TITLE:

Rewet and Acquisition Time Under Load for Disposable Baby Diapers

SCOPE:

This method describes the procedure for measuring the rewet under load (RUL) and acquisition time under load (ATUL) for disposable baby diapers.

SAFETY:

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

EQUIPMENT AND MATERIALS:

1. 1. Stainless steel dosing weight (figure 1)
2. 2. 0.7 psi rewet weight (figure 2)
3. 3. Lab balance accurate to the nearest 0.01 g
4. 4. Filter paper grade #4 (diameter 90 mm, VWR 415 or equivalent)
5. 5. 7 ml/sec separatory funnel
6. 6. 100 ml beaker or equivalent
7. 7. Timer
8. 8. Stopwatch
9. 9. Ruler
10. 10. Permanent marker
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. 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).
5. 5. 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.
6. 6. With the nonwoven coversheet side up, cup the diaper in a “U” shape.
7. 7. Measure 80 ml of the dyed saline solution and pour it into the separatory funnel.
8. 8. Place the dosing weight and separatory funnel over the insult zone.
9. 9. Pour the saline into the dosing weight, being certain the saline does not overfill the dosing ring. 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.
10. 10. Stop the stopwatch once all of the saline has entered the diaper core and record this time (seconds) as the primary ATUL.
11. 11. Leave the dosing weight on the diaper 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.

12. 12. After 10 minutes, lift the dosing ring and place the stack of 20 filter papers on the diaper (nonwoven coversheet side), centered on the marked dosing zone. Set the 0.7 psi rewet weight on top of the filter paper stack and keep it there for 2 minutes.
13. 13. After 2 minutes have elapsed, remove the 0.7 psi rewet weight and weigh the filter papers. Record the weight of the filter papers as the wet weight.
14. 14. 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 RUL.

Secondary Test

15.15.Repeat steps 7 – 11. The ATUL determined in step 10 is recorded as the secondary ATUL.
16.16.Repeat steps 12 – 14 using the 30 g stack of filter papers.
17.17.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 RUL.

Tertiary Test

18.18.Repeat steps 7 – 11. The ATUL determined in step 10 is recorded as the tertiary ATUL.
19.19.Repeat steps 12 – 14 using the 40 g stack of filter papers.
20.20.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 RUL.

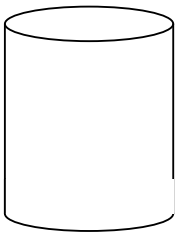
Calculation:

RUL (g) = wet weight of filter papers (g) - dry weight of filter papers (g)

The ATUL 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
Circular Weights
Weight of 1: 551.50 g
Outside Diameter: 4.20 in
Inside Diameter: 2.03 in
Height: 0.43 in



Note: 3 circular weights are used during this test

Figure 2:

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