

TITLE:

Rewet and Acquisition Time for Disposable Baby Diapers

SCOPE:

This method describes the procedure for quantitatively measuring the rewet and acquisition time of disposable baby diapers

SAFETY:

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

EQUIPMENT AND MATERIALS:

1. 1. 100 ml separatory funnel (7ml/sec or equivalent)
2. 2. Lab balance accurate to the nearest 0.01 g
3. 3. Filter paper grade #4 (diameter 90 mm, VWR 415 or equivalent)
4. 4. 100 ml graduated cylinder or volumetric dispenser
5. 5. Timer
6. 6. Stopwatch
7. 7. Ruler
8. 8. Permanent marker
9. 9. Stainless steel dosing ring (figure 1)
10. 10. 0.7 psi rewet weight (figure 2)
11. 11. 0.9% NaCl saline prepared with distilled or deionized water
12. 12. Food dye or equivalent

PROCEDURE:

1. 1. Prepare the 0.9% saline by dissolving 45 g of Sodium Chloride into 4955 ml of distilled or deionized water. Blend the saline thoroughly.
2. 2. Add a few drops of food dye (or equivalent) to the saline and blend thoroughly.
Note: Only use enough dye to allow for a visual indication of fluid flow and wicking.

Primary Test

3. 3. Weigh and record the total diaper weight of all samples.
4. 4. Weigh 20, 30, and 40 g stacks of Whatman filter paper to the nearest 0.01 g and record the weight as the dry filter paper weight.
5. 5. Find and mark (with permanent marker) the dosing zone, which is located 5 cm toward the front edge of the product, from the center (diaper chassis, not core).
6. 6. With the nonwoven coversheet side up, cup the diaper in a "U" shape.
7. 7. Measure 80 ml of the dyed saline and pour it into the separatory funnel.
8. 8. Place the dosing ring and separatory funnel (with spigot 1 cm above product surface) over the dosing zone of the diaper and open the stopper. Start the stopwatch as soon as the saline comes in contact with the surface of the diaper. Immediately after starting the stopwatch, start a ten-minute timer.
9. 9. Stop the stopwatch once all of the saline has entered the diaper core and record this time (seconds) as the primary acquisition time.

10. 10. Allow the article to swell for 10 minutes. Note: This ten-minute interval should start at the onset of the acquisition test, when the saline is first poured into the dosing weight.
11. 11. After 10 minutes, place the 20 g stack of filter papers on the diaper (nonwoven coversheet side), centered on the marked dosing zone. Set the rewet weight on top of the filter paper stack and keep it there for 2 minutes.
12. 12. After 2 minutes, remove the weight and weigh the filter papers. Record the weight of the filter papers as the wet weight.
13. 13. Subtract the dry weight of the first filter paper stack from the wet weight of the first filter paper stack and record the difference as the primary rewet.

Secondary Test

14. 14. Repeat steps 7 – 10. The acquisition time determined in step 9 is recorded as the secondary acquisition time.
15. 15. Repeat steps 11 – 13 using the 30 g stack of filter papers.
16. 16. Subtract the dry weight of the second filter paper stack from the wet weight of the second filter paper stack and record the difference as the secondary rewet.

Tertiary Test

14. 14. Repeat steps 7 – 10. The acquisition time determined in step 9 is recorded as the tertiary acquisition time.
15. 15. Repeat steps 11 – 13 using the 40 g stack of filter papers.
16. 16. Subtract the dry weight of the third filter paper stack from the wet weight of the third filter paper stack and record the difference as the tertiary rewet.

CALCULATION:

$$\text{Rewet value (g)} = \text{wet weight of filter papers (g)} - \text{dry weight of filter papers (g)}$$

The acquisition time is measured in seconds and is reported to the nearest 0.1 sec.

Figure 1:

Stainless Steel Dosing Ring Description
 Total Weight: 316.65 g
 Total Height: 4.20 in
 Inside Diameter: 1.87 in
 Outside Diameter (top) 2.00 in
 Outside Diameter (bottom) 2.12 in

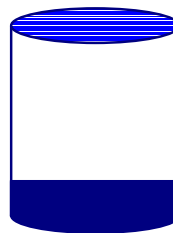


Figure 2:

Rewet Weight Description
 2.5 Kg circular weight
 0.7 psi
 8 cm diameter

