CHAPTER 3

TESTING DETERMINATION AND INSTRUMENTS

3.1 Consistency and freeness determination of stock

The samples should be taken in two two-liter cans, one can is filled a sample from consistency controller and the other can from the head box, but care should be taken not to fill the cans over 75% full because upon standing the stock and water will separate and any spillage will cause error.

3.1.1 Consistency determination

The sample is throughly mixed and poured into a weighed one-liter can. When the weighed can is nearly filled to 600 c.c. it is placed on the balance and stock is added or removed until 600 grams of stock are acculately weighed. When transferring stock from one can to another for the last small adjustment in weight, the fingers may be used, However, care must be taken to agitate the stock well a and to avoid squeezing, which would remove water and introduce error. The 600 grams of stock are diluted with water to 6000 c.c. in a two gallon pail. After thorough agitation, 1000 c.c. of the dilute stock are measured out in a graduate and filtered in a Buchner funnel on weighed filter paper under vacuum. The pulp pad and filter paper are removed and any small deposits of stock are removed from the sides and bottom of the filter with a wet finger and pressed on the pad. The pulp pad and filter paper are dried on the electric hot plate. The end point of the drying is considered to be about 30 seconds after the pad has stopped steaming. The pad plus filter paper may then

be weighed immediately on balance. The weighing should be made as rapid as possible on the balance to the nearest 0.01 gram. The consistency of the original slush stock sample is calculated as follows:

W = percent consistency, where

a = weight of oven dry pulp pad and filter paper in grams.

b = filter paper weight in grams.

W = a - b

= weight of oven dry pulp pad or weight of oven dry pulp in 1000 c.c. of dilute stock.

The explanation of this formula is:

$\frac{W * 6 * 100}{600} = W$

= consistency in percentage, where

6 - multiply by 6, because the 1000 c.c. represents only 1/6ths the original sample.

W * 6 = total weight of pulp in original 600 grams sample.

$\frac{W * 6}{600}$ = the fraction of pulp in the original sample.

$\frac{W * 6 * 100}{600}$ = the consistency expressed as percent.

3.1.2 Freeness determination

The dilute stock is taken out 1000 c.c. from 6000 c.c. After agitation the temperature of the stock is noted to the nearest degree and the sample rapidly and carefully poured into the Canadian Standard Freeness tester. With the air cock open, the lid is closed the bottom plate is opened and, with a grduate in place at the over

flow spout, the air cock is opened. The measured volume is corrected for consistency and temperature using the canadian standard freeness tables (table 2 and 3 in appendix B) and the corrected volume in c.c.'s reported as the freeness.

the operations outlined above from the point where the sample is poured into the freeness tester should be performed as rapidly as possible. Effort should be made not only to operate the equipment rapidly but to attain the same rate of speed from test to test, as the time element influences to some extent the freeness results.

3.2 Pecent crepe determination

The percent crepe is calcalculated with the yankee dryer and reel speeds as follow:

$$\frac{\text{Yankee dryer speed - Reel speed}}{\text{Reel speed}} * 100 = \% \text{ crepe}$$

3.3 Basis weight determination

Two plies of tissue paper have been cut from the roll approximately 40 cm. width (as shown in fig. 9 by dotted line). The sample tissues are folded to 10 plies and cut to size 20*25 cm.. Then they are weight on the balance.

Let W = weight of 10 plies tissue paper with size 20*25 cm. in grams.

$20 * 25 * 10$ = total surface area of 10 pliesppaper in $cm.^2$.

$= 20 * 25 * 10 * 10^{-4}$ $M.^2$

$= 1/2$ $M.^2$

$W * 2$ = basis weight in $G./M.^2$

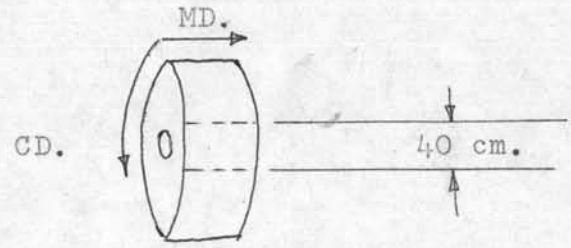

FIG. 9 Sample tissue paper cut from the roll with approximately 40 cm. width.

3.4 Tensile strength determination

The sample tissue paper has been cut into strips with 15 mm. width (as shown in fig. 10). For each test, two strips of tissue paper are used, therefore, a roll of tissue paper have five values of tensile strength in each direction. Let the values of tensile strength in one direction are x_1, x_2, x_3, x_4, x_5.

$\therefore$ the tensile strength = $(x_1 + x_2 + x_3 + x_4 + x_5)/5$ G./15MM.

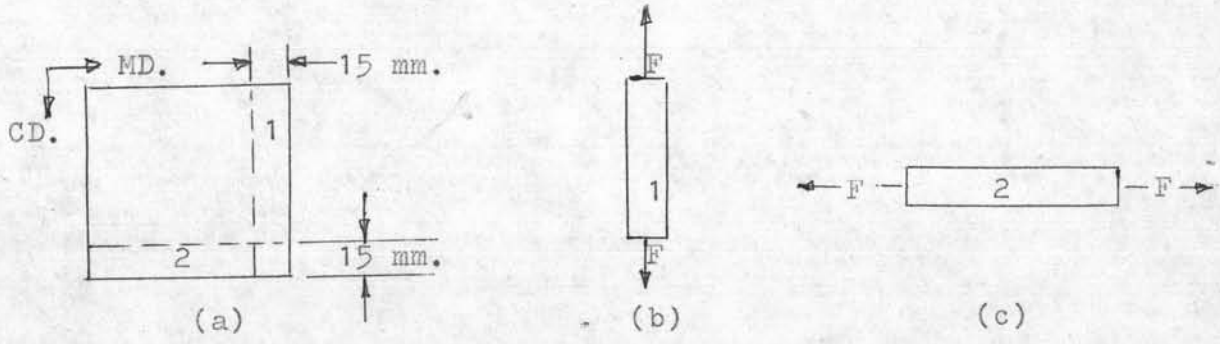

FIG. 10 Tensile strength test. (a) sample tissue paper size 20*25 cm. 10 plies. (b) MD. tensile strength (c) CD. tensile strength.

3.5 Breaking length determination

$$\text{breaking length} = \frac{\text{tensile breaking strength (G./M.)}}{\text{basis weight (G./M.}^2\text{)}}$$

3.6 Instruments

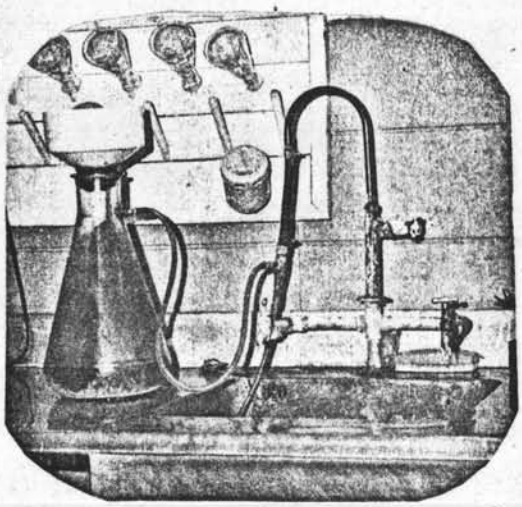

FIG. 11 Consistency tester.

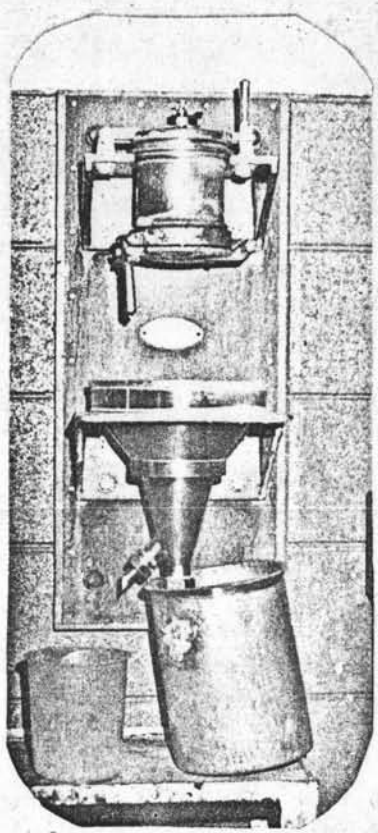

FIG. 12 Canadian Standard Freeness tester.

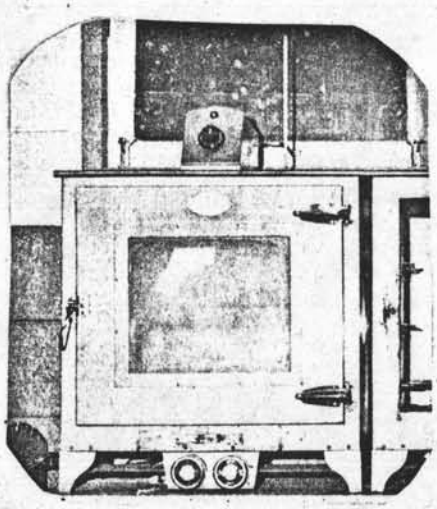

FIG. 13 Oven

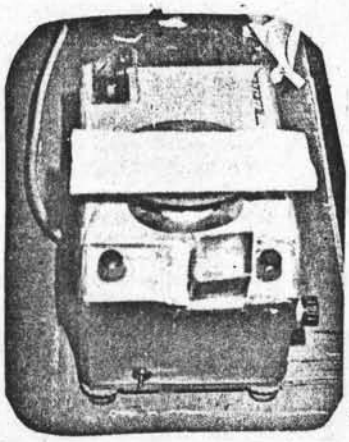

FIG. 14 Balance

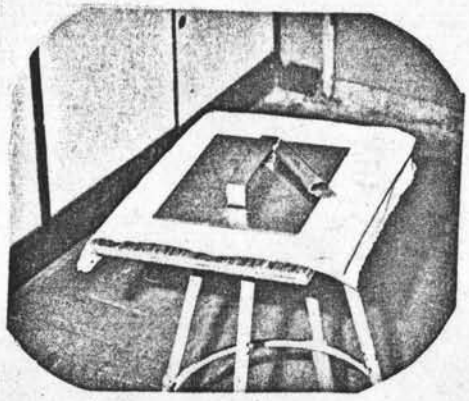

FIG. 15 Plate size 20*25 cm. and cutter.

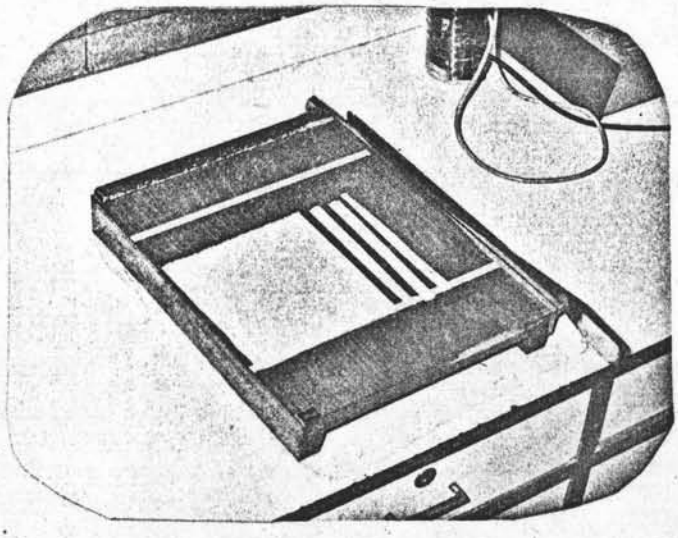

FIG. 16 Cutter for cutting sample tissue paper into strips.

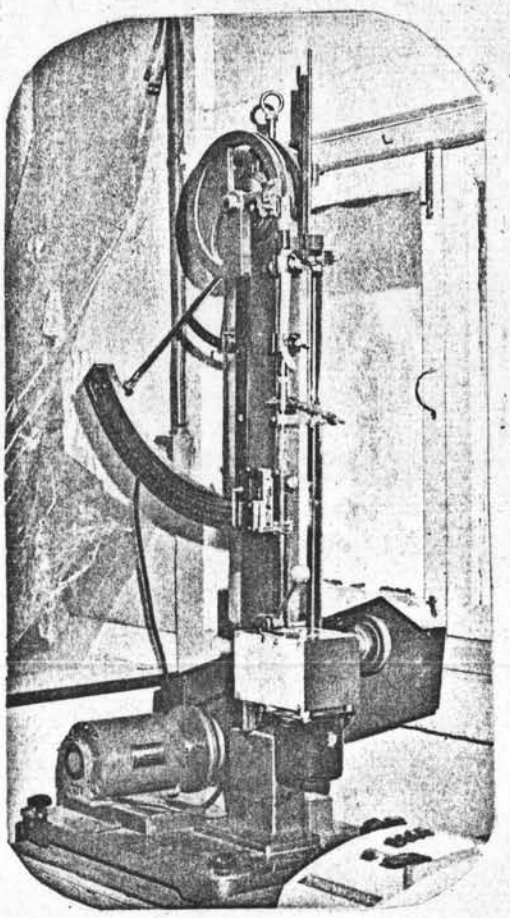

FIG. 17 Tensile strength tester.