

## 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 with the VVP. If only one test is performed the Westvaco Rod Applicator gives a time-saving, however, a series of tests may be carried out sooner following the IGT method (see W31, W65 and W75). In both cases a test strip is printed on with IGT pick test oil at an increasing speed. In the IGT method a printing disc is inked in on the IGT inking unit; with the Westvaco Rod Applicator ink is applied by means of a rod onto the printing disc, which is provided with a groove of a specific depth.

The Westvaco method can be carried out with an integrated system on the GST1-W or with a special inker on the AIC2-5T2000 and GST P and 1.

## Principle

The Westvaco Rod Applicator exists of a printing disc, in which a 15 µm deep groove has been ground, a doctor rod in a doctor rod holder. The doctor rod is pressed against the grooved disc by means of a lever system. By applying a small amount of pick test oil to the disc and subsequently rotating the disc the groove is filled. A print is made on a strip of the paper to be tested 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 and Global Standard Tester follow the instructions of the manual, 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. Mount the packing on the sector. See W100.
4. For AIC2-5T2000 only:
  - 4.1. Adjust the printing force of the upper printing disc shaft to 700 N and pay attention for the right backlash. See W100.
  - 4.2. Adjust the desired printing speed in the increasing speed mode. (▲).
5. For GST-P/1 only:
  - 5.1. Select the menu "Options" in the display.
  - 5.2. Change "Fixed Menu" from "ON" into "OFF".
  - 5.3. Select the menu "Picking IGT" in the display.
  - 5.4. Adjust the printing force into 700 N.



Fig. 1: Westvaco system on GST1-W

- 5.5. Adjust the desired end speed.

## IGT information leaflet W38 PICKING, Westvaco method IGT AIC2-5T2000, Global Standard Tester P/1/1-W Version: July 2006

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 with integrated Westvaco accessory ***** <u>For AIC2-5T2000, GST P/1 only:</u>	710.000.000 470.000.000 410.000.000 415.000.000
2	Westvaco inker	413.060
3	Printing disc, grooved, 20 mm, groove depth 15 µm and groove width 10 mm ***** <u>For GST 1W only:</u>	402.320.710
4	Printing disc, grooved, 20 mm, groove depth 15 µm and groove width 10 mm	402.320.415
5	Cartridges, empty	160.200
6	Hose and coupling ***** <u>For AIC2-5T2000, GST P/1/1W:</u>	160.300
7	Pick test oil, low viscosity or pick test oil medium viscosity or pick test oil high viscosity	404.004.010 404.004.020 404.004.030
8	Packing, paper, 55 mm	404.001.005
9	IGT Pick Start Viewer	441.000
10	Velocity table	437.005
11	Thermometer, accuracy of 0.1 °C or F	
12	Ruler	
13	Strips of paper to be tested, preferable 55 x 340 mm, 5 strips per sample	
14	Lint free rags	
15	Cleaning naphtha	
Printing force		700 N
Printing speed		Increasing, end speed at choice
<ul style="list-style-type: none"> <li>▶ The numbers 1 thru 10 are available at IGT Testing Systems.</li> <li>▶ The numbers 2, 3 and 8 thru 10 can be obtained as Westvaco Rod Applicator Set for AIC2-5T2000 and GST P/1, article number 413.000.710</li> <li>▶ The numbers 4 thru 10 are delivered as the standard Westvaco Rod Applicator accessory together with the Global Standard Tester 1-W.</li> </ul> <p style="text-align: center;">• This leaflet contains article numbers per January 1st, 2006 •</p>		

6. For GST 1-W with integrated Westvaco system only:
  - 6.1. Select the menu "Picking Westvaco" in the display.
  - 6.2. Select the desired end speed.
  - 6.3. Place the printing disc on the printing disc shaft.
  - 6.4. Slide the rod holder with the rod downward and pointing to the right on the two pins of the mounting plate.
7. Check the functioning of the tester following the instructions in the chapter "Execution".
8. Slide the rod into the rod holder.
9. For Westvaco inker for AIC2-5T2000 and GSTP/1 only:
  - 9.1. Slide the rod holder with the rod upward and pointing to the right on the pin of the Westvaco inker and fasten it with the screw.
  - 9.2. Move the handle under the rod holder to the left, so that the rod is in the lower position.
10. Clean the printing disc with rags and naphtha.



## Execution

1. Adjust the printing speed, if necessary.
2. Attach a test strip in the front clamp of the sector.

3. For Westvaco inker for AIC2-5T2000, GST P/1 only:
  - 3.1. Place the printing disc on the printing disc shaft of the inker.
  - 3.2. Apply some drops of the pick test oil onto the printing disc.
  - 3.3. Move the handle of the rod holder to the right so that the rod has contact with the printing disc.
  - 3.4. Place the handle in the grip of the disc and make some rotations of the disc in clockwise direction so that the groove of the disc is filled with the oil.
  - 3.5. Move the handle of the rod holder to the left so that the rod is in the lower position and has no contact with the disc.
  - 3.6. Take the disc from the inker and place it on the printing disc shaft of the tester.
4. Make a print. See W100.
5. Remove the test strip from the tester.
6. Measure the temperature with an accuracy of 0.1 °C or F.
7. Measure the pick test result immediately after printing as explained in the chapter "Assessment".
8. Take the printing disc from the shaft and clean it with rags and naphtha.
9. Repeat points 1 thru 8 for every test strip. It is recommended to perform the test at least 5 times per sample.
10. After having finished the tests, clean and store all parts as described in the manual and grease the printing disc with acid free Vaseline
11. Make an accurate record of the conditions and the results of the test.

**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. 3: Pick start viewer

- 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. 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.
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 (see note 2 and table 2) belonging to the printability tester or with the formula:

$$V_p = 0.005 * V_e * d$$

herein is:  $V_p$  = velocity at point d (in m/s)  
 $V_e$  = 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:

$$VVP = V_p * \eta$$

Herein is:  $V_p$  = velocity at point d (in m/s)  
 $\eta$  = 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 2001. This new table can be used for the AIC2-5 as well.
3. The viscosity of the pick test oils is temperature dependent. The Velocity Viscosity Product (VVP) may be used to compensate these differences.

**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 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

5,0		1,25	1,5 0	1,75	2,0 0	2,25	2,5 0	2,75	3,0 0	3,25	3,5 0	3,75	4,0 0	4,25	4,5 0	4,75	5,0 0	
6,0			1,8 0	2,10	2,4 0	2,70	3,0 0	3,30	3,6 0	3,90	4,2 0	4,50	4,8 0	5,10	5,4 0	5,70	6,0 0	
7,0			2,1 0	2,45	2,8 0	3,15	3,5 0	3,85	4,2 0	4,55	4,9 0	5,25	5,6 0	5,95	6,3 0	6,65	7,0 0	
Remark:	Yellow back ground is valid for <b>AIC2-5T2000</b> only									Blue figures are valid for <b>GST</b> only								