TITLE:

Product Thickness, Density, and Basis Weight Measurement for Hygienic Articles

SCOPE:

This method describes the procedure for measuring the absorbent product thickness, density, and basis weight at various zones within the product. The standard positions are at the dosing zone and 6 set positions, 3 toward the front and 3 toward the back (from the dosing zone).

SAFETY:

Read the material safety data sheets for all chemicals used in this procedure.

EQUIPMENT AND MATERIALS:

1. 1. Ratchet Arbor Press or equivalent
1. 1. Sharpened, circular steel die (area of die = 20 cm^2)
2. 2. Micrometer and stand, Mitutoyo electronic indicator IDS-1012EB or equivalent
3. 3. Two, 2 inch diameter plastic discs (weight 30 grams each)
4. 4. Lab balance accurate to the nearest 0.01 g
5. 5. Template for locating the sampling positions (figure 2)
6. 6. Ruler
7. 7. Permanent marker

PROCEDURE:

1. SAMPLE PREPARATION

a. a. Weigh 3 hygienic articles and record the weights to within 0.01 grams.
b. b. If necessary, remove the elastics so that the product will lay flat.
c. c. With a ruler, mark the center of the product (diaper chassis, not core) and draw a line in the cross machine direction.
d. d. Place the template (see figure 2 on page 3) on the article and align the center of the product with the marking on the template that reads "product center". Outline each circle (20 cm^2 area) with a permanent marker and label each with the corresponding label on the template.

Note: Front remaining (FR) and back remaining (BR) sections should be tested if the absorbent core extends beyond B4 and/or F4. Draw two 20 cm^2 circles, one at the front and one at the back, at a distance approximately 1 cm from the edge of the absorbent core.

e. At each marked position, punch out the sample circles with the press.

Note: Handle the punched samples with care in order to minimize the loss of material and/or alteration to the thickness.

2. ARTICLE EVALUATION

a. a. Weigh each punched sample and record the weight to the nearest 0.01 grams.
b. b. Prior to use, and between each measurement, verify that the gauge reads zero when only the plastic discs are between the micrometer foot and base.
c. c. Measure each punched sample thickness by placing it between the two plastic discs (see figure 1 on page 3) and centering the sample on the micrometer base (do not apply any additional pressure as this may alter the thickness reading). Lower the micrometer foot onto the sample and record the thickness reading to the nearest 0.001 cm.

3. CALCULATION

Calculate the **density** as follows:

$$\text{Density (g/cc)} = \frac{\text{Sample Weight (grams)}}{\text{Area (sq. cm)} \times \text{Thickness (cm)}}$$

Using the 20 cm^2 punch and thickness reading in cm, the density calculation is:

$$\text{Density (g/cc)} = \frac{\text{Sample Weight (grams)}}{20 \times \text{Thickness (cm)}}$$

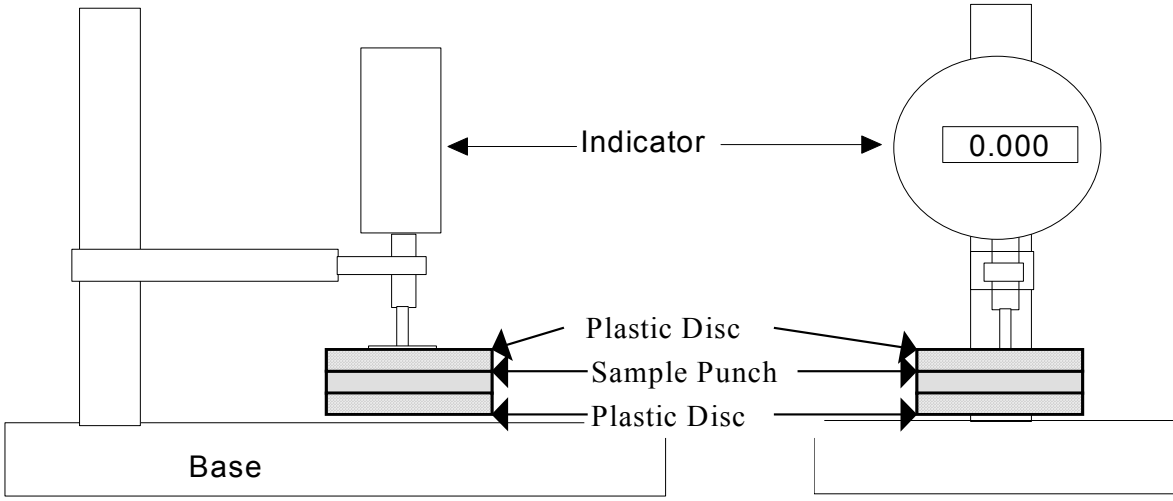
Calculate the **basis weight** as follows:

$$\text{Basis weight (gsm or grams per square meter)} = \text{Sample Weight (grams)}$$

Using the 20 cm^2 area punch, the basis weight calculation is:

$$\text{Basis weight (gsm)} = \text{Sample Weight (grams)} \times 500$$

MICROMETER SETUP



Side View

Front View

Figure 1

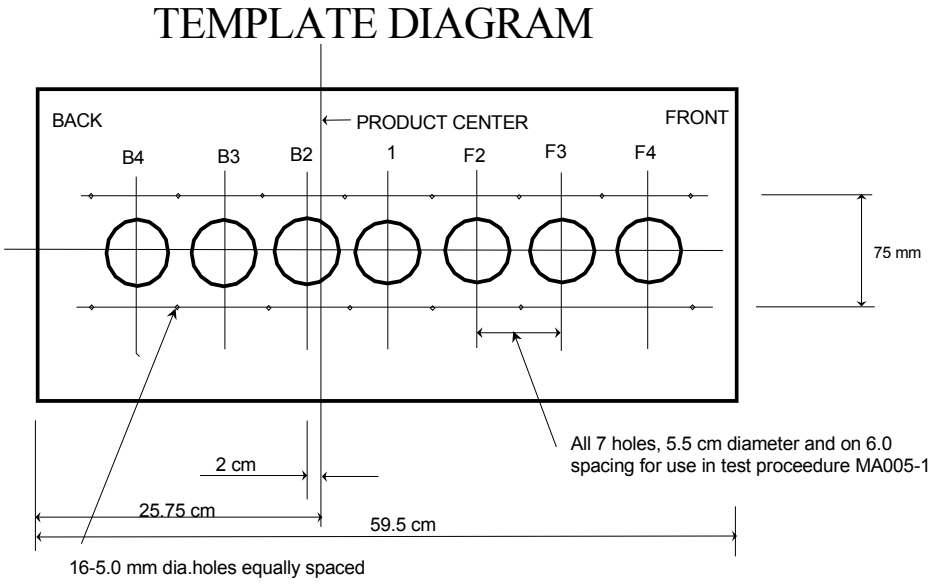

TEMPLATE DIAGRAM
BACK
PRODUCT CENTER
FRONT
B4
B3
B2
1
F2
F3
F4
75 mm
All 7 holes, 5.5 cm diameter and on 6.0 spacing for use in test proceedure MA005-1
2 cm
25.75 cm
59.5 cm
16-5.0 mm dia.holes equally spaced

Figure 2