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Carol T. Crawford, Esq., Director  
Bureau of Consumer Protection  
Federal Trade Commission  
Washington, D.C. 20580

Re: FTC Request for Comments on  
Modifications to the Present FTC  
Cigarette Testing Methodology  
48 Fed Reg. 15953 (April 13, 1983)

Dear Ms. Crawford:

Several weeks ago, Judith Wilkenfeld invited Brown & Williamson to submit samples of the "Kamm holder" for consideration by the Commission as an alternative to the modifications of the FTC cigarette testing methodology proposed in the Commission's April 13, 1983 Federal Register notice.

As stated in its June 30, 1983 Comment, Brown & Williamson opposes any change in the current testing methodology that purports to reflect actual human smoking behavior for Actron filter products alone. If a modification is to be made, however, it should be one that incorporates, to the maximum possible extent, current scientific knowledge about

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lip-filter interactions as they affect the air-dilution systems of all ventilated filter cigarettes. As Brown & Williamson explained in its June 30 Comment, none of the filter holders proposed in the Commission's April 13, 1983 Federal Register notice was based on studies of normal smoking behavior.

The ventilation studies on which the Commission has relied in proposing modifications to its present smoking machine purport to show that human lips impair the ventilation system on Barclay (and, presumably, other Actron filter cigarettes) by lip pressure, lip drape, or a combination of the two.

The Kamm holder is capable of replicating human lip-filter interactions far more realistically for the following reasons:

1. Lip Pressure During Normal Human Smoking

In 1981, Dr. Roger Kamm, Associate Professor of Mechanical Engineering at the Massachusetts Institute of Technology, conducted a series of tests to determine how much pressure is exerted by human lips on a cigarette filter tip during normal smoking. Dr. Kamm's report of these tests was annexed as Exhibit J to Brown & Williamson's Comment, filed with the Commission on June 30, 1983.

Dr. Kamm's pressure measurements showed that human lips exert an average pressure of about 34 torr. The range of

recorded pressures was from 2.7 to an extreme of 133 torr.

## 2. Lip "Drape" and Insertion Depth

Two of the three holders that have been proposed as modifications to the FTC smoking machine attempt to simulate the purported effect of "lip drape" on Barclay's filter channels.

Dr. Kamm's initial studies did not control for variations in the depth to which the test cigarettes were inserted in the subjects' mouths. The depth to which the cigarette filter is inserted into the human lips can affect "lip drape." It is only at relatively shallow insertion depths that it becomes likely that the phenomenon known as "lip drape" -- the blocking of portions of the filter tip at its very end by the lips -- will occur. Fiber optic viewing shows that the shorter the insertion depth, the more opportunity for "lip drape." The longer the insertion depth, the less opportunity for "lip drape."

## 3. The Kamm Holder

In June 1983, Dr. Kamm developed a new cigarette holder for use in the standard smoking machine, that would be able to reflect typical lip pressures, insertion depths and produce the lip drape that has been claimed to impair ventilation, while directly measuring "tar" and nicotine yields.

The Kamm holder simulates lip pressure, insertion depth, and lip drape found in normal human smoking without preferentially altering the smoke delivery of any one particular cigarette design beyond that which would occur in normal smoking. In operation, the cigarette is positioned inside a polymer tube, made of the thinnest-walled, most compliant tubing material available, which provides for maximum "lip drape". When pressure is applied to the tube, it balloons inward to simulate "lip drape" and lip pressure.

#### 4. Construction of the Kamm Holder

The design and construction of the Kamm holder incorporates all three of the above parameters and best simulates human smoking. With this holder and an 8 mm insertion length (current FTC insertion length), it is possible to achieve an area of pressure on the filter and still give an opportunity for "lip drape."

The components and assembly of the Kamm holder are illustrated in Figure 1 and Photographs 1a-1c, 2a-2c and are described in the Appendix.

#### 5. Smoking Procedures Using the Kamm Holder

The Kamm holder is incorporated easily into the present apparatus of the FTC smoking procedures and adds a minimum of additional work for the operator. Use of the

Kamm assembly does not interfere with the normal operation of the smoking machine. Smoking procedures using the Kamm holder are fully described in the Appendix.

6. Smoke yields with the Kamm Holder

During August 1983, extensive lip pressure and insertion depth tests were performed using the Kamm holder on a standard smoking machine in Brown & Williamson's laboratories by Brown & Williamson scientists who consulted with Dr. Kamm to develop and refine their test procedures and methodology. These test procedures and results are set forth in the enclosed report by James F. Nall, the head of Brown & Williamson's testing laboratory, at pp. 6-10, Figures 15-17 and Appendix B. The reliability of the Kamm holder is evidenced by the low standard deviation of the tar yields obtained with use of the holder.

We therefore request that the Commission consider the Kamm holder as an alternative proposal for modifying the FTC smoking machine.

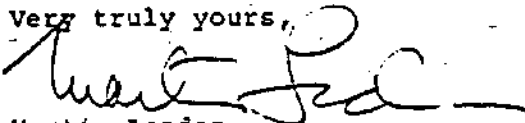
Twenty sample Kamm holders, as well as a cone-shaped tool useful in assembling the holders, are enclosed for the Commission's inspection and use. These holders are designed to be used with the Gelman filter-pad holder. If requested, Brown & Williamson would be pleased to supply additional Kamm

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holders, as well as Kamm holders designed for use with Cambridge filter-pad holders.

Very truly yours,

  
Martin London

## COMPONENTS OF THE KAMM HOLDER

### 1. Kamm Assembly

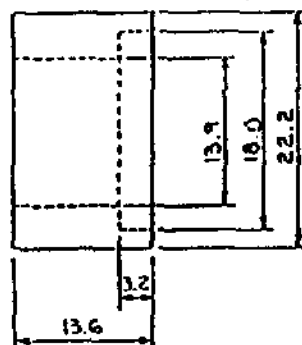
- (a) Kamm Holder. The Kamm Holder is machined from a cast acrylic rod. Dimensions are given in Figure 1. The stainless pressure tubing is pressed into the acrylic wall and sealed with epoxy glue. The pressure tubing is .040" I.D. HPLC stainless tubing manufactured by Waters Associates, Milford, Massachusetts 01757.
- (b) Kamm Collar. The Kamm Collar is machined from a cast acrylic rod. Dimensions are given in Figure 1. (The inside collar dimension is for use with a Gelman holder only.)
- (c) Kamm Tubing. Dimensions of the Kamm Tubing are given in Figure 1. The tubing is made of silicone rubber and is manufactured by Bivona Surgical Instrument Inc., 5700 West 23rd Avenue, Gary, Indiana 46404.

Specifications of the tubing are as follows :

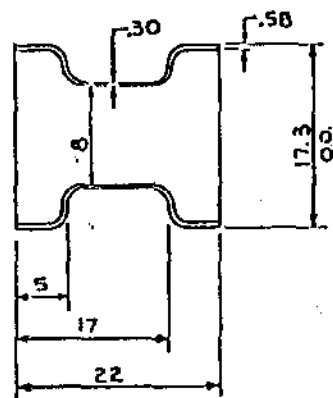
<u>Characteristic</u>	<u>Specification</u>
Silicone Material (General Electric)	SE 5218
Durometer (Shore A)	25 $\pm$ 5
Tensile Strength (psi)	1,000
Tear Strength (psi)	100
Ultimate Elongation (%)	800

<u>Characteristic</u>	<u>Specification</u>
Tensile Modulus	
at 50% (psi)	55
100% (psi)	80
200% (psi)	110
2. <u>Cast Acrylic Rod.</u> 0.625" and 0.875" diameter, AIN Plastics, Inc., 249 East Sanford Boulevard, Mount Vernon, New York 10550.	
3. <u>Pressure Tubing.</u> Stainless steel .040" I.D. for HPLC, Waters Associates, Milford, Massachusetts 01757.	
4. <u>O-Rings.</u> 1/2" I.D. x 1/16" cross section.	
5. <u>Gelman Holder.</u> Gelman Sciences, Medical Device Division, 674 South Wagner Avenue, Ann Arbor, Michigan 48106.	
6. <u>Pressure Regulator</u> (to provide air pressure at smok- ing machine). Nullmatic 0-100 inches of water. Moore Products Co., Spring House, Pennsylvania.	
7. <u>Differential Pressure Gauge</u> (to be sure that there are no leaks in system during smoking). 0-100 inches of water.	

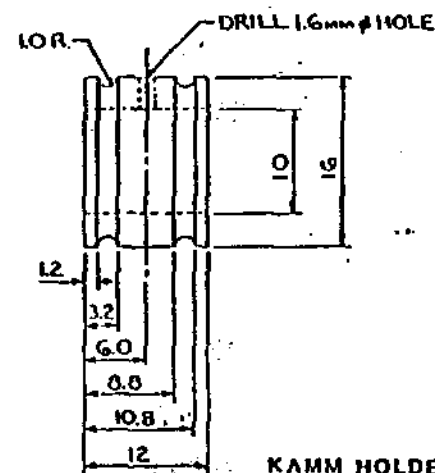




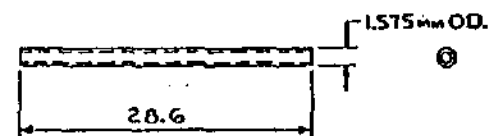
KAMM COLLAR  
(CAST ACRYLIC)



KAMM TUBE  
(SILICONE RUBBER)




KAMM HOLDER  
(CAST ACRYLIC)



PRESSURE TUBE  
(16 GA STAINLESS STEEL TUBING)

NOTE: ALL DIMENSIONS IN MM.

 BROWN & WILLIAMSON TOBACCO CORPORATION	
DWN. CLARK APR'D. DATE 8-12-83 SCALE 1:40	TITLE <b>FIGURE 1</b> <b>KAMM ASSEMBLY</b>
DWG. - NR. -	

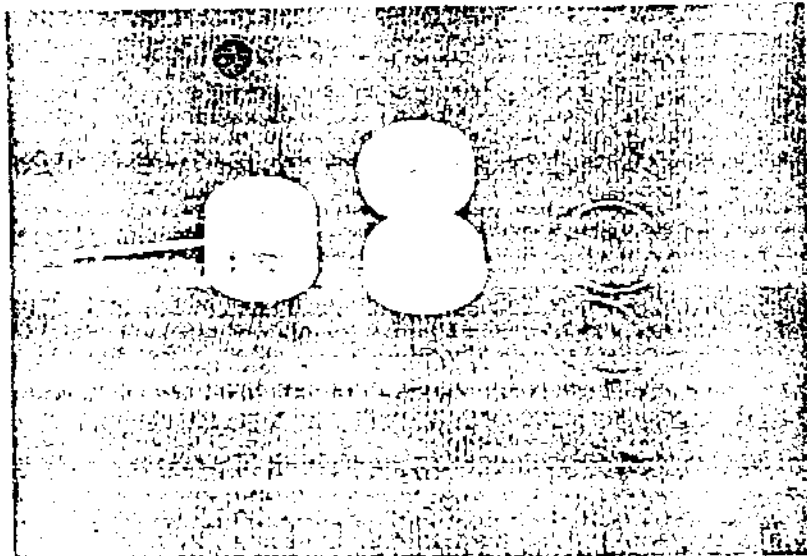
#### ASSEMBLY OF KAMM HOLDER

As is illustrated in Photographs 1a-1c, the Kamm holder is assembled by inserting the Kamm tubing through the plastic cylinder. An airtight seal is made by folding the tubing back and over the rim of the plastic holder. The plastic cone is then placed firmly against the end of the tube and used to guide the O-rings over the grooves in the holder. The use of the O-rings ensures an airtight seal; the use of the plastic cone prevents distortion of the tube. The holder/tubing assembly is then inserted into the Kamm collar as shown in Photograph 2a. A Gelman holder is inserted into the other end of the Kamm collar. Additional photographs of the Kamm holder are shown in Photographs 2b, 2c, 3a-3c.

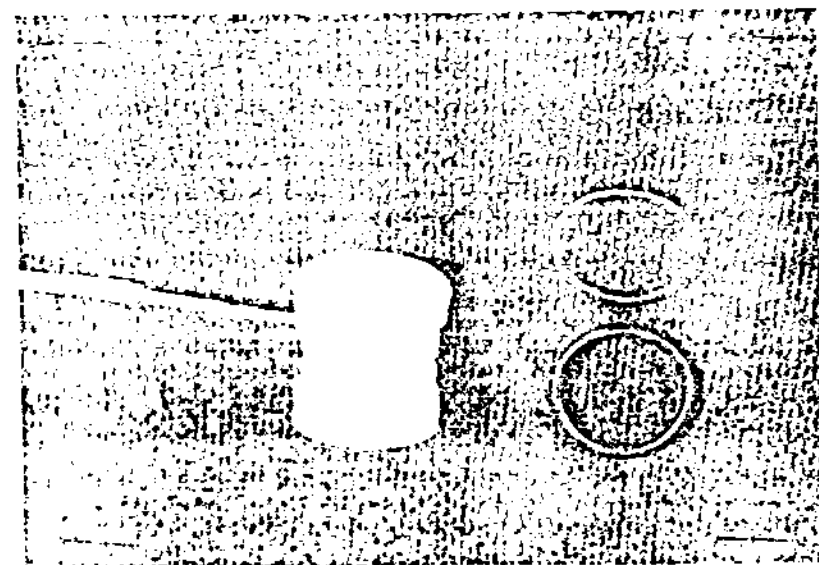
### SMOKING PROCEDURES USING THE KAMM HOLDER

The standard Phipps & Bird smoking machine and standard smoking procedures can be used to measure "tar", nicotine and CO yields using the Kamm holder. The smoking machine must be modified slightly to bring compressed air through a precision regulator and then to the machine through small Tygon tubing (1/16" I.D.). Each port must be fitted with a pressure source (a "T" at each port) that allows pressures from 0 to 90 inches of water. Pressure is measured at the source of the pressure just after the regulators and after the last port connection to be sure that there are no leaks during smoking. Cigarette insertion is facilitated by the application of a low vacuum, in place of pressure, using a 3-way valve. Photographs 3a-3c show the standard smoking machine using the Kamm holder.

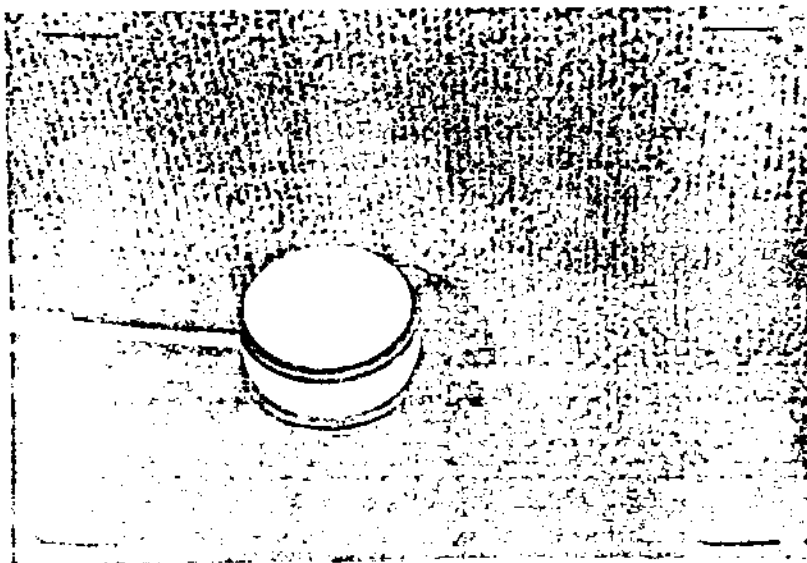
The combined Kamm assembly and Gelman holder should be weighed before and after smoking to obtain TPM values. The silicone rubber tubes may be reused a minimum of five times providing that they are cleaned between samples. Cleaning involves alternating isopropanol/water rinses, and drying in a 40°C oven.



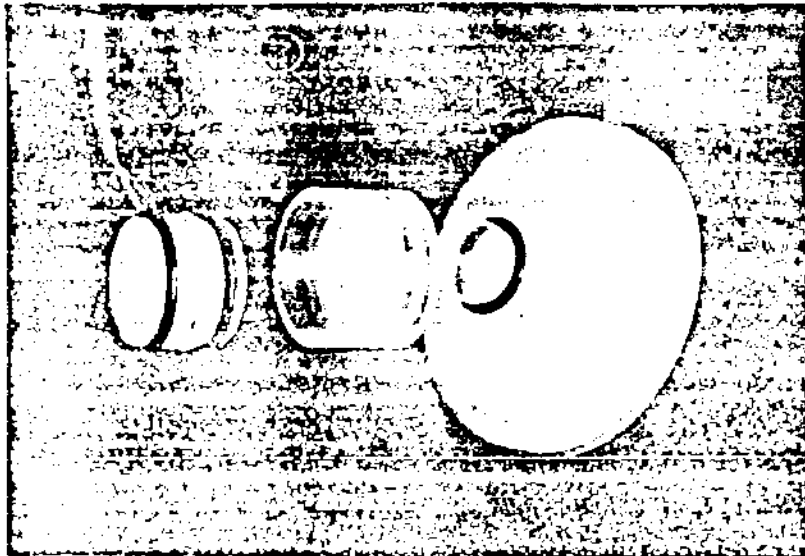
1a. Kamm holder components:  
O-rings, Kamm tube and  
Kamm holder



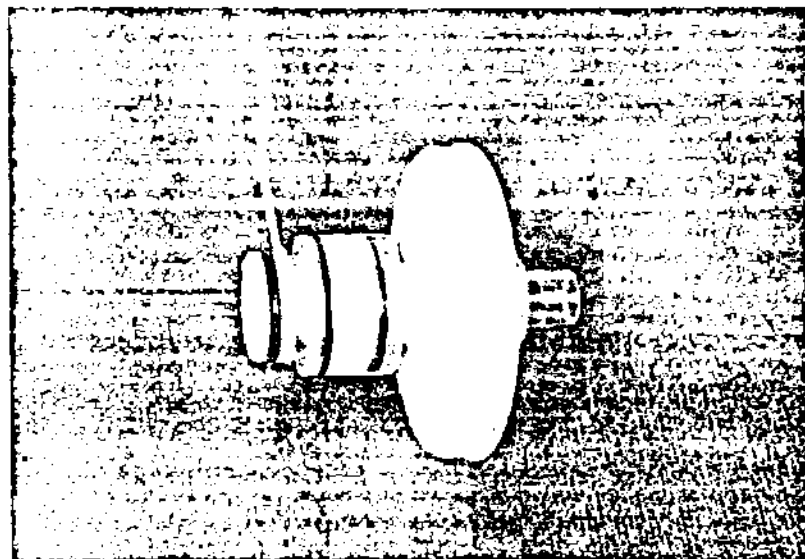
1b. Partially assembled  
Kamm holder



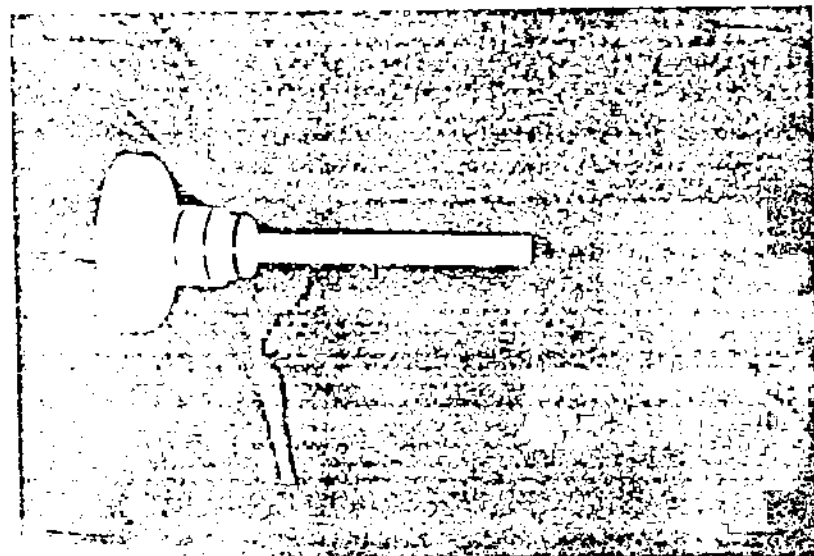
1c. Fully assembled Kamm  
holder



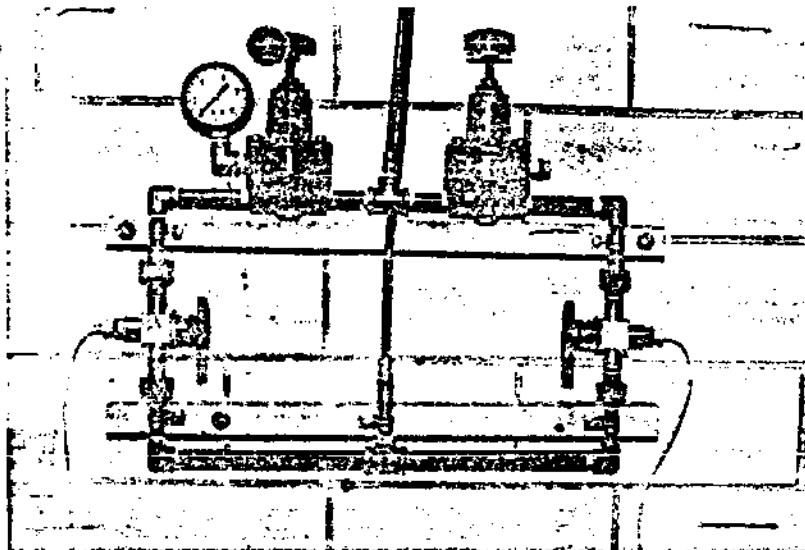
2a. Assembled Kamm holder  
adapter collar, and  
Gelman filter



2b. Fully assembled Kamm  
holder and Gelman filter



2c. Assembled Kamm Holder  
and Gelman filter with  
cigarette



3a. Pressure/vacuum manifold serving two Phipps & Bird smoke machines



3b. Side view of Phipps & Bird smoke machine with Kamm holder in place



3c. Front view of Phipps & Bird smoke machine with Kamm holders in place

