Introduction

There are several principles to measure the roughness of paper. Many of them are based on air leakage. In the IGT Information leaflet W28 a method is described which is based on filling irregularities of the surface of paper with coloured water. The method described in this information leaflet W77 is based on printing the surface of the paper with a smooth printing form and a thin ink film under a low printing force. In this case only the tops of the paper surface are printed. Dependent to the roughness of the paper there will be more or less white spots in the print: the rougher the paper the more white spots.

The method in this leaflet describes a print with 5 fields, every field printed with another printing force.

W77-1AMS: Printing smoothness at 500-400-300-200-100 N

W77-2AMS: Printing smoothness at 1000-800-600-400-200 N

Principle

The paper strip to be tested is printed with a standard ink with the help of an IGT printability tester. The printing form is an aluminum one. Only the tops of the surface of the paper are printed. The print is divided in 5 parts, each next part a lower printing force. The rougher the paper the more white spots are visible in the print. The results are compared to a self made scale or are compared with the results of other (standard) papers.

Method of operation

- It is recommended to execute the test in the standard atmosphere; to most standards it is 23,0 ± 1,0 °C
- For the operation of the AMSTERDAM, Inking Unit and ink pipette follow the instructions of the manuals, IGT information leaflet W100 and the displays accurately.
- Handle the samples carefully.

Preparation

1. Condition the papers, the ink and the equipment during >6 hours in the standard atmosphere.
2. Cut the paper strips and mark them with top and/or bottom side, machine and/or cross direction and a code for the type of paper.
3. Select method
   Print Smoothness 500 – 100N or
   Print Smoothness 1000 – 200N
4. Fill the ink pipette with the ink for density tests.
5. For High Speed Inking Unit only:
   Adjust the unit with the following settings:
   - Water bath: 23.0 °C
   - Top roller: 4-segmented, rubber for conventional inks
   - Mode: 2
   - Startup time: 10 s
   - Distribution time: 20 s
   - Distribution speed: 0,5 m/s
   - Inking time printing discs: 15 s

Execution

1. Touch the button **PRINT** to rotate the 1st printing disc shaft into the start position.
2. If desired, touch the checkbox **SCAN** to scan and save the test results of the test strip.
3. Mount a test strip into the front clamp of the sector.
4. Apply 0,03 cm³ of ink to a segment of the top roller of the inking unit and distribute the ink during the preset or desired time.
   NOTE: It is not advised to add some ink after a test.

Materials / Testing conditions		
1	IGT AMSTERDAM	
2	IGT High Speed Inking Unit 4	466.000.710
3	Top roller with 4 segments for conventional inks	466.003.003
4	IGT ink pipette	408.000.200
5	Printing disc, aluminum, 50 mm, pin	402.331.720
6	Packing, paper, 55 mm	404.001.005
7	Ink for density tests	404.003.001
Strips of paper to be tested, preferable 55*340 mm², 3 strips per sample Lint free rags and cleaning naphtha		
Printing force	1) 500-400-300-200-100 N 2) 1000-800-600-400-200N	
Printing speed	Constant, 0,2 m/s	
Ink film thickness (volume) (guide line)	0,8 µm (0,03 cm³)	
►The numbers 1 thru 7 are available at IGT Testing Systems.		

5. Place the printing disc on the printing disc shaft of the inking unit and ink the disc during the preset or desired time.
6. Remove the disc from the inking unit and place it on the top printing disc shaft of the printability tester.
7. Press both side buttons to make a print in 5 steps, if activated to move the camera downward to make a scan and to come into the end position; then release the side buttons.
   NOTE: the 5 steps have been printed with the following printing forces:
   W77-1AMS: Printing smoothness at 500-400-300-200-100 N
   W77-2AMS: Printing smoothness at 1000-800-600-400-200 N
8. If the camera is activated:
   8.1. The test strip is assessed; if finished the camera moves upward.
   8.2. Save or discard the results
9. Remove the printed strip from the sector.
10. Check the test result as described in the chapter “Assessment”.
11. Remove the printing disc from the tester and clean it with rags and naphtha and let it dry.
12. Clean the rollers of the inking unit or use the next segment for the following test.
13. For a following test start with point 3 or touch **BACK** and start with point 1. It is recommended to perform the test at least three times per sample.
14. After finishing the tests clean and store all parts as described in the manuals.
15. Make an accurate record of the conditions and the results of the test and refer to:
    - W77-1AMS: Printing smoothness at 500-400-300-200-100 N
    - W77-2AMS: Printing smoothness at 1000-800-600-400-200 N

Assessment

1. Observe the printing result with a self made scale or with other (standard) papers.
2. Calculate the average and if desired, the standard deviation. Sometimes it can be useful to mention the highest and lowest values as well.

Notes:

The storage life of the ink in the original packing is 3 years maximum; in an opened packing 1 year.