Introduction

In laser printing/photocopying the toner is heated to have a good adhesion on the substrate. This adhesion is influenced by the type of printer, toner and paper. To use the printed documents the adhesion must be good. To check the adhesion a print with pick test oil can be made on the laser printed/photocopied substrate. It can be checked if the toner is pulled off from the surface.

In this leaflet W55-AMS the method has been described for a constant speed of 0,4 m/s, according to EN 12883. If the toner is not pulled off from the paper and it must be known if there are differences in toner adhesion, the test can be carried out at higher constant speeds.

Another way to find out at what are the differences is to carry out the test at an increased speed so that the toner is pulled off at different levels. This method with increasing speed has been described in W56-AMS.

Principle

The paper is laser printed/photocopied. A strip of this toner printed paper is printed with pick test oil at a constant speed on an IGT printability tester. After printing the densities are measured at the location where the print has been made with pick test oil (toner has been pulled off) and at the location where no print has been made with the pick test oil (toner has not been pulled off). The densities are used in a formula to calculate the percentage of toner, which has been pulled off from the surface of the paper.

Method of operation

- It is recommended to execute the test in the standard atmosphere; to most standards it is 23,0 ± 1,0 °C and 50 ± 2% rh.
- For the operation of the AMSTERDAM, Inking Unit and ink pipette follow the instructions of the manuals and displays accurately.
- Handle the samples carefully.

Preparation

1. Condition the papers during > 6 hours in the standard atmosphere.
2. Print a stack of 10 sheets of a standard paper, the sheets of the papers to be tested and 5 sheets of the standard paper with a maximum density on a laser printer or photocopier.
3. Condition the papers, the pick test oil and the equipment during > 6 hours in the standard atmosphere.
4. Cut the paper strips (preferable 55*340 mm^2), 5 strips per sample and mark them with top and/or bottom side, machine and/or cross direction and a code for the type of material.
5. Mount the packing on the sector.
6. Select method **Toner adhesion EN12283**.
7. Adjust the High Speed Inking Unit 4 with the following settings:
   - Water bath: 23,0 °C
   - Top roller: 4-segmented, rubber for conventional inks
   - Mode: 3
   - Startup time: 5 s
   - Distribution time: 30 s
   - Distribution speed: 0,5 m/s
   - 2nd distribution time: 10 s
   - 2nd distribution speed: 0,2 m/s
   - Inking time printing discs: 20 s

Execution

1. If desired, adjust the printing speed of the tester.
2. Touch the button **PRINT** to rotate the shafts into the start position.
3. Apply 0,30 cm^3 of pick test oil to a segment of the top roller of the inking unit or add 0,03 cm^3 of pick test oil to maintain this layer and distribute the pick test oil during the preset or desired time.
   NOTE 1: Do not add pick test oil more than 4 times.
   NOTE 2: For another type of top roller see the manual of the inking unit.
4. Place the printing disc on the printing disc shaft of the inking unit and ink the printing disc during the preset or desired time.

Materials / Testing conditions		
1	IGT AMSTERDAM 1/2/5/6	
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, aluminium, 20 mm, pin	402.302.720
6	Pick test oil, medium viscosity	404.004.020
7	Packing, paper, 55 mm	404.001.005
Photocopier or laser printer Densitometer "Standard paper", 15 sheets A4 Paper to be tested, 5 sheets A4 per type Lint free rags and cleaning naphtha		
Printing force	800 N	
Printing speed	Constant, 0,4 m/s	
Pick test oil film thickness (volume)	8 µm (0,30 cm^3)	
Checkbox Scan	Activated	
► The numbers 1 thru 7 are available at IGT Testing Systems..		

5. Attach a test strip into the front clamp of the sector with the laser printed side up.
6. Take the printing disc from the inking unit and place it on the 1st printing disc shaft of the tester.
7. Press both side buttons to make a print, if activated to move the camera downward to make a scan and to come into the end position; then release the side buttons.
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 test strip from the sector.
10. Measure the test result as explained in the chapter "Assessment".
11. Take the printing disc from the shaft and clean it with rags and naphtha and let it dry.
12. For a next test start with point 3 or touch **BACK** and start with point 1. It is recommended to perform the test at least 5 times per sample.
13. After having finished the tests, clean and store all parts as described in the manuals.
14. Make an accurate record of the conditions and the test results of the test and refer to W55-AMS.

Fig. 1: Toner adhesion

Assessment

1. Measure the densities on the toner which has not been subjected to the pick test ($D_{solid\ black}$) and on the toner which has been subjected to the pick test (D_{IGT}). Measurements have to be made 10 times on every single strip.
2. Calculate the toner adhesion as:
   $$Toner\ adhesion = (D_{IGT} : D_{solid\ black}) * 100\%$$
   In which:
   D_{IGT} = density of toner which has been subjected to the pick test
   $D_{solid\ black}$ = density of toner which has not been subjected to the pick test
3. Repeat the points 1 thru 2 for every test strip.
4. Calculate the average and if desired the standard deviation. Sometimes it can be useful to mention the highest and lowest values as well.

Note:

The maximum storage life of the pick test oil in the original, closed packing is 3 year; in an opened packing 1 year.