

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. 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, 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.

Principle

The Westvaco Rod Applicator exists of a printing disc, in which a 15 µm deep groove has been ground, and a doctor rod, both mounted on an IGT printability tester. 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. Using this disc 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 AIC2-5 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 paper packing on the sector. See W100.
4. Place the longest side of mounting pin in the bottom accessory hole.
5. Place the mounting attachment with the thick shaft in the middle accessory hole and place the bottom end of the

attachment around the mounting pin.

6. Fasten the mounting attachment and the mounting pin with the set screws in the house of the tester.
7. Place the grooved printing disc on the upper printing disc shaft.

Materials / testing conditions		
1	IGT AIC2-5 from type AA	414
2	Printing disc, grooved, 20 mm, groove depth 15 µm and groove width 10 mm	402.020.xxx
3	Mounting attachment	xxxx
4	Mounting pin	xxxx
5	Long crank	413.055
	Pick test oil, low viscosity	404.004.010
	or pick test oil medium viscosity	404.004.020
6	or pick test oil high viscosity	404.004.030
7	Packing, paper, 55 mm	404.001.005
8	Pick Start Viewer	441.000.xxx
9	Velocity table	437.005
10	Thermometer, accuracy of 0.1 °C or F	
11	Ruler	
	Strips of paper to be tested, preferable 55 x 340 mm, 5 strips per sample	
12		
13	Lint free rags	
	Cleaning naphtha	
Printing force		700 N
Printing speed		Increasing, end speed at choice
The numbers 1 thru 9 are available at IGT Testing Systems. The numbers 2 thru 9 can be obtained as Westvaco Rod Applicator for AIC2-5 from type AA, article number xxxxxxxxx		

8. Adjust the printing force of the upper printing disc shaft to 700 N and pay attention for the right backlash. See W100.
9. Adjust the speed to increasing speed (▲), end speed at choice.
10. Check and if needed, move the slide in front of the sector into the increasing speed mode (▲).
11. Slide the rod into the rod holder.
12. Slide the rod holder with the rod downward and pointing to the right on the two pins of the mounting plate.
13. Clean the printing disc with rags and naphtha.
14. Check the functioning of the Westvaco system with AIC2-5 following the instructions in the chapter "Execution".

Execution

1. Place the printing disc on the printing disc shaft.
2. Place the lever with counter-weight and movable rod holder with rod in it on



- the pin of the mounting attachment and rest the rod against the grooved disc .
- Adjust the printing speed, if necessary.
- W38 for IGTAIC2-5 from type AA**
- Attach a test strip in the front clamp of the sector.
 - Turn the sector into starting position. Place the crank on the handle of the grooved disc.
 - Apply a small amount of pick test oil on the disc.
 - Rotate the grooved disc a number of times counterclockwise, in order to distribute the pick test oil on the disc.
 - Remove the crank from the disc.
 - Remove the lever with weight and rod holder from the pin of the mounting attachment.
 - Turn the grooved disc so, that the place of the doctor rod just before lifting is positioned just below the point of contact between disc and sector.
 - Press one of the side buttons to start the motor.
 - Move the printing disc into printing position against the test strip.
 - Press the other side button as well to make a print.
 - After the sector has stopped, release the side buttons.
 - Move the printing disc out of printing position.
 - Remove the test strip from the sector.
 - Measure the pick test result immediately after printing as explained in the chapter "Assessment" (also see notes 3.1 and 3.2).
 - Measure the temperature with an accuracy of 0.1 °C or F.
 - Take the printing disc from the shaft and clean it with rags and naphtha.
 - Repeat points 1 thru 19 for every test strip.
 - After having finished the tests, clean and store all parts as described in the manual and grease the printing disc with acid free vaseline.
 - Make an accurate record of the conditions and the results of the test.

Assessment

- For picking:** place the test strip under the opening of the pick start viewer, looking from above into

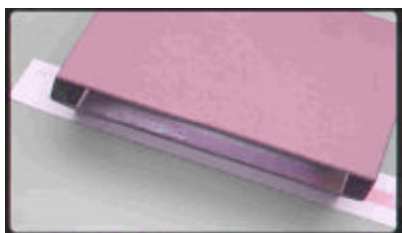


Fig. 2: Pick start viewer

- the viewer assess the test strip and mark the point where picking begins.
- 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.
 - Derive the pick velocity in m/s from the velocity table belonging to the printability tester or with the formula:

$$V_p = 0.005 \times V_e \times d$$
 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.

- If desired, calculate the Velocity Viscosity Product (VVP) in N/m with the formula: $VVP = V_p \times \eta$
 Herein is: **V_p** = velocity at point d (in m/s)
 η = viscosity in Pa.s at temperature T
 (see table 1)
- Repeat points 1 thru 4 for each test strip.
- 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.
- Describe the appearance of the type of picking. See note 5.

Notes:

- * The test results of the AIC2-5 and Global Standard Tester compare well with one another, on the condition that they have been carried out under the same conditions.
- * By using modern, very accurate measuring systems the velocity table for the AIC2-5 has been changed a little bit in comparison to the one of the AIC2-5 until 2001.
- 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.
- 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.
- * 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

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

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	0.075	0.10	0.125	0.15	0.175	0.20	0.225	0.25	0.275	0.30	0.325	0.35	0.375	0.40	0.425	0.45	0.475	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	0.225	0.30	0.375	0.45	0.525	0.60	0.675	0.75	0.825	0.90	0.975	1.05	1.125	1.2	1.275	1.35	1.425	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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