Introduction

Most commonly picking of paper is defined as the damage of the paper surface during the printing operation. At the time the printing form is lifted off the paper the ink is exerting a certain force on the paper. This force is increasing with an increase in the viscosity and tack of the ink and the printing speed. When this force exceeds a certain value, the surface of the paper will be damaged. This damaging is tested as pick velocity and/or pick resistance in W31, W38, W65 and W75.

Sometimes the qualitative pick testing method does not show differences between papers with a poor pick velocity or pick resistance, e.g. newsprint. For these types of papers it can be advised to use a quantitative testing method to test the surface strength. This test is called "Linting": a combination of dust, fluff and lint. Additional information about qualitative picking or delamination of paper boards can be got as well; however the results will be different from those of the IGT pick test due to a difference in the testing method (printing disc and pick test oil vs pick test ink).

This leaflet describes two methods:

- W44: Printing disc with rubber of 85 Shore A.
- W70: Printing disc with rubber of 65 Shore A.

Principle

A print is made with a test ink on the paper or paper board with an IGT printability tester. An increasing speed is used. For the quantitative picking the picking result is observed visually as the amount of fibres (dust, fluff and lint) which has been pulled off from the surface of the paper. For the qualitative picking the picking result is observed and measured as the first point of damaging in the print.

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 AIC2-5T2000, Global Standard Tester, 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 pick test 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 material.
3. For AIC2-5T2000 only:
   3.1. Adjust the printing force of the top printing disc shaft to 625 N and pay attention for the right backlash. See W100.
   3.2. Adjust the desired printing speed in the increasing speed mode. (◢).
4. For GST P/1/1W only:
   4.1. Select the menu "Linting" in the display.
   4.2. Adjust the desired end speed.
5. Fill the ink pipette with the desired ink.
6. 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
7. For inking unit AE FOUR only: see manual or W100

Execution

1. Apply 0,35 cm³ of pick test 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.
2. Place the printing disc on the printing disc shaft of the inking unit and ink the printing disc during the preset or desired time.
3. Adjust the printing speed, if necessary.
4. Attach a test strip into the front clamp of the sector.
5. Take the printing disc from the inking unit and place it on the top printing disc shaft of the tester.

Materials / Testing conditions		
1	IGT AIC2-5T2000	710.000.000
	or IGT Global Standard Tester P	470.000.000
	or IGT Global Standard Tester 1	410.000.000
	or IGT Global Standard Tester 1-W	415.000.000
2	IGT High Speed Inking Unit 4	466.000.710
	or IGT inking unit AE FOUR	465.000.710
3	Top roller with 4 segments for conventional inks	466.003.003
4	IGT Ink pipette	408.000.200
5	Printing disc, rubber, 85 Shore A, 50 mm, (W44)	402.634
	or Printing disc, rubber, 65 Shore A, 50 mm (W70)	402.687
6	IGT pick test ink 1, low tack	404.800.001
	or IGT pick test ink 2, medium tack	404.800.002
	or IGT pick test ink 3, high tack	404.800.003
7	Pick Start Viewer (115 or 230 V)	441.000
	or Delamination viewer V-form for board	441.000.040.090
	or Delamination viewer U-form for paper	441.000.040.180
8	Velocity table	437.005
Strips of paper to be tested, preferable 55*340 mm², 5 strips per sample		
Lint free rags and cleaning naphtha		
Printing force	625 N	
Printing speed	Increasing, end speed at choice	
Ink film thickness (volume)	8,0 µm (0,35 cm³)	
► The numbers 1 thru 8 are available at IGT Testing Systems.		

6. Make a print. See W100.
7. Take the sample from the sector.
8. Measure the test result immediately after printing as explained in the chapter "Assessment".
9. Take the printing disc from the tester and judge the surface on paper particles. At the beginning of the strip probably mainly dust and fluff, later mainly lint.
10. Clean the printing disc with rags and naphtha and let it dry.
11. Clean the rollers of the inking unit or use the next segment for the following test.
12. For a following test start with point 3 or 4. It is recommended to perform the test at least 5 times per sample.
13. After having finished the test, clean and store all parts as described in the manuals.
14. Make an accurate record of the conditions and the results of the test and refer to the method and printing disc used:
    14.1. W44 Printing disc with rubber 85 Shore A.
    14.2. W70 Printing disc with rubber 65 Shore A.

Assessment

1. For the quantitative picking (linting):
   Judge the damaging (fibre lifting) in the print and on the printing disc visually and describe it preferably in comparison to a self made scale or other papers.
   NOTE: The print shows dust, fluff and lint. At the beginning of the strip probably mainly dust and fluff, later mainly lint.

2. For qualitative picking:
   2.1. Place the test strip under the opening of the pick start viewer.
   2.2. Looking from above into the viewer assess the test strip and mark the point where picking begins. See fig.1.

Fig.1: IGT Pick Start Viewer PSV

►►

W44/70-for IGT AIC2-5T2000 and GST P/1/1W

3. For delamination of heavy coated paper or low weight paper board:
   3.1. Place the test strip in the U-form delamination viewer with the tested side pointing up.
   3.2. Assess the test strip and mark the point where delamination begins. See fig. 2.

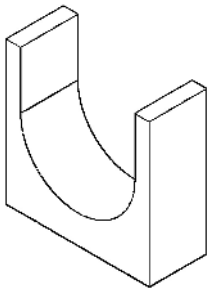

Fig. 2: IGT U-form Delamination viewer

4. For delamination of high weight paper board:
   4.1. Place the test strip in the V-form delamination viewer with the tested side pointing up.
   4.2. Assess the test strip and mark the point where delamination begins. See fig. 3.

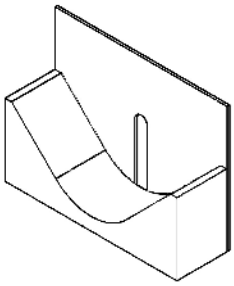

Fig. 3: IGT V-form Delamination viewer

5. Measure the distance between the starting point of the print (= the centre of the initial print contact line) and the point where picking or delamination begins at the test strip.

   NOTE 1: A single damaging >20 mm before the point where picking begin is NOT the first point of picking or delamination
   NOTE 2: If picking or delamination occurs < 20 mm from the starting point of the print the test has to be repeated at a lower speed. In case the lowest speed has been applied already a change to a lower grade of the pick test oil is necessary.
   NOTE 2: If no picking occurs or the picking occurs >180 mm from the starting point of the print, the test has to be repeated at a higher speed. In case the highest speed has been applied already a change to a higher grade of the pick test oil is necessary.

6. If desired derive the pick velocity in m/s from the velocity table (table 2) or with the formula:

$$V_p = 0.005 * V_e * d_p \quad or \quad V_d = 0.005 * V_e * d_d$$

   Herein is:
   V_p = velocity at point d (in m/s)
   V_d = delamination at point d (in m/s)
   V_e = set end speed (in m/s)
   d_p = distance from beginning of the print to beginning of picking (in mm)
   d_d = distance from beginning of print to beginning of delamination (mm)

7. Repeat points 1 thru 6 for each test strip.
8. Calculate the average and if required the standard deviation. In some cases it may be useful to mention the highest and lowest value as well.
9. Describe the appearance of the type of picking.
   NOTE: It may be useful to describe the point where picking begins. Especially in coated papers and cardboards there may occur initial deformation or delamination in the test strip, followed by loosened coating particles or fibers before the actual overall damaging of the paper surface takes place.

Notes

1. Due to the accuracy of this test it is advised to use the IGT High Speed Inking Unit 4 with water bath.
2. The maximum storage life of the ink in the original packing is 3 years, in an opened packing 1 year.
3. The results of the qualitative pick will differ from those of the IGT pick tests as described in W31, W38, W65 and W75 due to the difference in the ink used.

► *2006: In comparison to older IGT leaflets, this leaflet is valid for the AIC2-5T2000 and Global Standard Testers as mentioned.*
► *2012: This leaflet is valid for the AMSTERDAM and AE FOUR as well and contains some small text corrections.*
► *2017: This leaflet is valid for the AIC2-5T2000 and GST P/1/1W only. Quantitative picking (linting) and qualitative picking with pick tests ink are introduced. The leaflet contains some small text corrections.*

Velocity table of AIC2-5T2000 and Global Standard Tester P/1/1W

▼End speed in m/s	Distance in mm																	
	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
	Velocity in m/s																	
0.5	0,08	0,10	0,13	0,15	0,18	0,20	0,23	0,25	0,28	0,30	0,33	0,35	0,38	0,40	0,43	0,45	0,48	0,50
1.0	0,15	0,20	0,25	0,30	0,35	0,40	0,45	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85	0,90	0,95	1,00
1.5	0,23	0,30	0,38	0,45	0,53	0,60	0,68	0,75	0,83	0,90	0,98	1,05	1,13	1,20	1,28	1,35	1,43	1,50
2.0	0,30	0,40	0,50	0,60	0,70	0,80	0,90	1,00	1,10	1,20	1,30	1,40	1,50	1,60	1,70	1,80	1,90	2,00
3.0	0,45	0,60	0,75	0,90	1,05	1,20	1,35	1,50	1,65	1,80	1,95	2,10	2,25	2,40	2,55	2,70	2,85	3,00
4.0	0,60	0,80	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,40	2,60	2,80	3,00	3,20	3,40	3,60	3,80	4,00
5,0			1,25	1,50	1,75	2,00	2,25	2,50	2,75	3,00	3,25	3,50	3,75	4,00	4,25	4,50	4,75	5,00
6,0				1,80	2,10	2,40	2,70	3,00	3,30	3,60	3,90	4,20	4,50	4,80	5,10	5,40	5,70	6,00
7,0				2,10	2,45	2,80	3,15	3,50	3,85	4,20	4,55	4,90	5,25	5,60	5,95	6,30	6,65	7,00

Remark: ► Yellow back ground is valid for **AIC2-5T2000** only ► Blue figures are valid for **GST** only

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