IGT Testing Systems

Research, development and production of testing equipment for the printing and allied industries

IGT Information leaflet W65
PICKING, OFFSET, rubber 65 Shore
IGT AIC2-5T2000, Global Standard Tester P/1/1W

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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 test can be used to determine the delamination of paperboard as well.

The pick velocity is defined as the velocity at which picking starts in this test method (this is not the velocity on the printing press in practice); the pick resistance is characterized by the product of pick velocity in m/s and viscosity in Pa.s of the pick test oil used. This product is also called the VVP (Viscosity Velocity Product), which has a constant value for a certain paper or paper board. Using the VVP it is possible to compare the test results of different papers and paperboards obtained with different grades of pick test oil under certain conditions. Also it is possible to eliminate differences in temperature within certain limits.

The determination of the pick velocity and the pick resistance is one of the most widely used tests performed on the IGT printability testers.

The pick test is standardized internationally for using an aluminium printing disc in e.g. ISO 3783, Tappi 514 and in many countries as well; in the Netherlands in NEN 3095. This method has been described in W31.

The pick test with the rubber covered printing disc is used specially for internal testing within paper and paperboard mills. This information leaflet W65 describes the method with a printing disc with rubber of 65 Shore A, W75 with a printing disc of 85 Shore A and W38 with a grooved disc (Westvaco method).

Principle:

Using the IGT-printability tester a print is made on the paper to be tested with pick test oil at an increasing speed. The first damaging of the print is observed and from a table the speed where picking begins is read. The VVP is calculated as the product of the speed where picking begins and the viscosity of the pick test oil used.

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 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 oil and the equipment during >6 hours in the standard atmosphere.
2. 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.
3. For AIC2-5T2000 only:
   - 3.1. Adjust the printing force of the upper printing disc shaft to 625 N and pay attention for the right backlash. See W100. NOTE: This type of printing disc (ø 66 mm) is not the standard type for the AIC2-5T2000; for that reason the backlash must be adjusted.
   - 3.2. Adjust the desired printing speed in the increasing speed mode. (◢).
4. For GSTP/1/1W only:
   - 4.1. Select the menu "Picking Offset" in the display.
   - 4.2. Adjust the desired end speed.
5. Check the functioning of the tester following the instructions in the chapter "Execution".
6. Fill the ink pipette with the desired IGT pick test oil.

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
3	(Top roller with 4 segments for conventional inks)	(466.003.003)
4	IGT Ink pipette	408.000.200
5	Printing disc with coated rubber, 65 Shore A, 50 mm ø 66 mm.	402.087
6	Pick test oil, low viscosity	404.004.010
	or pick test oil medium viscosity	404.004.020
	or pick test oil high viscosity	404.004.030
7	Pick Start Viewer (115 or 230 V)	441.000
8	Velocity table	437.005
9	Thermometer, accuracy 0.1°C or F	
10	Ruler	
11	Strips of paper to be tested, preferable 55 x 340 mm, 5 strips per sample	
12	Lint free rags	
13	Cleaning naphtha	

Printing force	625 N
Printing speed	Increasing, end speed at choice
Pick test oil film thickness	8.0 µm (0.35 cm3)

► The numbers 1 thru 8 are available at IGT Testing Systems.
► The numbers 5 thru 8 can be obtained as Pick Testing Set (rubber 65 Shore A) for AIC2-5T2000, GST-P/1/1-W, article number 441.000.710.065.

•*This leaflet contains article numbers per January 1st, 2006*•.

7. Adjust the High Speed Inking Unit 4 with the following settings:
   - 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
   - 2nd distribution time: 10 s
   - 2nd distribution speed: 0.3 m/s
   - Inking time printing discs: 30 s
8. Check the functioning of the High Speed Inking Unit.

Execution

1. Apply (0.35 cm3) of pick test oil to the inking unit or add 0.09 cm3 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. Adjust the printing speed of the tester, if necessary.
4. Attach a test strip in the front clamp of the sector.
5. Take the printing disc from the inking unit and place it on the (upper) printing disc shaft of the tester.
6. Make a print (See W100)

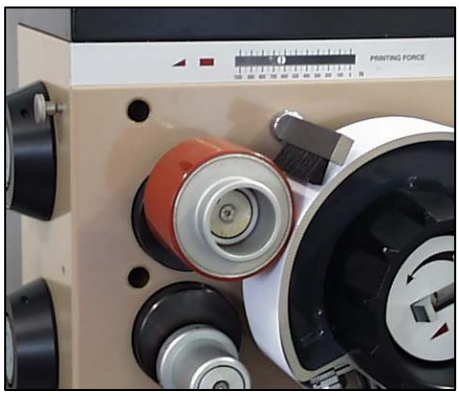

Fig. 1: picking with AIC2-5T2000

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7. Remove the test strip from the sector.
8. Measure the temperature with an accuracy of 0.1°C or F.
9. Measure the pick test result immediately after printing as explained in chapter "Assessment.
10. Take the printing disc from the shaft and clean it with rags and naphtha.
11. Clean the rollers of the inking unit or add a little pick test oil or use the next segment for the following test.
12. Repeat points 1 thru 11 for every test strip. 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 results of the tests.

Assessment

1.1. For picking: place the test strip under the opening of the pick start viewer. Looking from above into the viewer assess the test strip and mark the point where picking begins.

Fig.2 IGT Pick Start Viewer PSV

1.2. For delamination: bend the test strip towards the tested side in such a way that the test strip is a part of a circle with a diameter of 80 mm. Assess the test strip and mark the point where delamination begins.

2. 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.

   NOTE 1: If picking or delamination occurs within 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 picking occurs only at the end of the test strip 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.

3. Derive the pick velocity in m/s from the velocity table belonging to the printability tester (see note 2 and table 2) or with the formula:

$$Vp = 0.005 * Ve * d$$

herein is: Vp = velocity at point d (in m/s)
Ve = set end speed (in m/s)
d = distance from beginning of the print to beginning of picking or delamination (in mm)

4. If desired, calculate the Velocity Viscosity Product (VVP) in N/m with the formula:

$$VVP = Vp * \eta$$

Herein is: Vp = velocity at point d (in m/s)
η = viscosity in Pa.s at temperature T (see table 1)

5. Repeat points 1 thru 4 for each test strip.
6. 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.
7. 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 fibres before the actual overall damaging of the paper surface takes place.

Notes:

1 The test results of the AIC2-5T2000, AIC2-5 and Global Standard Tester P, 1 and 1-W compare well with one another, on the condition that they have been carried out under the same conditions.

2 By using modern, very accurate measuring systems the velocity table for the Global Standard Testers has been changed a little bit in comparison to the one of the AIC2-5 until August 2001. This new table can be used for the AIC2-5 as well. See table 2.

3 The viscosity of the pick test oils is temperature dependent. The Velocity Viscosity Product (VVP) may be used to compensate these differences. See table 1.

Table 1: Viscosity (Pa.s) of pick test oils

°C	lv	mv	hv
20	22.5	68	145
20,5	21.7	65,3	139,2
21	20.8	62,7	133,9
21,5	20	60	127,5
22	19.2	57,4	121,7
22,5	18.3	54,7	115,9
23	17,5	52	110
23,5	16,8	50	105,5
24	16	48	101
24,5	15,3	46	96,5
25	14,5	44	92

lv = low viscosity
mv = medium viscosity
hv = high viscosity

4 The printing disc 402.087 does not have the standard diameter for the AIC2-5T2000. For that reason the back lash must be adjusted.

5 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 the older IGT leaflets, a new velocity table is included.*
► *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.

Table 2: velocity table

▼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

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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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