

## 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 or photocopied substrate. It can be checked if the toner is pulled off from the surface.

In IGT information leaflet W55 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.

An alternative method to find out at what the differences are is to carry out the test at an increased speed, so the toner is pulled off at different speed levels. This method with increasing speed has been described in this IGT information leaflet W56.

## Principle:

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

## Method of operation:

- It is recommended to execute the test in the standard atmosphere; to most standards it is 23.0 ± 1.0 °C (73.4 ± 1.8 °F) and 50 ± 2% rh.
- For the operation of the AIC2-5T2000, Global Standard Tester, High Speed Inking Unit 4 and ink pipette follow the instructions of the manual, IGT information leaflet W100 and the display accurately.
- Handle the samples to be tested 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 x 340 mm, 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. For AIC2-5T2000 only:
  - 5.1. Mount the packing on the sector. See W100.
  - 5.2. Adjust the printing force for the upper printing disc shaft to 800 N and pay attention for the right backlash for both shafts. See W100.
  - 5.3. Adjust the desired printing speed in the increasing speed mode. (▲).
6. For GST 2/3/3H only:
  - 6.1. If not present, mount the sector with clamps. See W100.
  - 6.2. Mount the packing on the sector. See W100.
  - 6.3. Select the menu "Toner adhesion" in the display.
7. Check the functioning of the tester following the instructions in the chapter "Execution"
8. Adjust the High Speed Inking Unit with the following settings:

## Materials / testing conditions

1	IGT AIC2-5T2000 or IGT Global /Standard Tester P or IGT Global Standard Tester 1 or IGT Global Standard Tester 1-W	710.000.000 470.000.000 410.000.000 415.000.000
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, ø 65 mm	402.302
6	Pick test oil, medium viscosity	404.004.020
7	Packing, paper, 55 mm	404.001.005
8	Photocopier or laser printer	
9	Densitometer	
10	"Standard paper", 15 sheets A4	
11	Paper to be tested, 5 sheets A4 per type	
12	Lint free rags	
13	Cleaning naphtha	

Printing force	800 N
Printing speed	Increasing, end speed at choice
Pick test oil film thickness (volume)	8 µm (0.30 cm <sup>3</sup> )

- ▶ The numbers 1 thru 7 are available at IGT Testing Systems.
- ▶ The numbers 5 thru 7 can be obtained as Toner Adhesion Set for AIC2-5T2000, GST P/1/W, article number 489.000.710.

▶ This leaflet contains article numbers per January 1st, 2006 ◀.

Water bath: 23.0 °C (73.4 °F)

Top roller: 4-segmented, rubber for conventional inks

Mode: 3

Starting time: 10 s

Distribution time: 30 s

Distribution speed: 0.5 m/s

2<sup>nd</sup> distribution time: 10 s

2nd distribution speed: 0.3 m/s

Inking time printing discs: 30 s

9. Check the functioning of the High Speed Inking Unit.
10. Fill the ink pipette with IGT medium viscosity pick test oil

## Execution

1. Apply (0.30 cm<sup>3</sup>) of pick test oil to the inking unit or add 0.03 cm<sup>3</sup> of pick test oil to maintain this layer and distribute the pick test oil. **NOTE:** Do not add pick test oil more than 4 times. **NOTE:** For another type of top roller see the manual of the inking unit.
2. Place the printing disc on the printing disc shaft of the inking unit and ink the printing disc.
3. If desired, adjust the printing speed of the tester.
4. Attach a test strip in the front clamp of the sector with the laser printed side up
5. Take the printing disc from the inking unit and place it on the (top) printing disc shaft of the tester.
6. Make a print. See W100.
7. Remove the test strip from the sector.
8. Measure the test result as explained in the chapter "Assessment".
9. Take the printing disc from the shaft and clean it with rags and naphtha.
10. Repeat the points 1 thru 9 for every strip. It is recommended to perform the test at least 5 times per sample.
11. After having finished the tests, clean and store all parts as described in the manuals.
12. Make an accurate record of the conditions and the test results of the test. ▶



Fig. 1: Toner adhesion

Assessment

1. Mark points on the test strip after 90, 120, 150 and 180 mm from the beginning of the print.
2. Measure the densities on the toner which has not been subjected to the pick test ( $D_{\text{solid black}}$ ) and on the toner which has been subjected to the pick test ( $D_{\text{IGT}}$ ) at the selected distances from the beginning of the print.
3. Calculate the toner adhesion for the selected places with the formula:

$$\text{Toner adhesion} = (D_{\text{IGT}} : D_{\text{solid black}}) \times 100\%$$

4. Repeat the points 1 thru 3 for every test strip.
5. Calculate the average and if desired the standard deviation. In some cases it may be useful to mention the highest and lowest value as well.

**Notes:**

- 1 The test results of the AIC2-5T2000, AIC2-5 and Global Standard Tester P, 1 and 1W compare well with one another, on the condition that they have been carried out under the same conditions.
- 2 The maximum storage life of the pick test oil in the original packing is 3 years, in an opened packing 1 year.

► *In comparison to older IGT leaflets, this leaflet is valid for the AIC2-5T2000 and Global Standard Testers as mentioned*

This information leaflet has been compiled with the utmost care. However, may you find any inadequacies or if there are any comments, we kindly request you to send these to IGT Testing Systems, Sales Department.