55 | 1.530 | 0.176 | 19.76 | 3.41 |
| 16 | Number 7 Lt. | RSFT | 7.68 | 0.29 | 17.10 | 0.46 | 1.590 | 0.025 | 16.29 | 0.37 |
| 19 | Number 7 Lt. | KSFT | 9.70 | 0.22 | 15.94 | 0.42 | 1.673 | 0.069 | 16.40 | 0.90 |
| 95 | Peter Jackson | KSFT | 10.18 | 0.42 | 22.23 | 1.35 | 1.737 | 0.116 | 16.89 | 0.82 |
| 94 | Peter Jackson X.L. | KSFT | 9.26 | 0.50 | 7.38 | 0.59 | 1.000 | 0.348 | 5.69 | 1.01 |
| 503 | Peter Stuyvesant 100 | PSFT | 10.26 | 0.69 | 18.14 | 1.04 | 1.230 | 0.778 | 19.17 | 2.29 |
| 112 | Players | RSFT | 9.44 | 0.86 | 21.84 | 1.64 | 1.742 | 0.092 | 16.82 | 0.60 |
| 111 | Players | KSFT | 9.43 | 0.27 | 23.15 | 1.14 | 2.125 | 0.049 | 20.56 | 0.97 |
| 114 | Players Lt. | RSFT | 8.69 | 0.68 | 16.91 | 1.37 | 1.574 | 0.084 | 14.65 | 0.71 |
| 113 | Players Lt. | KSFT | 11.49 | 0.75 | 16.59 | 0.69 | 1.915 | 0.044 | 16.29 | 0.58 |
| 550 | Players Lt.Smooth | KSFT | 10.78 | 0.23 | 16.96 | 0.34 | 1.729 | 0.513 | 16.61 | 0.66 |
| 549 | Players Lt.Smooth | RSFT | 8.11 | 0.21 | 17.03 | 0.67 | 1.762 | 0.048 | 17.23 | 0.99 |
| 314 | Players Medium | RSFT | 9.86 | 0.79 | 17.51 | 0.80 | 1.669 | 0.117 | 15.42 | 0.70 |
| 315 | Players Medium | KSFT | 9.56 | 0.16 | 22.71 | 0.91 | 1.905 | 0.041 | 18.91 | 0.83 |
| 116 | Players Plain | RSPT | 8.26 | 0.21 | 15.14 | 0.51 | 1.733 | 0.055 | 19.04 | 0.69 |
| 229 | Players Sp. Blend | RSFT | 7.48 | 0.29 | 19.29 | 0.61 | 1.774 | 0.122 | 18.59 | 1.14 |
| 115 | Players X.Lt. | RSFT | 9.94 | 0.58 | 12.60 | 0.95 | 1.341 | 0.068 | 11.15 | 0.90 |
| 228 | Players X.Lt. | KSFT | 12.17 | 0.77 | 14.86 | 1.13 | 1.560 | 0.061 | 12.85 | 0.39 |
| 121 | Rothmans | KSFT | 10.85 | 0.69 | 20.40 | 1.04 | 1.504 | 0.097 | 16.85 | 1.01 |
| 233 | Rothmans Lt. | KSFT | 10.39 | 0.55 | 19.24 | 0.66 | 1.890 | 0.132 | 17.21 | 0.97 |
| 122 | Rothmans Sp.M. | KSFT | 10.94 | 1.02 | 17.70 | 1.43 | 1.442 | 0.034 | 14.89 | 0.49 |
| 525 | Rothmans U.Lt. | KSFT | 11.39 | 0.61 | 13.37 | 0.34 | 1.400 | 0.027 | 12.02 | 0.53 |
| 124 | Rothmans X.Lt. | KSFT | 9.98 | 0.32 | 16.11 | 0.53 | 1.619 | 0.116 | 14.39 | 1.05 |
| 138 | Vantage | KSFT | 9.86 | 0.60 | 14.53 | 0.39 | 0.963 | 0.049 | 10.11 | 0.37 |
| 139 | Vantage Lt. | KSFT | 10.53 | 0.49 | 7.82 | 0.91 | 0.860 | 0.081 | 6.96 | 0.71 |
| 141 | Viscount 1 U.M. | KSFT | 9.82 | 0.34 | 1.73 | 0.12 | 0.234 | 0.024 | 1.29 | 0.43 |
| 159 | Viscount 100 X.M. | PSFT | 10.20 | 0.41 | 7.05 | 0.29 | 0.774 | 0.030 | 6.19 | 0.61 |
| 146 | Viscount X.M. | KSFT | 9.37 | 0.20 | 7.04 | 0.51 | 0.713 | 0.042 | 5.46 | 1.08 |
| 148 | Viscount X.M. Men. | KSFM | 9.51 | 0.28 | 7.09 | 0.37 | 0.740 | 0.312 | 4.94 | 0.92 |

Table 2: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions.
Puff Volume, 44 ml; Puff Interval, 26 sec; Ventilation, Unobstructed.
(Condition Code: Average 2)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 133 | Accord U.M. | KSFT | 14.45 | 0.30 | 10.16 | 0.80 | 1.160 | 0.070 | 8.37 | 2.41 |
| 132 | Accord U.M. Men. | KSFM | 14.74 | 0.81 | 9.29 | 0.86 | 1.210 | 0.071 | 10.02 | 0.36 |
| 243 | Avanti Slim | KSFT | 13.49 | 0.39 | 21.60 | 2.32 | 2.780 | 0.184 | 25.38 | 1.06 |
| 244 | Avanti Slim Lt. | KSFT | 14.77 | 0.59 | 15.39 | 0.79 | 2.260 | 0.063 | 16.84 | 3.42 |
| 11 | B&H 100 | PSFT | 15.21 | 1.10 | 24.87 | 1.96 | 2.977 | 0.124 | 25.49 | 0.51 |
| 206 | B&H 100 Del. U.Lt. | PSFT | 16.81 | 0.66 | 12.80 | 6.53 | 1.765 | 0.065 | 15.52 | 0.65 |
| 207 | B&H 100 Del. U.Lt. Men | KSFT | 17.33 | 0.65 | 16.62 | 1.14 | 2.167 | 0.180 | 16.80 | 1.28 |
| 154 | B&H 100 Lt. | PSFT | 17.99 | 0.42 | 18.14 | 1.01 | 2.470 | 0.108 | 20.14 | 1.04 |
| 24 | B&H 100 Lt. Men. | PSFM | 15.92 | 1.72 | 18.05 | 1.86 | 2.656 | 0.117 | 20.43 | 0.55 |
| 12 | B&H 100 Men. | PSFM | 15.67 | 1.42 | 24.21 | 0.65 | 2.634 | 0.151 | 27.90 | 9.73 |
| 250 | B&H Sp. | KSFT | 14.02 | 0.53 | 18.42 | 0.78 | 2.590 | 0.095 | 22.40 | 0.72 |
| 251 | B&H Sp.Lt. | KSFT | 14.74 | 1.23 | 17.20 | 3.46 | 2.415 | 0.157 | 19.66 | 1.57 |
| 3 | Belmont Milds | KSFT | 12.57 | 0.51 | 24.05 | 1.18 | 2.335 | 0.150 | 21.11 | 1.43 |
| 7 | Belvedere | RSFT | 12.58 | 0.36 | 22.93 | 1.38 | 2.091 | 0.140 | 22.08 | 1.65 |
| 9 | Belvedere | KSFT | 12.95 | 0.89 | 27.11 | 1.82 | 2.897 | 0.098 | 27.49 | 1.80 |
| 10 | Belvedere X.M. | RSFT | 11.92 | 0.30 | 20.46 | 9.49 | 2.043 | 0.225 | 21.65 | 1.34 |
| 6 | Belvedere X.M. | KSFT | 14.61 | 0.76 | 20.60 | 1.23 | 2.718 | 0.149 | 22.45 | 1.52 |
| 25 | Cameo Men. | KSFM | 15.61 | 0.94 | 25.27 | 12.19 | 2.513 | 0.036 | 24.95 | 1.83 |
| 26 | Cameo Men. X.M. | KSFM | 17.15 | 0.71 | 20.98 | 0.51 | 2.385 | 0.095 | 21.52 | 0.91 |
| 180 | Canadian Classic | RSFT | 11.50 | 0.14 | 20.30 | 0.51 | 2.420 | 0.107 | 23.27 | 0.50 |
| 190 | Canadian Classic | KSFT | 14.80 | 0.72 | 24.61 | 1.72 | 2.980 | 0.157 | 26.61 | 3.57 |
| 32 | Craven A | RSFT | 13.04 | 0.59 | 19.55 | 0.21 | 1.774 | 0.093 | 17.67 | 0.72 |
| 31 | Craven A | KSFT | 15.75 | 0.59 | 25.19 | 1.31 | 2.316 | 0.153 | 21.77 | 0.73 |
| 578 | Craven A Extra Lt. KS | KSFT | 15.84 | 0.89 | 16.33 | 1.43 | 2.260 | 0.074 | 18.47 | 3.03 |
| 519 | Craven A Extra Lt. RS | RSFT | 13.51 | 0.44 | 13.81 | 1.14 | 2.050 | 0.096 | 16.39 | 1.50 |
| 105 | Craven A Lt. | RSFT | 12.81 | 0.33 | 16.11 | 0.73 | 2.030 | 0.140 | 16.68 | 2.41 |
| 179 | Craven A Lt. | KSFT | 15.25 | 0.86 | 18.06 | 0.95 | 2.513 | 0.152 | 20.54 | 2.07 |
| 34 | Craven A Sp.M. | RSFT | 12.68 | 0.63 | 9.46 | 0.77 | 1.120 | 0.062 | 8.11 | 1.42 |
| 33 | Craven A Sp.M. | KSFT | 13.62 | 2.08 | 11.03 | 0.84 | 1.041 | 0.246 | 8.70 | 2.53 |
| 38 | Craven A Sp.M. 100 | PSFT | 18.48 | 0.50 | 19.10 | 0.69 | 2.304 | 0.120 | 18.46 | 1.93 |
| 579 | Craven A U. Lt. KS | KSFT | 16.16 | 0.63 | 17.37 | 0.38 | 1.920 | 0.157 | 13.20 | 4.46 |
| 30 | Craven A U.M. | KSFT | 17.44 | 1.00 | 4.53 | 0.24 | 0.680 | 0.066 | 4.40 | 1.15 |
| 528 | Craven A Ultra Lt RS FT | RSFT | 14.48 | 0.16 | 12.17 | 0.61 | 1.560 | 0.059 | 12.31 | 0.76 |
| 35 | Craven Men. | KSFM | 15.76 | 0.37 | 19.55 | 9.26 | 2.054 | 0.075 | 21.67 | 1.12 |
| 152 | Craven Men. Sp.M. | KSFM | 15.51 | 0.44 | 10.26 | 0.99 | 1.060 | 0.059 | 9.20 | 0.83 |
| 28 | Craven Men. Sp.M. 100 | PSFM | 19.29 | 1.14 | 16.66 | 1.05 | 1.860 | 0.107 | 16.95 | 0.99 |
| 39 | Du Maurier | RSFT | 12.49 | 0.37 | 25.31 | 1.07 | 1.961 | 0.086 | 19.92 | 0.65 |
| 37 | Du Maurier | KSFT | 15.31 | 1.06 | 21.52 | 10.23 | 2.437 | 0.119 | 21.68 | 0.60 |
| 151 | Du Maurier Lt. | RSFT | 14.16 | 0.61 | 22.25 | 0.65 | 1.733 | 0.094 | 16.05 | 0.87 |
| 153 | Du Maurier Lt. | KSFT | 17.72 | 0.25 | 18.86 | 9.12 | 2.404 | 0.152 | 20.86 | 1.17 |

Table 2: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 44 ml; Puff Interval, 26 sec; Ventilation, Unobstructed.
(Condition Code: Average 2)

| Brand Number | Brand Name | Filter Type | Puffs | | Carbon Monoxide | | Nicotine | | Tar | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Number | Std.Dev | (mg/cig) | Std.Dev | (mg/cig) | Std.Dev | (mg/cig) | Std.Dev |
| 40 | Du Maurier Sp.M. | KSFT | 17.34 | 1.16 | 22.22 | 2.00 | 1.994 | 0.156 | 18.70 | 1.20 |
| 41 | Du Maurier Sp.M. | PSFT | 20.11 | 0.54 | 14.27 | 10.95 | 2.071 | 0.188 | 18.98 | 1.25 |
| 523 | Du Maurier U.Lt. | RSFT | 13.66 | 0.48 | 12.66 | 0.80 | 1.920 | 0.107 | 13.04 | 1.51 |
| 522 | Du Maurier U.Lt. | KSFT | 17.91 | 0.95 | 14.19 | 0.75 | 2.021 | 0.103 | 14.60 | 1.24 |
| 284 | Du Maurier X.Lt. | RSFT | 15.48 | 0.83 | 11.50 | 8.80 | 1.763 | 0.153 | 14.94 | 0.90 |
| 283 | Du Maurier X.Lt. | KSFT | 16.14 | 0.94 | 17.02 | 0.69 | 1.885 | 0.095 | 15.51 | 0.41 |
| 45 | Dunhill | KSFT | 14.14 | 0.40 | 28.83 | 0.77 | 3.181 | 0.167 | 28.89 | 1.70 |
| 52 | Export A | RSFT | 13.50 | 0.43 | 26.69 | 1.32 | 2.167 | 0.151 | 21.57 | 1.36 |
| 51 | Export A | KSFT | 14.14 | 0.66 | 25.80 | 0.84 | 2.765 | 0.102 | 26.05 | 1.06 |
| 158 | Export A Lt. | RSFT | 13.49 | 0.33 | 17.05 | 7.90 | 2.017 | 0.160 | 18.70 | 1.66 |
| 42 | Export A Lt. | KSFT | 14.97 | 0.32 | 23.18 | 1.36 | 2.842 | 0.182 | 24.13 | 1.55 |
| 56 | Export A Med. | RSFT | 13.02 | 0.81 | 24.31 | 1.37 | 1.997 | 0.125 | 19.90 | 1.32 |
| 54 | Export A Med. | KSFT | 13.45 | 0.60 | 23.43 | 1.02 | 2.927 | 0.129 | 24.41 | 0.89 |
| 43 | Export A Mild | KSFT | 17.31 | 0.89 | 16.33 | 1.13 | 2.390 | 0.065 | 18.70 | 1.35 |
| 49 | Export A Mild | RSFT | 13.77 | 0.58 | 20.11 | 1.21 | 2.241 | 0.053 | 19.08 | 1.29 |
| 570 | Export A Smooth | RSFT | 11.01 | 0.36 | 24.26 | 0.91 | 2.490 | 0.056 | 24.86 | 4.08 |
| 569 | Export A Smooth | KSFT | 16.19 | 0.83 | 23.15 | 1.20 | 3.060 | 0.116 | 25.82 | 1.08 |
| 574 | Export A Smooth Lt. | RSFT | 15.46 | 0.42 | 15.45 | 0.24 | 1.830 | 0.032 | 15.69 | 1.04 |
| 573 | Export A Smooth Lt. | KSFT | 16.61 | 0.94 | 18.36 | 0.57 | 2.290 | 0.054 | 16.05 | 4.28 |
| 572 | Export A Smooth Med. | RSFT | 13.35 | 0.34 | 21.34 | 0.81 | 2.350 | 0.075 | 22.54 | 2.51 |
| 571 | Export A Smooth Med. | KSFT | 15.08 | 0.40 | 20.37 | 0.80 | 2.770 | 0.060 | 24.34 | 0.53 |
| 309 | Export A U.Lt. | RSFT | 16.29 | 0.44 | 12.61 | 1.65 | 1.601 | 0.134 | 13.74 | 1.28 |
| 308 | Export A U.Lt. | KSFT | 18.67 | 1.04 | 13.23 | 0.53 | 2.200 | 0.155 | 15.73 | 2.17 |
| 173 | Export A X.Lt. | RSFT | 15.31 | 1.35 | 18.21 | 1.18 | 1.774 | 0.077 | 16.47 | 0.45 |
| 172 | Export A X.Lt. | KSFT | 17.83 | 1.04 | 15.56 | 0.76 | 2.600 | 0.069 | 18.23 | 3.65 |
| 50 | Export Plain | RSPT | 12.73 | 0.49 | 22.83 | 0.99 | 3.210 | 0.081 | 30.37 | 5.35 |
| 68 | John Player Special | KSFT | 14.29 | 0.68 | 29.74 | 0.79 | 3.382 | 0.082 | 28.37 | 1.88 |
| 75 | Macdonald Men. | RSFM | 14.74 | 1.24 | 15.20 | 1.28 | 1.970 | 0.106 | 16.63 | 1.52 |
| 74 | Macdonald Men. | KSFM | 17.39 | 0.24 | 18.31 | 1.00 | 2.600 | 0.117 | 20.60 | 1.69 |
| 262 | Macdonald Man. Lt. | RSFM | 15.44 | 0.38 | 14.14 | 0.64 | 2.030 | 0.051 | 15.69 | 0.47 |
| 69 | Macdonald Select U.M. | KSFT | 18.31 | 0.92 | 4.94 | 0.35 | 0.850 | 0.192 | 4.78 | 1.31 |
| 78 | Mark Ten | RSFT | 12.28 | 0.32 | 27.42 | 0.85 | 2.324 | 0.079 | 25.85 | 0.95 |
| 76 | Mark Ten | KSFT | 13.49 | 0.65 | 29.47 | 0.87 | 2.744 | 0.116 | 28.99 | 1.31 |
| 73 | Mark Ten Lt. | KSFT | 13.53 | 0.66 | 23.78 | 3.59 | 2.725 | 0.114 | 26.31 | 0.80 |
| 72 | Mark Ten Lt. | RSFT | 10.53 | 0.43 | 24.41 | 1.10 | 2.560 | 0.120 | 30.18 | 1.35 |
| 79 | Mark Ten Plain | KSPT | 15.71 | 0.67 | 24.33 | 1.41 | 3.230 | 0.145 | 32.68 | 1.17 |
| 83 | Matinee | KSFT | 17.62 | 0.86 | 15.27 | 7.65 | 2.013 | 0.284 | 16.68 | 2.36 |
| 84 | Matinee | RSFT | 13.08 | 0.17 | 21.64 | 0.40 | 2.367 | 0.253 | 18.91 | 1.36 |
| 218 | Matinee Slims X.M. | KSFT | 16.34 | 0.93 | 8.78 | 0.71 | 1.336 | 0.124 | 6.94 | 0.94 |
| 220 | Matinee Slims X.M. | PSFT | 18.98 | 0.30 | 11.50 | 1.07 | 1.439 | 0.155 | 10.47 | 1.42 |

Table 2: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions;
Puff Volume, 44 ml; Puff Interval, 26 sec; Ventilation, Unobstructed.
(Condition Code: Average 2)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 221 | Matinee Slims X.M. Men | PSFM | 19.68 | 0.72 | 11.13 | 0.66 | 1.480 | 0.100 | 9.95 | 1.00 |
| 219 | Matinee Slims X.M. Men. | KSFM | 16.32 | 0.57 | 9.03 | 0.54 | 1.429 | 0.043 | 8.45 | 0.45 |
| 82 | Matinee X.M. | KSFT | 16.30 | 0.67 | 9.44 | 1.47 | 0.959 | 0.073 | 6.04 | 0.70 |
| 217 | Matinee X.M. | RSFT | 14.54 | 0.87 | 10.79 | 0.77 | 1.564 | 0.092 | 10.55 | 0.95 |
| 88 | Medallion U.M. | KSFT | 17.13 | 1.09 | 3.57 | 3.37 | 0.436 | 0.145 | 3.32 | 1.62 |
| 18 | Number 7 | KSFT | 14.86 | 0.87 | 26.32 | 1.09 | 2.337 | 0.136 | 22.96 | 0.96 |
| 223 | Number 7 | RSFT | 10.94 | 0.65 | 23.87 | 1.27 | 2.530 | 0.069 | 27.00 | 1.47 |
| 19 | Number 7 Lt. | KSFT | 14.68 | 0.51 | 21.62 | 0.59 | 2.600 | 0.091 | 22.45 | 1.44 |
| 16 | Number 7 Lt. | RSFT | 11.95 | 0.70 | 19.96 | 2.33 | 2.650 | 0.123 | 23.23 | 4.37 |
| 95 | Peter Jackson | KSFT | 14.92 | 0.71 | 24.43 | 7.91 | 2.450 | 0.116 | 22.72 | 1.01 |
| 94 | Peter Jackson X.Lt. | KSFT | 14.73 | 0.46 | 9.41 | 0.82 | 1.310 | 0.059 | 9.48 | 0.30 |
| 503 | Peter Stuyvesant 100 | PSFT | 15.29 | 1.06 | 22.22 | 1.69 | 3.250 | 0.089 | 27.26 | 2.55 |
| 112 | Players | RSFT | 13.76 | 0.62 | 20.84 | 9.50 | 2.361 | 0.079 | 23.08 | 1.31 |
| 111 | Players | KSFT | 13.74 | 0.49 | 30.06 | 1.30 | 3.265 | 0.139 | 30.96 | 2.55 |
| 113 | Players Lt. | KSFT | 17.42 | 1.01 | 25.04 | 0.72 | 2.593 | 0.061 | 22.02 | 0.57 |
| 114 | Players Lt. | RSFT | 13.65 | 0.23 | 23.23 | 0.86 | 2.390 | 0.098 | 22.68 | 0.44 |
| 550 | Players Lt.Smooth | KSFT | 16.39 | 1.09 | 24.15 | 1.03 | 3.009 | 0.114 | 24.06 | 1.17 |
| 549 | Players Lt.Smooth | RSFT | 12.07 | 0.79 | 22.31 | 1.38 | 2.884 | 0.247 | 25.70 | 2.31 |
| 314 | Players Medium | RSFT | 12.93 | 0.78 | 23.29 | 0.95 | 2.284 | 0.114 | 21.08 | 0.87 |
| 315 | Players Medium | KSFT | 13.96 | 1.08 | 28.76 | 1.40 | 3.081 | 0.091 | 27.57 | 1.07 |
| 116 | Players Plain | RSFT | 12.47 | 0.64 | 20.69 | 0.84 | 2.655 | 0.137 | 28.02 | 2.38 |
| 229 | Players Sp. Blend | RSFT | 10.86 | 0.53 | 25.04 | 1.17 | 2.874 | 0.100 | 28.99 | 1.75 |
| 115 | Players X.Lt. | RSFT | 15.36 | 0.79 | 17.25 | 0.96 | 2.007 | 0.091 | 15.92 | 0.50 |
| 228 | Players X.Lt. | KSFT | 18.72 | 0.80 | 21.96 | 4.03 | 2.127 | 0.222 | 18.50 | 1.44 |
| 121 | Rothmans | KSFT | 15.46 | 0.42 | 26.61 | 0.35 | 2.395 | 0.186 | 23.78 | 1.15 |
| 233 | Rothmans Lt. | KSFT | 15.05 | 0.62 | 21.27 | 2.54 | 3.000 | 0.148 | 25.46 | 0.97 |
| 122 | Rothmans Sp.M. | KSFT | 15.96 | 0.72 | 14.83 | 10.96 | 2.081 | 0.113 | 20.59 | 0.19 |
| 525 | Rothmans U.Lt. | KSFT | 16.97 | 0.54 | 17.69 | 0.52 | 2.360 | 0.107 | 19.94 | 0.61 |
| 124 | Rothmans X.Lt. | KSFT | 15.12 | 0.49 | 19.54 | 0.96 | 2.604 | 0.165 | 20.53 | 2.33 |
| 138 | Vantage | KSFT | 15.85 | 0.38 | 15.61 | 7.39 | 1.359 | 0.090 | 14.28 | 0.58 |
| 139 | Vantage Lt. | KSFT | 17.44 | 0.78 | 10.64 | 0.53 | 1.700 | 0.081 | 10.60 | 2.66 |
| 141 | Viscount 1 U.M. | KSFT | 17.67 | 0.92 | 2.94 | 0.18 | 0.461 | 0.074 | 2.21 | 0.89 |
| 158 | Viscount 100 X.M. | PSFT | 16.59 | 0.72 | 10.11 | 1.13 | 1.370 | 0.110 | 10.54 | 0.65 |
| 146 | Viscount X.M. | KSFT | 14.56 | 1.65 | 10.41 | 0.71 | 1.265 | 0.026 | 9.04 | 0.80 |
| 148 | Viscount X.M. Men. | KSFM | 15.31 | 0.55 | 9.90 | 0.53 | 1.350 | 0.507 | 6.85 | 3.15 |

Table 3: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions.
Puff Volume, 55 ml; Puff Interval, 26 sec; Ventilation, Unobstructed.
(Condition Code: Maximum 1)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 133 | Accord U.M. | KSFT | 13.49 | 0.31 | 14.01 | 0.79 | 1.180 | 0.104 | 11.46 | 0.96 |
| 132 | Accord U.M. Men. | KSFM | 13.76 | 0.46 | 13.86 | 0.24 | 1.230 | 0.076 | 12.72 | 1.21 |
| 243 | Avanti Slim | KSFT | 12.09 | 0.27 | 27.66 | 0.67 | 3.030 | 0.046 | 33.99 | 2.05 |
| 244 | Avanti Slim Lt. | KSFT | 14.33 | 0.51 | 18.85 | 0.57 | 2.160 | 0.119 | 21.35 | 1.54 |
| 11 | B&H 100 | PSFT | 14.80 | 0.18 | 27.81 | 2.78 | 3.009 | 0.052 | 30.45 | 1.46 |
| 206 | B&H 100 Del. U.Lt. | PSFT | 17.46 | 0.93 | 18.68 | 0.64 | 2.020 | 0.060 | 16.58 | 0.19 |
| 207 | B&H 100 Del. U.Lt. Men | KSFT | 17.65 | 0.30 | 20.78 | 1.02 | 2.579 | 0.259 | 16.99 | 6.34 |
| 154 | B&H 100 Lt. | PSFT | 16.99 | 0.37 | 21.64 | 0.75 | 2.506 | 0.163 | 23.97 | 0.51 |
| 24 | B&H 100 Lt. Men. | PSFM | 16.36 | 0.29 | 21.90 | 0.78 | 2.803 | 0.107 | 25.12 | 1.36 |
| 12 | B&H 100 Men. | PSFM | 15.27 | 0.41 | 28.54 | 1.22 | 2.924 | 0.087 | 29.32 | 0.99 |
| 250 | B&H Sp. | KSFT | 12.83 | 1.05 | 20.38 | 4.68 | 2.600 | 0.189 | 28.57 | 1.33 |
| 251 | B&H Sp.Lt. | KSFT | 14.09 | 0.93 | 23.48 | 0.82 | 2.528 | 0.136 | 24.46 | 2.01 |
| 3 | Belmont Milds | KSFT | 12.47 | 0.48 | 26.45 | 0.77 | 2.431 | 0.107 | 26.47 | 1.95 |
| 7 | Belvedere | RSFT | 10.62 | 0.60 | 26.39 | 0.53 | 2.427 | 0.107 | 24.90 | 1.03 |
| 9 | Belvedere | KSFT | 13.46 | 0.33 | 31.39 | 1.11 | 2.994 | 0.347 | 37.69 | 4.53 |
| 10 | Belvedere X.M. | RSFT | 10.79 | 0.70 | 25.45 | 0.71 | 2.338 | 0.084 | 24.34 | 0.86 |
| 6 | Belvedere X.M. | KSFT | 14.53 | 0.53 | 25.36 | 1.14 | 2.752 | 0.081 | 27.20 | 1.49 |
| 25 | Cameo Men. | KSFM | 14.00 | 0.35 | 32.72 | 5.45 | 2.818 | 0.137 | 29.22 | 5.05 |
| 26 | Cameo Men. X.M. | KSFM | 17.63 | 0.52 | 24.75 | 0.81 | 2.478 | 0.133 | 26.18 | 1.55 |
| 180 | Canadian Classic | RSFT | 10.15 | 0.57 | 25.16 | 0.90 | 2.330 | 0.116 | 31.29 | 2.37 |
| 150 | Canadian Classic | KSFT | 12.89 | 0.54 | 30.07 | 1.50 | 2.490 | 0.164 | 31.77 | 2.21 |
| 32 | Craven A | RSFT | 11.45 | 0.59 | 23.18 | 1.01 | 2.158 | 0.106 | 20.20 | 1.64 |
| 31 | Craven A | KSFT | 14.10 | 0.79 | 28.13 | 1.77 | 2.622 | 0.193 | 24.63 | 0.71 |
| 578 | Craven A Extra Lt. KS | KSFT | 15.96 | 2.29 | 21.86 | 0.59 | 2.160 | 0.157 | 22.86 | 0.60 |
| 519 | Craven A Extra Lt. RS | RSFT | 12.05 | 0.67 | 18.17 | 0.36 | 2.150 | 0.146 | 21.51 | 1.32 |
| 179 | Craven A Lt. | KSFT | 15.72 | 0.29 | 20.81 | 1.32 | 2.487 | 0.126 | 22.58 | 1.00 |
| 105 | Craven A Lt. | RSFT | 12.26 | 0.79 | 16.32 | 3.32 | 2.060 | 0.049 | 24.72 | 2.02 |
| 34 | Craven A Sp.M. | RSFT | 11.01 | 0.69 | 12.94 | 0.88 | 1.100 | 0.092 | 9.65 | 1.50 |
| 33 | Craven A Sp.M. | KSFT | 13.93 | 0.96 | 13.94 | 1.45 | 1.284 | 0.159 | 14.25 | 6.49 |
| 38 | Craven A Sp.M. 100 | PSFT | 18.86 | 0.63 | 22.76 | 0.62 | 2.471 | 0.141 | 22.58 | 0.88 |
| 579 | Craven A U. Lt. KS | KSFT | 15.25 | 0.41 | 21.93 | 1.18 | 1.890 | 0.100 | 18.50 | 1.07 |
| 30 | Craven A U.M. | KSFT | 16.81 | 1.04 | 7.15 | 0.88 | 0.770 | 0.067 | 6.09 | 0.50 |
| 528 | Craven A Ultra Lt KS FT | RSFT | 13.46 | 0.43 | 15.18 | 1.08 | 1.550 | 0.071 | 14.32 | 1.64 |
| 35 | Craven Men. | KSFM | 13.62 | 0.79 | 26.87 | 1.87 | 2.336 | 0.075 | 24.39 | 0.37 |
| 152 | Craven Men. Sp.M. | KSFM | 14.67 | 0.49 | 13.88 | 0.94 | 1.020 | 0.050 | 10.41 | 1.06 |
| 28 | Craven Men. Sp.M. 100 | PSFM | 18.72 | 2.00 | 21.62 | 0.99 | 1.860 | 0.075 | 20.10 | 1.55 |
| 39 | Du Maurier | RSFT | 11.27 | 0.76 | 29.91 | 1.05 | 2.329 | 0.058 | 23.02 | 0.89 |
| 37 | Du Maurier | KSFT | 14.07 | 1.02 | 31.47 | 1.30 | 2.911 | 0.089 | 25.37 | 0.49 |
| 151 | Du Maurier Lt. | RSFT | 12.55 | 0.51 | 24.02 | 1.79 | 2.030 | 0.125 | 19.03 | 1.22 |
| 153 | Du Maurier Lt. | KSFT | 15.67 | 0.22 | 27.41 | 0.37 | 2.945 | 0.275 | 24.92 | 2.21 |

Table 2: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 56 ml; Puff Interval, 26 sec; Ventilation, Unobstructed.
(Condition Code: Maximum 1)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | Du Maurier Sp.M. | KSFT | 15.15 | 0.57 | 27.15 | 0.65 | 2.392 | 0.123 | 21.74 | 0.72 |
| 41 | Du Maurier Sp.M. | PSFT | 18.48 | 0.79 | 28.80 | 1.05 | 2.552 | 0.073 | 23.52 | 0.58 |
| 523 | Du Maurier U.Lt. | RSFT | 14.21 | 0.58 | 15.11 | 0.91 | 1.962 | 0.030 | 17.29 | 0.45 |
| 522 | Du Maurier U.Lt. | KSFT | 17.78 | 0.17 | 17.00 | 1.57 | 2.173 | 0.091 | 17.32 | 0.66 |
| 264 | Du Maurier X.Lt. | RSFT | 14.31 | 0.39 | 21.52 | 5.25 | 2.008 | 0.158 | 16.87 | 1.10 |
| 263 | Du Maurier X.Lt. | KSFT | 16.70 | 0.64 | 20.54 | 1.05 | 2.239 | 0.140 | 18.88 | 0.43 |
| 45 | Dunhill | KSFT | 13.97 | 0.18 | 31.66 | 1.01 | 3.237 | 0.268 | 36.11 | 1.67 |
| 52 | Export A | RSFT | 11.70 | 0.56 | 29.46 | 0.36 | 2.278 | 0.173 | 24.06 | 1.83 |
| 51 | Export A | KSFT | 14.49 | 0.34 | 28.95 | 1.58 | 2.835 | 0.051 | 31.58 | 2.32 |
| 158 | Export A Lt. | RSFT | 12.31 | 0.61 | 24.38 | 3.28 | 2.402 | 0.128 | 22.98 | 0.90 |
| 42 | Export A Lt. | KSFT | 14.76 | 0.26 | 28.45 | 0.37 | 2.981 | 0.133 | 28.62 | 3.09 |
| 56 | Export A Med. | RSFT | 12.08 | 0.53 | 26.70 | 1.56 | 2.293 | 0.140 | 22.05 | 0.70 |
| 54 | Export A Med. | KSFT | 14.18 | 0.43 | 26.53 | 1.80 | 3.008 | 0.102 | 29.50 | 0.82 |
| 43 | Export A Mild | KSFT | 16.56 | 0.75 | 20.73 | 0.53 | 2.380 | 0.064 | 23.23 | 1.24 |
| 49 | Export A Mild | RSFT | 13.25 | 0.31 | 23.33 | 1.11 | 2.409 | 0.094 | 25.62 | 1.34 |
| 569 | Export A Smooth | KSFT | 15.03 | 0.83 | 27.02 | 0.94 | 2.960 | 0.069 | 30.97 | 0.60 |
| 570 | Export A Smooth | RSFT | 10.92 | 0.46 | 26.60 | 5.53 | 2.440 | 0.059 | 36.28 | 3.07 |
| 574 | Export A Smooth Lt. | RSFT | 15.01 | 1.97 | 20.49 | 0.46 | 1.850 | 0.056 | 21.74 | 2.10 |
| 573 | Export A Smooth Lt. | KSFT | 15.19 | 0.67 | 21.96 | 0.59 | 2.210 | 0.053 | 23.93 | 1.04 |
| 571 | Export A Smooth Med. | KSFT | 14.77 | 0.41 | 25.32 | 0.29 | 2.610 | 0.067 | 27.24 | 1.07 |
| 572 | Export A Smooth Med. | RSFT | 12.22 | 0.56 | 25.02 | 2.23 | 2.280 | 0.101 | 27.79 | 1.47 |
| 309 | Export A U.Lt. | RSFT | 14.78 | 0.52 | 16.82 | 1.05 | 1.895 | 0.112 | 16.36 | 0.73 |
| 308 | Export A U.Lt. | KSFT | 18.14 | 1.31 | 18.07 | 1.27 | 2.400 | 0.019 | 20.58 | 1.93 |
| 173 | Export A X.Lt. | RSFT | 13.56 | 0.24 | 20.76 | 0.46 | 2.067 | 0.124 | 20.26 | 1.66 |
| 172 | Export A X.Lt. | KSFT | 16.55 | 0.97 | 19.07 | 0.32 | 2.430 | 0.153 | 23.62 | 1.76 |
| 50 | Export Plain | RSFT | 12.14 | 0.54 | 27.28 | 0.87 | 2.980 | 0.236 | 40.13 | 3.57 |
| 68 | John Player Special | KSFT | 13.70 | 0.45 | 32.56 | 2.63 | 3.359 | 0.166 | 35.43 | 1.49 |
| 75 | Macdonald Men. | RSPM | 14.15 | 0.47 | 15.01 | 1.90 | 1.990 | 0.095 | 21.65 | 1.11 |
| 74 | Macdonald Men. | KSPM | 16.21 | 0.42 | 20.07 | 3.84 | 2.500 | 0.123 | 22.28 | 3.76 |
| 262 | Macdonald Men. Lt. | RSPM | 15.44 | 0.37 | 17.61 | 0.74 | 2.040 | 0.034 | 18.21 | 1.29 |
| 69 | Macdonald Select U.M. | KSFT | 18.35 | 2.00 | 7.99 | 0.62 | 0.880 | 0.022 | 7.62 | 1.09 |
| 76 | Mark Ten | RSFT | 10.89 | 0.74 | 31.40 | 2.30 | 2.601 | 0.185 | 28.16 | 2.30 |
| 78 | Mark Ten | KSFT | 13.78 | 0.75 | 33.29 | 2.10 | 2.905 | 0.236 | 37.11 | 2.69 |
| 73 | Mark Ten Lt. | KSFT | 13.22 | 0.75 | 29.35 | 1.11 | 2.742 | 0.140 | 33.26 | 1.67 |
| 72 | Mark Ten Lt. | RSFT | 10.10 | 0.72 | 29.34 | 1.38 | 2.590 | 0.143 | 39.86 | 3.85 |
| 79 | Mark Ten Plain | KSPT | 14.60 | 0.48 | 28.55 | 1.04 | 2.940 | 0.196 | 39.20 | 0.91 |
| 83 | Matinee | KSFT | 15.84 | 0.59 | 28.74 | 1.22 | 2.593 | 0.099 | 23.16 | 0.17 |
| 84 | Matinee | RSFT | 12.98 | 0.53 | 24.70 | 1.70 | 2.457 | 0.040 | 25.28 | 0.67 |
| 220 | Matinee Slims X.M. | PSFT | 18.64 | 0.45 | 14.72 | 0.98 | 1.561 | 0.075 | 12.69 | 0.97 |
| 218 | Matinee Slims X.M. | KSFT | 16.68 | 0.09 | 12.56 | 0.12 | 1.668 | 0.106 | 13.20 | 0.73 |

Table 3: Yields of Tar, Nicotine and CO Under Non-Standard Smoking Conditions:
Puff Volume, 55 ml; Puff Interval, 26 sec; Ventilation, Unobstructed,
(Condition Code: Maximum 1)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 221 | Matinee Slims X.M. Men | PSFM | 12.58 | 0.49 | 14.76 | 0.30 | 1.660 | 0.040 | 13.04 | 0.55 |
| 219 | Matinee Slims X.M. Men. | KSFM | 16.75 | 0.64 | 12.21 | 0.63 | 1.585 | 0.072 | 13.22 | 0.34 |
| 82 | Matinee X.M. | KSFT | 14.51 | 0.85 | 15.23 | 8.01 | 1.204 | 0.106 | 10.75 | 0.96 |
| 217 | Matinee X.M. | RSFT | 13.59 | 0.46 | 13.67 | 0.36 | 1.492 | 0.024 | 13.42 | 0.79 |
| 88 | Medallion U.M. | KSFT | 16.61 | 0.39 | 6.40 | 1.33 | 0.558 | 0.079 | 4.62 | 0.62 |
| 18 | Number 7 | KSFT | 13.70 | 0.57 | 28.18 | 3.81 | 2.834 | 0.106 | 26.09 | 4.02 |
| 223 | Number 7 | RSFT | 10.91 | 0.39 | 25.87 | 5.33 | 2.630 | 0.100 | 38.59 | 2.00 |
| 19 | Number 7 Lt. | KSFT | 15.00 | 0.36 | 25.44 | 1.30 | 2.446 | 0.691 | 30.40 | 2.33 |
| 16 | Number 7 Lt. | RSFT | 11.01 | 0.20 | 24.54 | 4.48 | 2.490 | 0.175 | 35.94 | 3.80 |
| 95 | Peter Jackson | KSFT | 13.64 | 0.42 | 33.35 | 2.76 | 2.980 | 0.249 | 26.86 | 0.81 |
| 94 | Peter Jackson X.Lt. | KSFT | 14.14 | 0.69 | 12.50 | 1.74 | 1.410 | 0.060 | 12.60 | 1.03 |
| 503 | Peter Stuyvesant 100 | PSFT | 13.95 | 1.03 | 23.12 | 4.45 | 3.110 | 0.131 | 36.06 | 1.29 |
| 112 | Players | RSFT | 11.71 | 0.66 | 30.06 | 1.30 | 2.786 | 0.071 | 25.72 | 1.73 |
| 111 | Players | KSFT | 14.19 | 0.17 | 33.27 | 3.74 | 3.514 | 0.296 | 36.97 | 2.87 |
| 113 | Players Lt. | KSFT | 16.01 | 2.26 | 31.14 | 4.46 | 3.042 | 0.081 | 23.47 | 1.03 |
| 114 | Players Lt. | RSFT | 11.93 | 0.50 | 23.30 | 3.71 | 2.741 | 0.036 | 24.64 | 0.36 |
| 550 | Players Lt.Smooth | KSFT | 16.69 | 0.41 | 29.59 | 1.06 | 3.128 | 0.080 | 30.05 | 1.15 |
| 549 | Players Lt.Smooth | RSFT | 13.06 | 1.30 | 25.72 | 2.22 | 2.903 | 0.242 | 32.50 | 4.59 |
| 314 | Players Medium | RSFT | 11.97 | 0.48 | 26.35 | 0.96 | 2.614 | 0.138 | 24.55 | 1.39 |
| 315 | Players Medium | KSFT | 14.20 | 0.38 | 33.47 | 0.41 | 3.114 | 0.158 | 33.55 | 1.35 |
| 116 | Players Plain | RSFT | 13.23 | 0.69 | 24.68 | 1.20 | 2.777 | 0.214 | 33.74 | 1.68 |
| 229 | Players Sp. Blend | RSFT | 11.20 | 1.18 | 29.48 | 2.56 | 3.003 | 0.094 | 36.62 | 2.76 |
| 115 | Players X.Lt. | RSFT | 14.23 | 0.60 | 20.83 | 0.93 | 2.378 | 0.073 | 19.48 | 1.54 |
| 228 | Players X.Lt. | KSFT | 15.84 | 0.43 | 25.12 | 1.71 | 2.565 | 0.082 | 22.97 | 1.33 |
| 121 | Rothmans | KSFT | 11.76 | 5.30 | 26.23 | 9.79 | 2.840 | 0.130 | 27.16 | 0.53 |
| 233 | Rothmans Lt. | KSFT | 13.67 | 0.52 | 29.04 | 1.01 | 2.850 | 0.402 | 34.45 | 1.14 |
| 122 | Rothmans Sp.M. | KSFT | 14.74 | 0.43 | 26.77 | 1.28 | 2.577 | 0.127 | 23.61 | 1.20 |
| 525 | Rothmans U.Lt. | KSFT | 16.49 | 0.21 | 21.52 | 1.22 | 2.400 | 0.111 | 24.95 | 2.09 |
| 124 | Rothmans X.Lt. | KSFT | 14.96 | 0.70 | 24.50 | 0.59 | 2.696 | 0.064 | 25.40 | 0.77 |
| 138 | Vantage | KSFT | 13.90 | 0.85 | 22.13 | 1.51 | 1.735 | 0.087 | 17.07 | 0.96 |
| 139 | Vantage Lt. | KSFT | 15.79 | 0.65 | 14.37 | 0.71 | 1.640 | 0.058 | 13.87 | 0.93 |
| 141 | Viscount 1 U.M. | KSFT | 17.53 | 0.49 | 5.14 | 0.59 | 0.560 | 0.034 | 4.53 | 0.47 |
| 159 | Viscount 100 X.M. | PSFT | 16.19 | 0.46 | 14.27 | 1.20 | 1.506 | 0.122 | 14.75 | 1.96 |
| 146 | Viscount X.M. | KSFT | 15.72 | 0.33 | 14.18 | 0.87 | 1.356 | 0.141 | 12.76 | 0.98 |
| 148 | Viscount X.M. Men. | KSFM | 14.79 | 0.44 | 13.15 | 0.75 | 1.150 | 0.034 | 11.28 | 1.35 |

Table 4: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions;
Puff Volume, 58 ml; Puff Interval, 26 sec; Ventilation, Obstructed,
(Condition Code: Maximum Z)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Ta- (mg/cig) | Ta- Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 133 | Accord U.M. | KSFT | 9.83 | 0.49 | 28.46 | 0.80 | 1.770 | 0.159 | 15.94 | 1.03 |
| 132 | Accord U.M. Men. | KSFM | 10.15 | 0.56 | 25.96 | 1.04 | 1.890 | 0.094 | 21.21 | 3.84 |
| 243 | Avanti Slim | KSFT | 11.46 | 0.31 | 30.88 | 0.78 | 2.690 | 0.197 | 36.60 | 4.38 |
| 244 | Avanti Slim Lt. | KSFT | 11.70 | 0.84 | 26.42 | 0.94 | 2.780 | 0.177 | 37.76 | 2.76 |
| 11 | B&H 100 | PSFT | 13.24 | 0.84 | 31.44 | 3.62 | 3.324 | 0.327 | 41.49 | 10.19 |
| 206 | B&H 100 Del. U.Lt. | PSFT | 14.06 | 1.18 | 29.17 | 1.11 | 2.533 | 0.036 | 29.83 | 1.37 |
| 207 | B&H 100 Del. U.Lt. Men | KSFT | 14.45 | 1.16 | 28.09 | 3.84 | 2.762 | 0.315 | 28.41 | 5.68 |
| 154 | B&H 100 Lt. | PSFT | 13.81 | 0.39 | 32.36 | 0.93 | 3.275 | 0.101 | 35.56 | 2.25 |
| 24 | B&H 100 Lt. Men. | PSFM | 13.57 | 0.70 | 30.40 | 1.45 | 3.240 | 0.166 | 35.83 | 3.79 |
| 12 | B&H 100 Men. | PSFM | 13.03 | 0.86 | 32.45 | 1.63 | 3.138 | 0.185 | 38.74 | 4.98 |
| 250 | B&H Sp. | KSFT | 11.05 | 0.68 | 26.79 | 0.43 | 2.950 | 0.126 | 39.33 | 3.60 |
| 251 | B&H Sp.Lt. | KSFT | 10.66 | 0.16 | 29.97 | 0.84 | 2.786 | 0.175 | 36.66 | 6.75 |
| 3 | Belmont Milds | KSFT | 11.96 | 0.29 | 27.96 | 1.56 | 2.451 | 0.162 | 29.32 | 2.31 |
| 7 | Belvedere | RSFT | 10.80 | 0.70 | 26.37 | 1.93 | 2.616 | 0.096 | 33.68 | 0.82 |
| 9 | Belvedere | KSFT | 12.74 | 1.17 | 31.39 | 3.64 | 3.207 | 0.247 | 40.92 | 3.37 |
| 10 | Belvedere X.M. | RSFT | 10.41 | 0.81 | 25.21 | 1.47 | 2.419 | 0.130 | 32.59 | 2.28 |
| 6 | Belvedere X.M. | KSFT | 12.84 | 0.29 | 28.41 | 2.54 | 2.827 | 0.167 | 37.92 | 3.82 |
| 25 | Cameo Men. | KSFM | 13.50 | 0.16 | 35.55 | 1.92 | 3.094 | 0.108 | 36.88 | 2.72 |
| 26 | Cameo Men. X.M. | KSFM | 16.28 | 0.60 | 27.32 | 4.49 | 2.591 | 0.281 | 32.05 | 3.25 |
| 180 | Canadian Classic | RSFT | 10.33 | 0.46 | 25.73 | 1.84 | 2.500 | 0.236 | 33.58 | 7.01 |
| 190 | Canadian Classic | KSFT | 12.22 | 0.41 | 33.17 | 2.07 | 2.870 | 0.122 | 34.40 | 5.06 |
| 32 | Craven A | RSFT | 9.29 | 1.23 | 20.41 | 7.35 | 2.218 | 0.242 | 29.27 | 3.29 |
| 31 | Craven A | KSFT | 12.42 | 0.70 | 30.72 | 1.04 | 3.176 | 0.128 | 35.78 | 1.94 |
| 578 | Craven A Extra Lt. KS | KSFT | 12.67 | 0.80 | 28.69 | 0.76 | 2.540 | 0.102 | 32.39 | 4.31 |
| 519 | Craven A Extra Lt. RS | RSFT | 10.08 | 0.21 | 24.63 | 0.94 | 2.320 | 0.078 | 32.52 | 3.84 |
| 105 | Craven A Lt. | RSFT | 9.79 | 0.66 | 24.36 | 1.10 | 2.270 | 0.088 | 31.00 | 2.46 |
| 179 | Craven A Lt. | KSFT | 12.51 | 0.49 | 28.98 | 0.80 | 2.980 | 0.114 | 34.95 | 2.00 |
| 33 | Craven A Sp.M. | KSFT | 9.23 | 0.40 | 27.26 | 0.59 | 1.895 | 0.073 | 24.35 | 1.42 |
| 34 | Craven A Sp.M. | RSFT | 8.44 | 0.46 | 22.21 | 1.27 | 1.530 | 0.042 | 24.67 | 3.93 |
| 38 | Craven A Sp.M. 100 | PSFT | 14.87 | 0.83 | 33.37 | 1.78 | 3.160 | 0.219 | 36.29 | 6.46 |
| 579 | Craven A U. Lt. KS | KSFT | 12.89 | 0.58 | 29.25 | 0.96 | 2.330 | 0.046 | 26.80 | 4.88 |
| 30 | Craven A U.M. | KSFT | 9.97 | 0.41 | 26.08 | 0.36 | 1.800 | 0.137 | 27.21 | 1.33 |
| 528 | Craven A Ultra Lt RS FT | RSFT | 10.61 | 0.47 | 25.86 | 2.05 | 2.000 | 0.043 | 21.66 | 2.08 |
| 35 | Craven Men. | KSFM | 12.94 | 0.53 | 27.87 | 3.34 | 2.627 | 0.066 | 35.37 | 2.11 |
| 152 | Craven Men. Sp.M. | KSFM | 11.31 | 1.05 | 29.38 | 1.34 | 1.610 | 0.076 | 16.73 | 4.12 |
| 28 | Craven Men. Sp.M. 100 | PSFM | 13.48 | 0.48 | 36.00 | 1.43 | 2.720 | 0.306 | 36.32 | 3.63 |
| 37 | Du Maurier | KSFT | 12.94 | 1.42 | 27.73 | 6.66 | 2.564 | 0.364 | 30.42 | 4.16 |
| 39 | Du Maurier | RSFT | 10.77 | 0.45 | 25.73 | 3.77 | 2.686 | 0.090 | 32.95 | 1.20 |
| 151 | Du Maurier Lt. | RSFT | 11.16 | 0.58 | 29.55 | 1.60 | 2.526 | 0.051 | 32.15 | 1.49 |
| 153 | Du Maurier Lt. | KSFT | 14.12 | 0.34 | 34.98 | 2.40 | 3.739 | 0.169 | 38.67 | 1.34 |

Table 4: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 56 ml; Puff Interval, 26 sec; Ventilation, Obstructed.
(Condition Code: Maximum 2)

| Brand Number | Brand Name | Filter Type | Puffs Number | Puffs Std.Dev | Carbon Monoxide (mg/cig) | Carbon Monoxide Std.Dev | Nicotine (mg/cig) | Nicotine Std.Dev | Tar (mg/cig) | Tar Std.Dev |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | Du Maurier Sp.M. | KSFT | 12.54 | 1.41 | 26.80 | 8.54 | 2.645 | 0.464 | 28.62 | 6.18 |
| 41 | Du Maurier Sp.M. | PSFT | 15.97 | 0.78 | 36.26 | 3.44 | 3.490 | 0.062 | 36.15 | 1.03 |
| 522 | Du Maurier U.Lt. | KSFT | 12.98 | 0.28 | 28.73 | 1.83 | 2.975 | 0.085 | 30.63 | 2.83 |
| 523 | Du Maurier U.Lt. | RSFT | 10.70 | 0.40 | 26.77 | 0.70 | 2.930 | 0.271 | 31.92 | 4.54 |
| 284 | Du Maurier X.Lt. | RSFT | 11.54 | 0.38 | 26.95 | 0.59 | 2.606 | 0.147 | 27.96 | 1.58 |
| 283 | Du Maurier X.Lt. | KSFT | 14.05 | 0.79 | 28.78 | 1.03 | 2.986 | 0.174 | 29.74 | 2.20 |
| 45 | Dunhill | KSFT | 12.65 | 0.33 | 34.24 | 1.32 | 3.413 | 0.085 | 38.70 | 5.05 |
| 52 | Export A | RSFT | 11.02 | 0.41 | 30.54 | 2.57 | 2.654 | 0.089 | 32.78 | 0.75 |
| 51 | Export A | KSFT | 12.17 | 0.41 | 32.38 | 1.51 | 2.604 | 1.185 | 33.27 | 10.04 |
| 156 | Export A Lt. | RSFT | 11.58 | 0.67 | 27.29 | 2.15 | 2.700 | 0.156 | 33.48 | 1.73 |
| 42 | Export A Lt. | KSFT | 12.41 | 0.66 | 33.90 | 1.90 | 3.491 | 0.126 | 42.26 | 3.32 |
| 56 | Export A Med. | RSFT | 10.60 | 0.96 | 27.87 | 7.21 | 2.556 | 0.187 | 32.32 | 3.58 |
| 54 | Export A Med. | KSFT | 12.21 | 0.42 | 32.07 | 1.88 | 3.196 | 0.124 | 36.55 | 3.18 |
| 49 | Export A Mild | RSFT | 11.15 | 0.38 | 28.90 | 1.20 | 2.599 | 0.103 | 34.39 | 1.74 |
| 43 | Export A Mild | KSFT | 12.37 | 0.55 | 34.54 | 0.60 | 3.180 | 0.091 | 44.09 | 5.78 |
| 570 | Export A Smooth | RSFT | 10.43 | 0.59 | 30.65 | 1.22 | 2.340 | 0.091 | 37.59 | 5.58 |
| 569 | Export A Smooth | KSFT | 12.81 | 0.26 | 36.73 | 1.63 | 3.420 | 0.105 | 44.21 | 2.80 |
| 574 | Export A Smooth Lt. | RSFT | 11.54 | 0.67 | 31.51 | 2.49 | 2.290 | 0.054 | 31.62 | 2.57 |
| 573 | Export A Smooth Lt. | KSFT | 13.46 | 1.06 | 32.47 | 1.72 | 2.810 | 0.046 | 37.27 | 5.81 |
| 572 | Export A Smooth Med. | RSFT | 10.79 | 0.55 | 32.45 | 0.74 | 2.480 | 0.096 | 35.08 | 3.65 |
| 571 | Export A Smooth Med. | KSFT | 12.45 | 0.96 | 34.24 | 1.19 | 3.110 | 0.071 | 37.12 | 3.01 |
| 309 | Export A U.Lt. | RSFT | 11.78 | 0.52 | 28.04 | 2.21 | 2.823 | 0.106 | 34.18 | 0.46 |
| 308 | Export A U.Lt. | KSFT | 12.60 | 0.13 | 32.00 | 1.20 | 3.200 | 0.130 | 43.23 | 2.87 |
| 173 | Export A X.Lt. | RSFT | 10.86 | 0.93 | 25.13 | 7.04 | 2.437 | 0.351 | 30.02 | 5.64 |
| 172 | Export A X.Lt. | KSFT | 13.31 | 1.01 | 31.29 | 1.88 | 3.240 | 0.160 | 40.57 | 4.93 |
| 50 | Export Plain | RSPT | 11.84 | 0.32 | 29.26 | 2.12 | 2.910 | 0.084 | 43.49 | 3.29 |
| 68 | John Player Special | KSFT | 13.39 | 0.49 | 36.30 | 0.66 | 3.562 | 0.124 | 41.51 | 2.34 |
| 75 | Macdonald Men. | RSPM | 11.01 | 0.95 | 30.12 | 0.74 | 2.440 | 0.131 | 37.47 | 4.74 |
| 74 | Macdonald Men. | KSPM | 13.12 | 0.75 | 33.85 | 1.87 | 3.190 | 0.165 | 43.84 | 4.18 |
| 262 | Macdonald Men. Lt. | RSPM | 12.01 | 1.00 | 31.26 | 1.34 | 2.680 | 0.159 | 33.60 | 5.31 |
| 69 | Macdonald Select U.M. | KSFT | 11.51 | 0.49 | 31.00 | 0.66 | 2.300 | 0.125 | 27.27 | 1.50 |
| 78 | Mark Ten | RSFT | 9.66 | 0.95 | 26.35 | 6.36 | 2.678 | 0.311 | 37.04 | 5.52 |
| 76 | Mark Ten | KSFT | 12.97 | 0.29 | 34.38 | 1.72 | 3.226 | 0.269 | 45.11 | 3.17 |
| 73 | Mark Ten Lt. | KSFT | 12.98 | 0.55 | 30.33 | 1.84 | 2.940 | 0.102 | 37.41 | 2.72 |
| 72 | Mark Ten Lt. | RSFT | 10.80 | 0.40 | 29.17 | 1.69 | 2.560 | 0.254 | 38.07 | 1.32 |
| 79 | Mark Ten Plain | KSPT | 14.79 | 0.90 | 29.81 | 2.54 | 3.060 | 0.204 | 44.40 | 5.44 |
| 84 | Matinee | RSFT | 11.32 | 0.66 | 28.32 | 3.66 | 2.464 | 0.160 | 30.30 | 3.87 |
| 83 | Matinee | KSFT | 13.66 | 1.15 | 35.37 | 0.64 | 3.309 | 0.153 | 36.80 | 1.22 |
| 218 | Matinee Slims X.M. | KSFT | 11.60 | 0.66 | 25.45 | 0.89 | 2.468 | 0.152 | 26.71 | 1.20 |
| 220 | Matinee Slims X.M. | PSFT | 14.25 | 0.40 | 30.73 | 2.51 | 2.629 | 0.131 | 29.50 | 2.91 |

Table 4: Yields of Tar, Nicotine and CO Under Non Standard Smoking Conditions:
Puff Volume, 55 ml; Puff Interval, 26 sec; Ventilation, Obstructed.
(Condition Code: Maximum 2)

| Brand Number | Brand Name | Filter Type | Puffs | | Carbon Monoxide | | Nicotine | | Tar | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Number | Std.Dev | (mg/cig) | Std.Dev | (mg/cig) | Std.Dev | (mg/cig) | Std.Dev |
| 221 | Matinee Slims X.M. Men | PSFM | 13.55 | 0.45 | 30.93 | 2.40 | 2.665 | 0.155 | 30.04 | 3.53 |
| 219 | Matinee Slims X.M. Men. | KSFM | 11.82 | 0.56 | 25.02 | 2.14 | 2.520 | 0.131 | 29.32 | 3.68 |
| 82 | Matinee X.M. | KSFT | 10.41 | 0.88 | 25.30 | 3.50 | 2.139 | 0.136 | 23.25 | 1.26 |
| 217 | Matinee X.M. | RSFT | 9.71 | 0.54 | 27.07 | 1.13 | 2.563 | 0.138 | 32.13 | 3.40 |
| 88 | Medallion U.M. | KSFT | 11.32 | 0.55 | 24.86 | 1.00 | 1.807 | 0.077 | 18.96 | 0.63 |
| 223 | Number 7 | RSFT | 10.62 | 0.48 | 30.46 | 1.56 | 2.580 | 0.093 | 30.47 | 3.23 |
| 18 | Number 7 | KSFT | 13.44 | 1.35 | 30.07 | 2.76 | 3.014 | 0.082 | 35.57 | 1.80 |
| 16 | Number 7 Lt. | RSFT | 10.39 | 0.40 | 26.93 | 1.92 | 2.600 | 0.132 | 35.66 | 3.66 |
| 19 | Number 7 Lt. | KSFT | 13.17 | 0.52 | 30.57 | 1.22 | 2.920 | 0.056 | 39.51 | 2.76 |
| 95 | Peter Jackson | KSFT | 13.15 | 0.39 | 32.15 | 3.51 | 3.238 | 0.067 | 34.94 | 0.48 |
| 94 | Peter Jackson X.Lt. | KSFT | 9.89 | 0.42 | 26.23 | 2.41 | 2.240 | 0.133 | 27.53 | 3.80 |
| 503 | Peter Stuyvesant 100 | PSFT | 12.77 | 0.69 | 31.87 | 1.44 | 3.300 | 0.046 | 36.66 | 3.59 |
| 112 | Players | RSFT | 11.29 | 1.07 | 32.64 | 2.20 | 3.132 | 0.220 | 37.27 | 2.68 |
| 111 | Players | KSFT | 12.72 | 0.34 | 35.17 | 1.47 | 3.358 | 0.250 | 42.27 | 4.16 |
| 114 | Players Lt. | RSFT | 10.99 | 1.32 | 22.60 | 6.52 | 2.779 | 0.424 | 29.44 | 5.74 |
| 113 | Players Lt. | KSFT | 13.80 | 1.70 | 28.39 | 6.14 | 3.291 | 0.348 | 32.67 | 4.26 |
| 549 | Players Lt.Smooth | RSFT | 11.79 | 0.74 | 26.02 | 3.60 | 2.996 | 0.063 | 34.75 | 6.71 |
| 550 | Players Lt.Smooth | KSFT | 14.83 | 0.66 | 33.28 | 2.10 | 3.430 | 0.083 | 39.28 | 2.30 |
| 314 | Players Medium | RSFT | 11.46 | 0.44 | 27.47 | 1.11 | 3.050 | 0.107 | 34.01 | 2.08 |
| 315 | Players Medium | KSFT | 13.26 | 0.88 | 34.28 | 1.81 | 3.369 | 0.304 | 37.48 | 2.50 |
| 116 | Players Plain | RSFT | 11.57 | 0.65 | 27.83 | 1.60 | 2.969 | 0.291 | 37.11 | 5.02 |
| 229 | Players Sp. Blend | RSFT | 10.19 | 0.43 | 28.19 | 2.58 | 3.325 | 0.284 | 35.97 | 1.69 |
| 115 | Players X.Lt. | RSFT | 12.62 | 1.05 | 24.27 | 2.21 | 2.824 | 0.094 | 27.71 | 1.07 |
| 228 | Players X.Lt. | KSFT | 13.16 | 0.73 | 31.46 | 6.06 | 3.196 | 0.197 | 34.02 | 3.33 |
| 121 | Rothmans | KSFT | 15.02 | 0.98 | 30.43 | 2.44 | 3.041 | 0.075 | 35.67 | 0.38 |
| 233 | Rothmans Lt. | KSFT | 12.94 | 0.51 | 34.24 | 3.00 | 2.920 | 0.226 | 35.71 | 3.46 |
| 122 | Rothmans Sp.M. | KSFT | 13.88 | 0.79 | 30.72 | 1.00 | 2.935 | 0.136 | 33.96 | 0.92 |
| 525 | Rothmans U Lt | KSFT | 12.73 | 0.81 | 29.63 | 1.44 | 2.620 | 0.073 | 36.11 | 5.66 |
| 124 | Rothmans X.Lt. | KSFT | 12.78 | 0.76 | 31.01 | 0.99 | 3.118 | 0.243 | 37.31 | 2.54 |
| 138 | Vantage | KSFT | 11.53 | 0.92 | 30.31 | 1.43 | 2.223 | 0.125 | 27.31 | 1.51 |
| 139 | Vantage Lt. | KSFT | 11.90 | 0.25 | 26.93 | 1.59 | 2.620 | 0.132 | 29.06 | 4.85 |
| 141 | Viscount 1 U.M. | KSFT | 9.83 | 0.73 | 25.15 | 1.58 | 1.842 | 0.097 | 24.27 | 0.88 |
| 159 | Viscount 100 X.M. | PSFT | 11.28 | 0.40 | 27.85 | 1.93 | 2.434 | 0.097 | 29.80 | 0.98 |
| 146 | Viscount X.M. | KSFT | 10.25 | 0.45 | 26.92 | 1.49 | 2.141 | 0.075 | 27.93 | 1.44 |
| 148 | Viscount X.M. Men. | KSFM | 10.68 | 0.12 | 27.50 | 1.25 | 1.790 | 0.097 | 21.50 | 0.54 |

Table5: Yields of Tar Under Standard and Non Standard Smoking Conditions:
When Yields are Expressed per Litre of Mainstream Tobacco Smoke

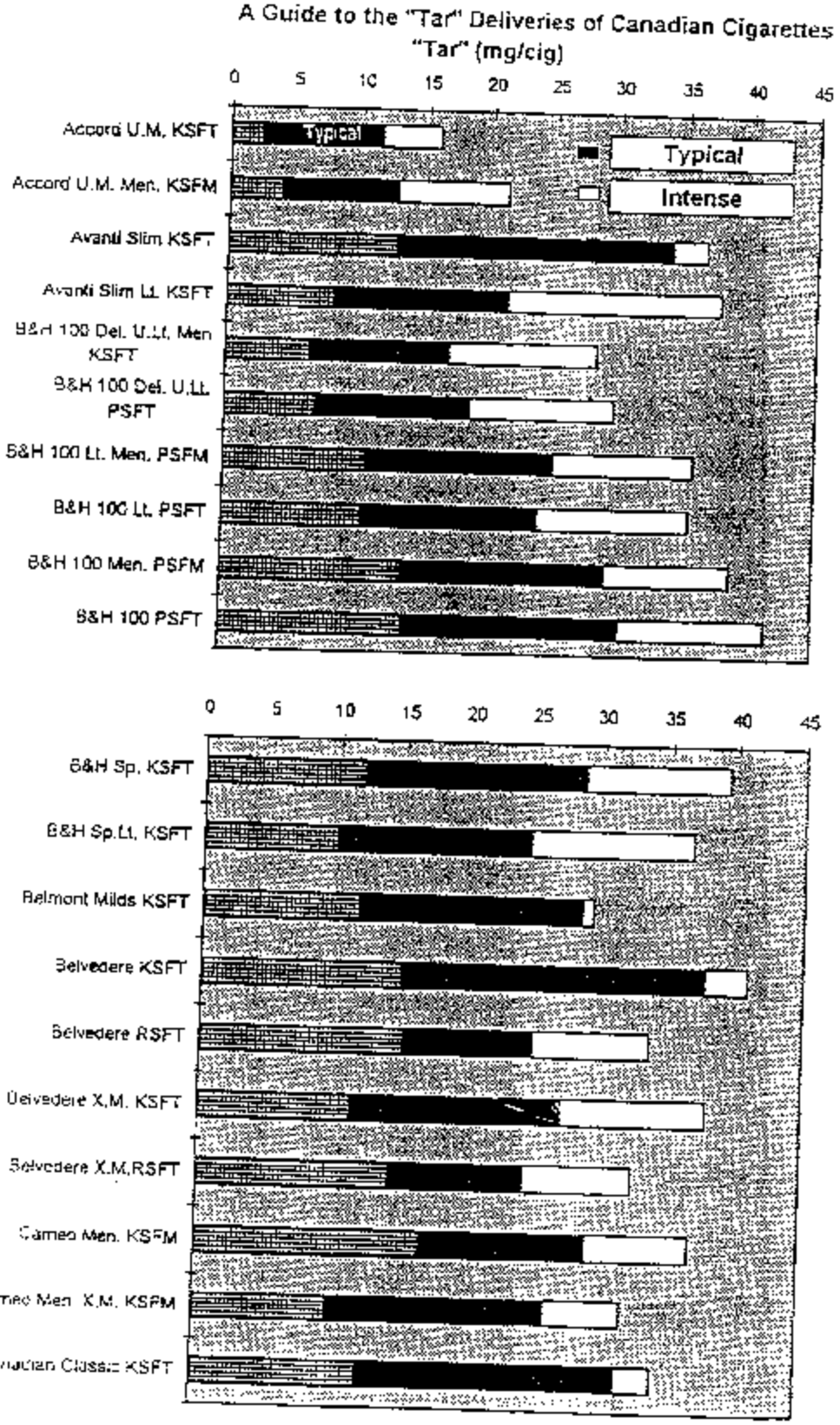
| Brand Number | Brand Description | Filter Type | 'Tar' Yield (mg/Litre of Smoke) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Standard | Average (1) | Average (2) | Maximum (1) | Maximum (2) | Overall |
| 133 | Accord U.M. | KSFT | 44,691 | 13.948 | 13.165 | 19.307 | 36.854 | 22.778 |
| 132 | Accord U.M. Men. | KSFM | 51,513 | 14.240 | 15.450 | 21.010 | 47.492 | 25.553 |
| 243 | Avanti Slim | KSFT | 47.475 | 39.029 | 42.759 | 63.896 | 72.584 | 48.289 |
| 244 | Avanti Slim Lt. | KSFT | 50.762 | 26.809 | 25.512 | 33.861 | 73.349 | 34.341 |
| 11 | B&H 100 | PSFT | 22.462 | 40.134 | 38.088 | 46.760 | 71.220 | 36.861 |
| 206 | B&H 100 Del. U.Lt. | PSFT | 18.330 | 18.274 | 16.752 | 24.185 | 48.219 | 19.885 |
| 207 | B&H 100 Del. U.Lt. Men | KSFT | 41.289 | 22.947 | 22.032 | 21.877 | 44.684 | 27.037 |
| 154 | B&H 100 Lt. | PSFT | 41.372 | 26.620 | 25.443 | 32.064 | 58.521 | 31.375 |
| 24 | B&H 100 Lt. Men. | PSFM | 23.563 | 29.077 | 29.166 | 34.854 | 60.009 | 29.165 |
| 12 | B&H 100 Men. | PSFM | 29.388 | 38.468 | 40.465 | 43.639 | 67.571 | 37.490 |
| 250 | B&H Sp. | KSFT | 40.560 | 31.837 | 36.312 | 50.609 | 80.893 | 39.830 |
| 251 | B&H Sp.Lt. | KSFT | 34.578 | 33.638 | 30.653 | 39.454 | 78.160 | 34.581 |
| 3 | Belmont Milds | KSFT | 29.764 | 40.216 | 36.168 | 51.888 | 55.623 | 40.009 |
| 7 | Belvedere | RSFT | 2.403 | 41.021 | 39.890 | 52.302 | 70.875 | 33.904 |
| 9 | Belvedere | KSFT | 26.602 | 48.563 | 48.245 | 63.640 | 72.998 | 47.013 |
| 10 | Belvedere X.M. | RSFT | 4.481 | 38.378 | 41.680 | 51.268 | 71.151 | 33.947 |
| 6 | Belvedere X.M. | KSFT | 30.649 | 34.222 | 34.923 | 42.545 | 67.120 | 35.565 |
| 25 | Cameo Men. | KSFM | 6.551 | 37.677 | 36.326 | 47.435 | 62.068 | 31.997 |
| 26 | Cameo Men. X.M. | KSFM | 32.630 | 29.487 | 28.518 | 33.749 | 44.715 | 31.096 |
| 180 | Canadian Classic | RSFT | 55.750 | 40.829 | 45.988 | 70.063 | 73.880 | 53.157 |
| 190 | Canadian Classic | KSFT | 38.458 | 39.035 | 40.853 | 56.016 | 63.979 | 43.594 |
| 31 | Craven A | KSFT | 9.172 | 33.634 | 31.414 | 38.700 | 65.474 | 28.480 |
| 32 | Craven A | RSFT | 13.021 | 32.616 | 30.797 | 40.095 | 71.607 | 29.132 |
| 578 | Craven A Extra Lt. KS | KSFT | 47.684 | 23.496 | 26.501 | 32.553 | 57.198 | 32.558 |
| 519 | Craven A Extra Lt. RS | RSFT | 48.447 | 29.748 | 27.572 | 40.435 | 73.023 | 36.301 |
| 179 | Craven A Lt. | KSFT | 30.063 | 29.442 | 30.611 | 32.645 | 63.495 | 30.590 |
| 105 | Craven A Lt. | RSFT | 50.618 | 31.126 | 29.593 | 45.751 | 71.966 | 39.272 |
| 33 | Craven A Sp.M. | KSFT | 35.347 | 12.556 | 14.307 | 23.249 | 59.958 | 21.365 |
| 34 | Craven A Sp.M. | RSFT | 43.056 | 11.624 | 14.536 | 19.920 | 66.431 | 22.284 |
| 38 | Craven A Sp.M. 100 | PSFT | 21.047 | 25.061 | 22.703 | 27.181 | 55.486 | 23.998 |
| 579 | Craven A U. Lt. KS | KSFT | 46.988 | 19.309 | 18.564 | 27.571 | 47.253 | 25.108 |
| 30 | Craven A U.M. | KSFT | 56.965 | 4.057 | 5.734 | 8.234 | 62.027 | 15.747 |
| 528 | Craven A Ultra Lt RS FT | RSFT | 49.313 | 17.623 | 19.321 | 24.178 | 46.440 | 27.606 |
| 35 | Craven Men. | KSFM | 12.796 | 34.618 | 31.250 | 40.698 | 62.122 | 29.841 |
| 152 | Craven Men. Sp.M. | KSFM | 44.596 | 12.090 | 13.481 | 16.128 | 39.647 | 21.574 |
| 28 | Craven Men. Sp.M. 100 | PSFM | 42.887 | 17.657 | 19.970 | 24.403 | 59.550 | 26.229 |
| 37 | Du Maurier | KSFT | 8.675 | 35.311 | 32.183 | 40.980 | 53.428 | 29.768 |
| 39 | Du Maurier | RSFT | 8.947 | 39.935 | 36.247 | 46.423 | 69.532 | 32.688 |
| 151 | Du Maurier Lt. | RSFT | 22.469 | 27.778 | 25.761 | 34.462 | 65.356 | 27.617 |
| 153 | Du Maurier Lt. | KSFT | 17.481 | 28.079 | 26.755 | 36.143 | 62.242 | 27.115 |
| 40 | Du Maurier Sp.M. | KSFT | 10.448 | 24.014 | 24.510 | 32.613 | 52.233 | 22.896 |
| 41 | Du Maurier Sp.M. | PSFT | 11.865 | 21.910 | 21.450 | 28.926 | 51.446 | 21.038 |

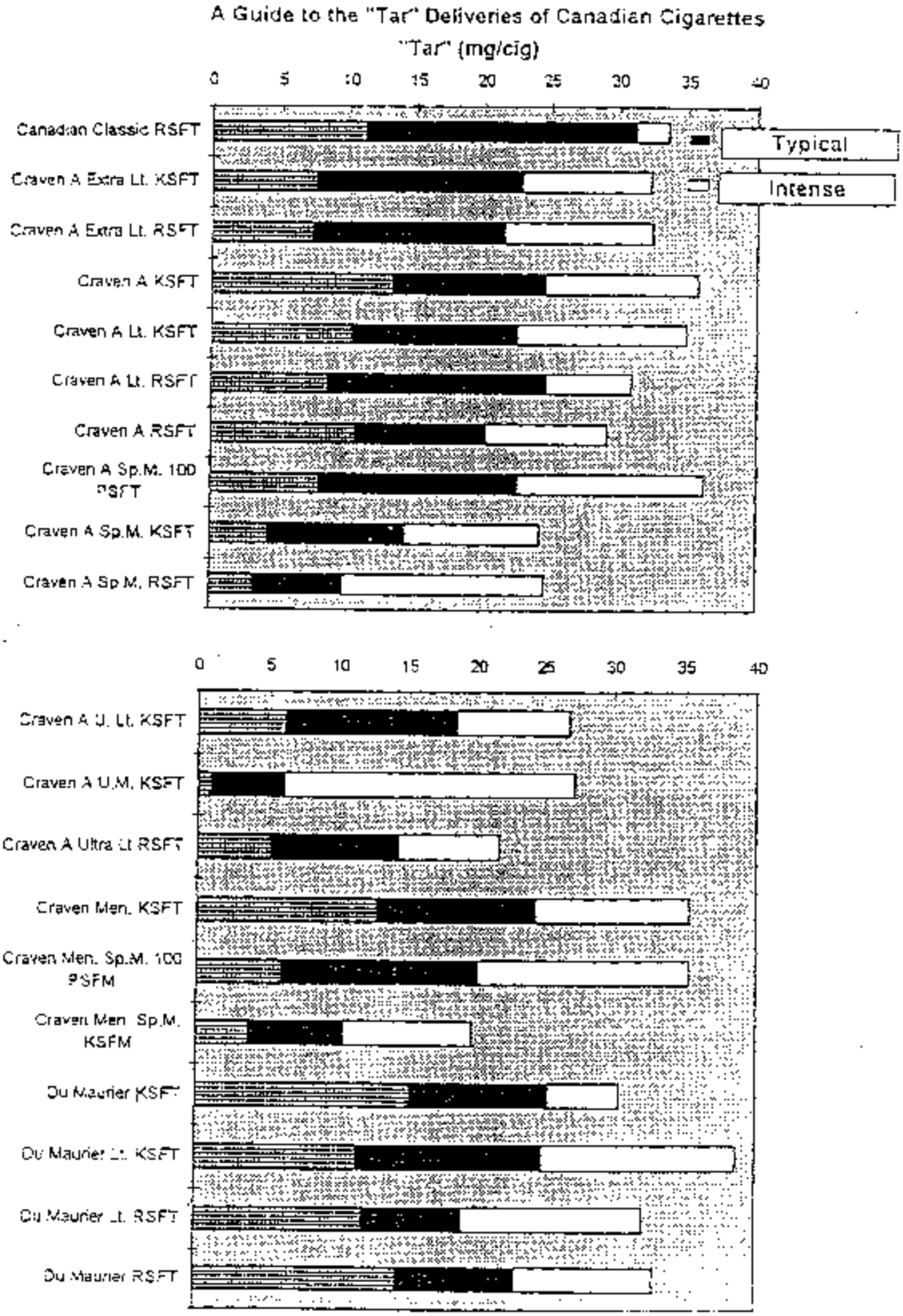
Table5: Yields of Tar Under Standard and Non Standard Smoking Conditions:
When Yields are Expressed per Litre of Mainstream Tobacco Smoke

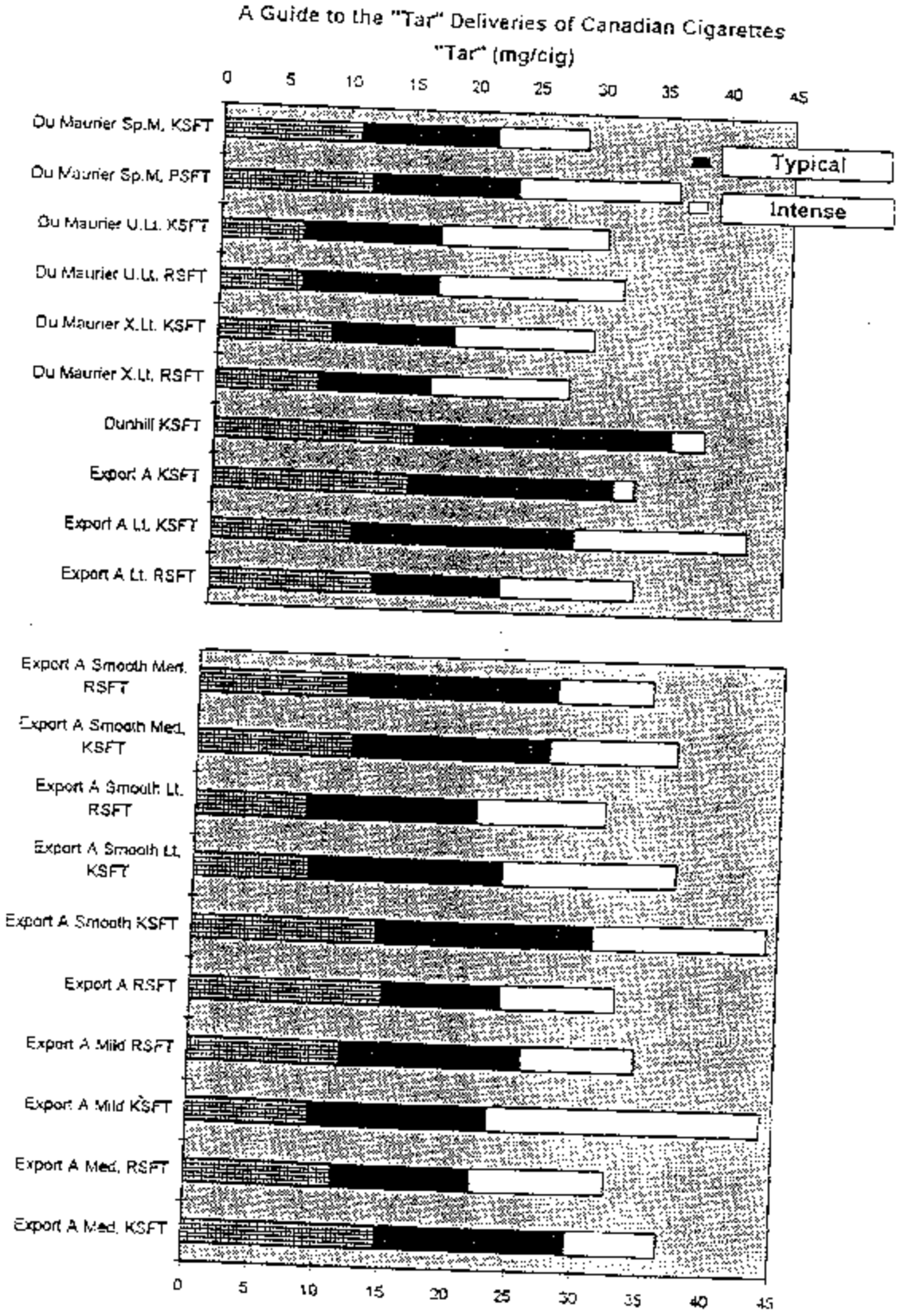
| Brand Number | Brand Description | Filter Type | Tar Yield (mg/Litre of Smoke) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Standard | Average (1) | Average (2) | Maximum (1) | Maximum (2) | Overall |
| 522 | Du Maurier U.Lt. | KSFT | 50.982 | 18.528 | 18.527 | 22.139 | 53.831 | 27.544 |
| 523 | Du Maurier U.Lt. | RSFT | 36.964 | 23.376 | 21.383 | 27.653 | 67.799 | 27.344 |
| 283 | Du Maurier X.Lt. | KSFT | 34.881 | 19.598 | 19.432 | 25.422 | 48.107 | 24.833 |
| 284 | Du Maurier X.Lt. | RSFT | 32.565 | 22.101 | 21.934 | 26.793 | 55.065 | 25.848 |
| 45 | Dunhill | KSFT | 23.449 | 49.942 | 46.435 | 58.746 | 69.474 | 44.643 |
| 52 | Export A | RSFT | 15.374 | 37.958 | 36.310 | 46.737 | 67.804 | 34.095 |
| 51 | Export A | KSFT | 38.774 | 44.118 | 41.870 | 49.533 | 62.131 | 43.574 |
| 158 | Export A Lt. | RSFT | 25.201 | 34.982 | 31.505 | 42.427 | 65.709 | 33.529 |
| 42 | Export A Lt. | KSFT | 30.244 | 43.142 | 38.634 | 44.069 | 77.394 | 38.522 |
| 56 | Export A Med. | RSFT | 14.044 | 36.152 | 34.737 | 41.485 | 69.297 | 31.605 |
| 54 | Export A Med. | KSFT | 46.160 | 45.764 | 41.247 | 47.262 | 68.033 | 45.113 |
| 49 | Export A Mild | RSFT | 36.871 | 34.279 | 31.491 | 44.288 | 70.098 | 36.732 |
| 43 | Export A Mild | KSFT | 33.424 | 24.064 | 24.552 | 31.881 | 81.006 | 26.480 |
| 569 | Export A Smooth | KSFT | 46.776 | 33.264 | 36.246 | 46.831 | 78.437 | 40.779 |
| 570 | Export A Smooth | RSFT | 63.587 | 45.920 | 51.358 | 75.508 | 81.810 | 59.096 |
| 573 | Export A Smooth Lt. | KSFT | 49.583 | 23.720 | 21.961 | 35.804 | 62.931 | 32.770 |
| 574 | Export A Smooth Lt. | RSFT | 55.134 | 23.980 | 23.065 | 32.917 | 62.274 | 33.774 |
| 571 | Export A Smooth Med. | KSFT | 46.707 | 31.524 | 36.683 | 41.915 | 67.762 | 39.207 |
| 572 | Export A Smooth Med. | RSFT | 51.442 | 35.640 | 38.372 | 51.685 | 73.911 | 44.285 |
| 309 | Export A U.Lt. | RSFT | 19.215 | 20.287 | 19.170 | 26.157 | 65.944 | 20.857 |
| 308 | Export A U.Lt. | KSFT | 49.313 | 20.713 | 19.148 | 25.764 | 77.976 | 28.740 |
| 173 | Export A X.Lt. | RSFT | 21.012 | 28.211 | 24.449 | 33.957 | 62.824 | 26.907 |
| 172 | Export A X.Lt. | KSFT | 35.033 | 28.644 | 23.237 | 32.436 | 69.275 | 29.337 |
| 50 | Export Plain | RSPT | 41.078 | 55.564 | 54.221 | 75.127 | 83.480 | 56.647 |
| 68 | John Player Special | KSFT | 35.296 | 46.451 | 45.121 | 58.776 | 70.456 | 46.411 |
| 74 | Macdonald Men. | KSFM | 33.262 | 27.323 | 26.922 | 31.238 | 75.596 | 29.686 |
| 75 | Macdonald Men. | RSFM | 37.910 | 26.328 | 25.641 | 34.774 | 77.347 | 31.163 |
| 282 | Macdonald Men. Lt. | RSFM | 41.087 | 23.353 | 23.095 | 26.805 | 53.962 | 28.585 |
| 69 | Macdonald Select U.M. | XSFT | 48.705 | 5.346 | 5.933 | 9.436 | 53.846 | 17.355 |
| 78 | Mark Ten | RSFT | 19.657 | 47.611 | 47.842 | 58.770 | 57.145 | 43.470 |
| 76 | Mark Ten | KSFT | 42.943 | 48.765 | 48.841 | 61.205 | 79.046 | 50.438 |
| 73 | Mark Ten Lt. | KSFT | 31.216 | 44.427 | 44.195 | 57.179 | 65.503 | 44.254 |
| 72 | Mark Ten Lt. | RSFT | 67.032 | 60.768 | 65.139 | 89.694 | 80.714 | 70.658 |
| 79 | Mark Ten Plain | KSPT | 30.552 | 36.470 | 47.277 | 61.021 | 68.228 | 44.330 |
| 83 | Matinee | KSFT | 10.394 | 27.558 | 21.515 | 33.230 | 61.138 | 23.174 |
| 84 | Matinee | RSFT | 41.166 | 35.809 | 32.857 | 44.264 | 60.834 | 38.524 |
| 218 | Matinee Slims X.M. | KSFT | 45.088 | 11.857 | 12.435 | 17.986 | 52.332 | 22.066 |
| 220 | Matinee Slims X.M. | PSFT | 38.848 | 11.694 | 12.537 | 15.473 | 47.667 | 19.636 |
| 221 | Matinee Slims X.M. Men | PSFM | 30.882 | 10.966 | 11.491 | 15.136 | 50.386 | 17.119 |
| 219 | Matinee Slims X.M. Men. | KSFM | 27.095 | 12.382 | 13.160 | 17.938 | 56.376 | 17.644 |

Table5 Yields of Tar Under Standard and Non Standard Smoking Conditions;
When Yields are Expressed per Litre of Mainstream Tobacco Smoke

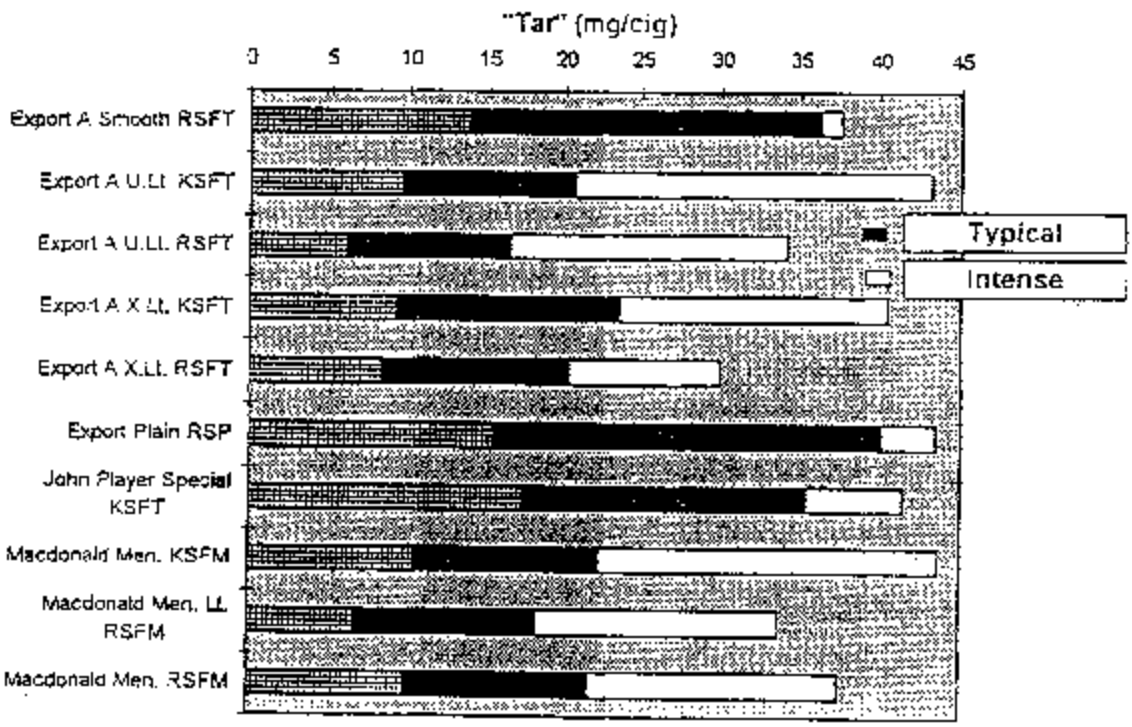
| Brand Number | Brand Description | Filter Type | "Tar" Yield (mg/Litre of Smoke) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Standard | Average (1) | Average (2) | Maximum (1) | Maximum (2) | Overall |
| 62 | Matinee X.M. | KSFT | 11.078 | 12.873 | 11.210 | 16.838 | 50.782 | 13.000 |
| 217 | Matinee X.M. | RSFT | 46.573 | 15.538 | 16.491 | 21.801 | 75.204 | 25.100 |
| 88 | Medallion U.M. | KSFT | 15.051 | 3.668 | 4.405 | 6.321 | 38.066 | 7.387 |
| 18 | Number 7 | KSFT | 2.848 | 36.194 | 35.146 | 46.589 | 80.149 | 30.197 |
| 223 | Number 7 | RSFT | 51.210 | 55.307 | 56.091 | 81.222 | 85.207 | 60.956 |
| 19 | Number 7 Lt. | KSFT | 31.382 | 38.425 | 34.757 | 46.061 | 68.182 | 37.656 |
| 16 | Number 7 Lt. | RSFT | 38.639 | 48.207 | 44.553 | 74.189 | 76.003 | 51.397 |
| 95 | Peter Jackson | KSFT | 14.357 | 37.708 | 34.609 | 44.756 | 60.387 | 32.857 |
| 94 | Peter Jackson X.Lt. | KSFT | 59.057 | 13.965 | 14.627 | 20.252 | 63.264 | 26.975 |
| 503 | Peter Stuyvesant 100 | PSFT | 42.188 | 42.464 | 40.520 | 58.749 | 65.245 | 45.980 |
| 112 | Players | RSFT | 14.660 | 40.495 | 38.121 | 49.918 | 75.026 | 35.799 |
| 111 | Players | KSFT | 36.379 | 49.552 | 51.211 | 59.213 | 75.525 | 49.089 |
| 113 | Players Lt. | KSFT | 15.568 | 32.162 | 26.729 | 33.317 | 53.804 | 27.444 |
| 114 | Players Lt. | RSFT | 12.946 | 37.453 | 37.762 | 46.940 | 60.882 | 33.775 |
| 549 | Players Lt.Smooth | RSFT | 44.091 | 48.265 | 48.392 | 56.471 | 86.987 | 49.385 |
| 550 | Players Lt.Smooth | KSFT | 32.806 | 35.019 | 33.363 | 40.920 | 60.197 | 35.527 |
| 314 | Players Medium | RSFT | 37.629 | 35.543 | 37.053 | 48.813 | 67.448 | 39.209 |
| 315 | Players Medium | KSFT | 26.769 | 44.861 | 44.885 | 53.687 | 64.240 | 43.053 |
| 118 | Players Plain | RSFT | 32.689 | 52.388 | 51.088 | 57.961 | 72.896 | 48.527 |
| 229 | Players Sp. Blend | RSFT | 28.112 | 56.788 | 60.869 | 74.310 | 80.226 | 54.470 |
| 115 | Players X.Lt. | RSFT | 19.792 | 25.494 | 23.556 | 31.112 | 49.903 | 24.989 |
| 228 | Players X.Lt. | KSFT | 24.996 | 23.987 | 22.460 | 32.957 | 58.752 | 26.103 |
| 121 | Rothmans | KSFT | 25.552 | 35.295 | 34.958 | 52.489 | 53.973 | 37.074 |
| 233 | Rothmans Lt. | KSFT | 43.382 | 37.845 | 38.448 | 57.275 | 62.720 | 44.188 |
| 122 | Rothmans Sp.M. | KSFT | 19.461 | 30.933 | 29.320 | 36.404 | 55.606 | 29.030 |
| 525 | Rothmans U.Lt. | KSFT | 50.804 | 23.984 | 26.705 | 36.821 | 64.468 | 34.579 |
| 124 | Rothmans X.Lt. | KSFT | 28.409 | 32.770 | 30.859 | 38.588 | 66.350 | 32.657 |
| 138 | Vantage | KSFT | 28.526 | 23.256 | 20.476 | 27.910 | 53.832 | 25.042 |
| 139 | Vantage Lt. | KSFT | 35.618 | 15.065 | 13.814 | 19.964 | 55.500 | 22.115 |
| 141 | Viscount 1 U.M. | KSFT | 34.596 | 2.966 | 2.843 | 5.656 | 58.113 | 11.579 |
| 159 | Viscount 100 X.M. | PSFT | 38.934 | 13.592 | 14.439 | 20.706 | 60.042 | 21.918 |
| 146 | Viscount X.M. | KSFT | 49.047 | 13.219 | 14.111 | 18.448 | 61.869 | 23.706 |
| 148 | Viscount X.M. Men. | KSFM | 47.773 | 11.806 | 10.169 | 17.334 | 46.604 | 21.770 |

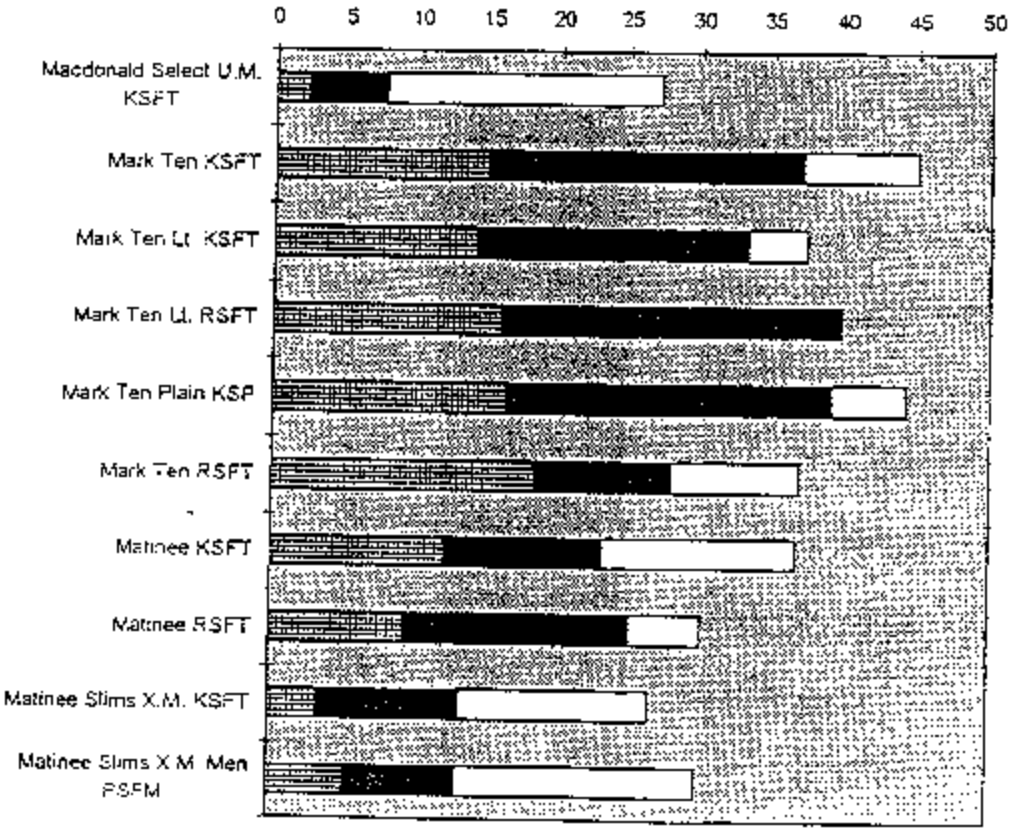

A Guide to the "Tar" Deliveries of Canadian Cigarettes
"Tar" (mg/cig)
0 5 10 15 20 25 30 35 40 45
Typical
Intense
Accord U.M. KSFT
Accord U.M. Men. KSFM
Avanti Slim KSFT
Avanti Slim Lt. KSFT
B&H 100 Del. U.Lt. Men KSFT
B&H 100 Del. U.Lt. PSFT
B&H 100 Lt. Men. PSFM
B&H 100 Lt. PSFT
B&H 100 Men. PSFM
B&H 100 PSFT
0 5 10 15 20 25 30 35 40 45
B&H Sp. KSFT
B&H Sp.Lt. KSFT
Belmont Milds KSFT
Belvedere KSFT
Belvedere RSFT
Belvedere X.M. KSFT
Belvedere X.M.RSFT
Cameo Men. KSFM
Cameo Men X.M. KSFM
Canadian Classic KSFT

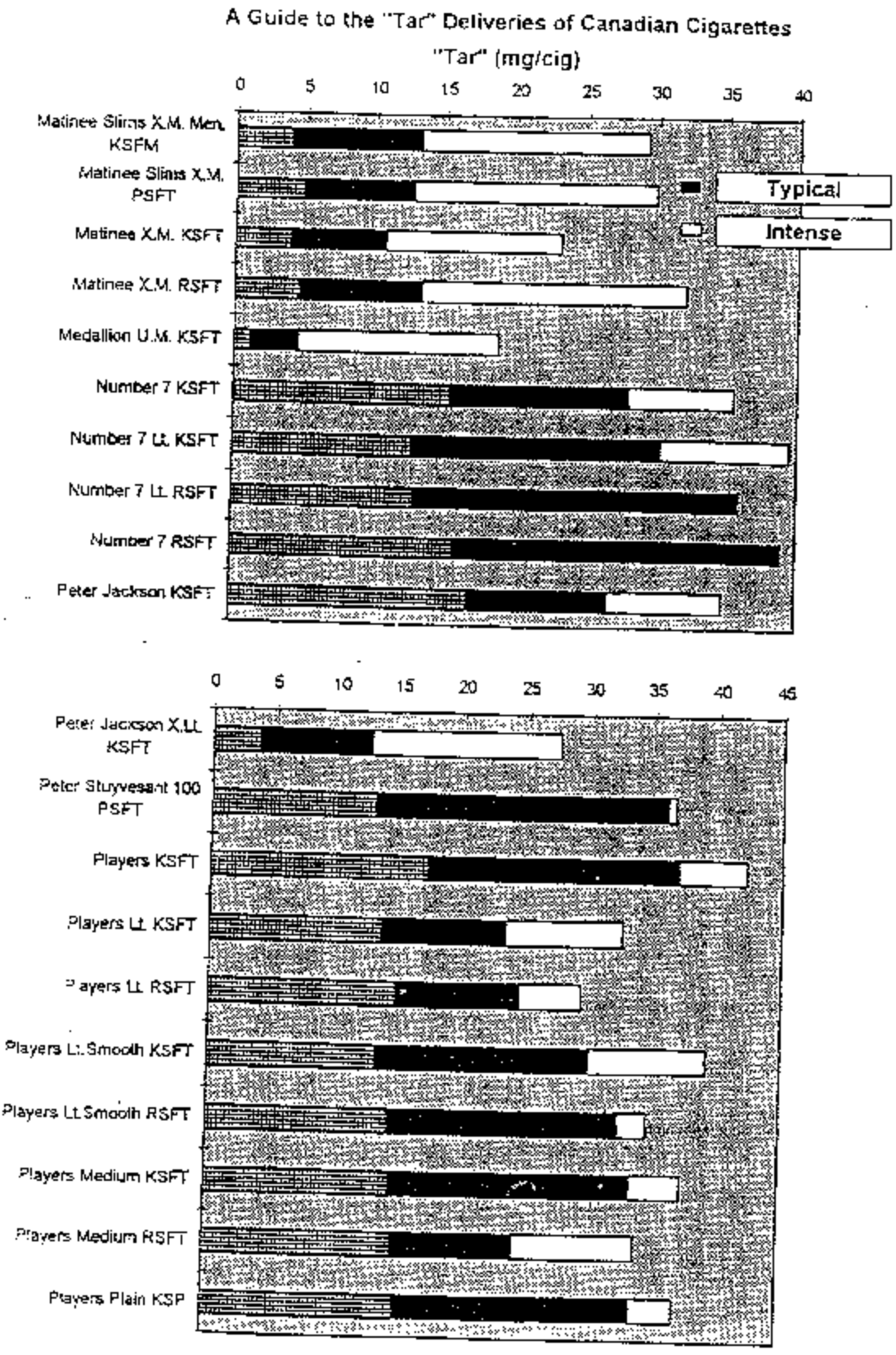

A Guide to the "Tar" Deliveries of Canadian Cigarettes
"Tar" (mg/cig)
0
5
10
15
20
25
30
35
40
Typical
Intense
Canadian Classic RSFT
Craven A Extra Lt. KSFT
Craven A Extra Lt. RSFT
Craven A KSFT
Craven A Lt. KSFT
Craven A Lt. RSFT
Craven A RSFT
Craven A Sp.M. 100 RSFT
Craven A Sp.M. KSFT
Craven A Sp.M. RSFT
Craven A U. Lt. KSFT
Craven A U.M. KSFT
Craven A Ultra Lt RSFT
Craven Men. KSFT
Craven Men. Sp.M. 100 RSFM
Craven Men Sp.M. KSFM
Du Maurier KSFT
Du Maurier Lt. KSFT
Du Maurier Lt. RSFT
Du Maurier RSFT


A Guide to the "Tar" Deliveries of Canadian Cigarettes
"Tar" (mg/cig)
0
5
10
15
20
25
30
35
40
45
Typical
Intense
Du Maurier Sp.M. KSFT
Du Maurier Sp.M. RSFT
Du Maurier U.Lt. KSFT
Du Maurier U.Lt. RSFT
Du Maurier X.Lt. KSFT
Du Maurier X.Lt. RSFT
Dunhill KSFT
Export A KSFT
Export A Lt. KSFT
Export A Lt. RSFT
Export A Smooth Med. RSFT
Export A Smooth Med. KSFT
Export A Smooth Lt. RSFT
Export A Smooth Lt. KSFT
Export A Smooth KSFT
Export A RSFT
Export A Mild RSFT
Export A Mild KSFT
Export A Med. RSFT
Export A Med. KSFT

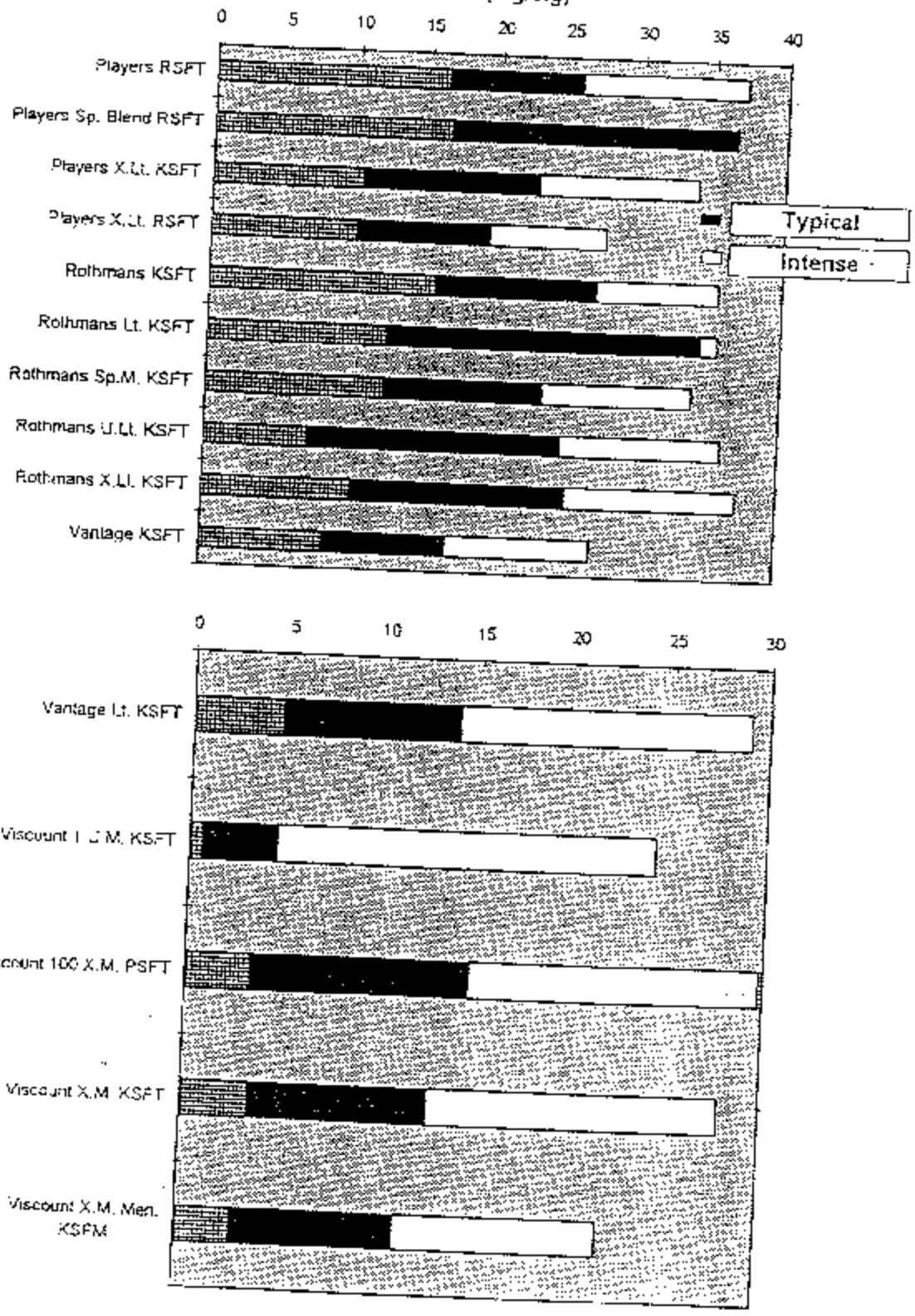
## A Guide to the "Tar" Deliveries of Canadian Cigarettes




A Guide to the "Tar" Deliveries of Canadian Cigarettes
"Tar" (mg/cig)
0
5
10
15
20
25
30
35
40
45
Matinee Slims X.M. Men KSFM
Matinee Slims X.M. PSFT
Matinee X.M. KSFT
Matinee X.M. RSFT
Medallion U.M. KSFT
Number 7 KSFT
Number 7 Lt. KSFT
Number 7 Lt. RSFT
Number 7 RSFT
Peter Jackson KSFT
Peter Jackson X.Lt. KSFT
Peter Stuyvesant 100 PSFT
Players KSFT
Players Lt. KSFT
Players Lt. RSFT
Players Lt.Smooth KSFT
Players Lt.Smooth RSFT
Players Medium KSFT
Players Medium RSFT
Players Plain KSP
Typical
Intense

A Guide to the "Tar" Deliveries of Canadian Cigarettes



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