

Introduction:

In offset printing, the fact that water as well as ink are transferred to paper may well lead to complications. Especially in process printing, where the paper is wetted several times, water may affect ink transfer because it changes the surface structure of the paper. For example, it is possible the water is weakening the paper surface to such an extent that paper particles are pulled off from the surface by the tack of the ink. This phenomenon is known as wet pick. Another possible effect of water is that the paper does not accept ink because the water did not completely penetrate into the paper. This is called wet repellence. Both phenomena may occur simultaneously and sometimes it is difficult to differentiate between them, because they both appear as white spots in the print.

During offset printing a moisture film of about 0.2 to 0.3 µm (0.2 to 0.3 g/m²) per colour is applied to the paper. To investigate and check a paper for wet pick and wet repellence a water film of this thickness is needed and sometimes a thicker water film to imitate the multi colour process.

The occurrence of wet pick and wet repellence is also influenced by the time interval between damping and printing. This is the case in multi colour printing presses. The time lapse between two colours depends on printing speed and the distance between printing units. In practice this time is dependent to the type of printing press and varies between about 0.03 and 1 s.

Principle:

The damping unit consists of a screened damping disc with doctor blade and a printing disc. An excess of damping fluid is applied to the disc, which is then metered by a doctor blade. The amount of fluid remaining on the damping disc is transferred to the paper, which is printed on with a standard ink, if required after the set time interval. After this the printed sample is checked on wet pick or wet repellence. There are damping discs available for the application of moisture films of 0.25, 0.5 and 1.0 µm.

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 Global Standard

Tester, the High Speed Inking Unit 4 and the ink pipette follow the instructions of the manuals, IGT

information leaflet W100 and the displays accurately.

- Handle the samples carefully.



Fig. 1: Damping unit

Preparation:

1. Condition the papers, the ink and the equipment during >6 hours in the standard atmosphere.

Materials / testing conditions		
1	IGT AIC2-5 from type AA	414
2	IGT High Speed Inking Unit 4 (with 4 segmented top roller for conventional inks)	466.410.100 (466.003.003)
3	Mounting set for damping unit	xxxxxx
4	Damping disc for 0.25 µm of water or damping disc for 0.5 µm of water or damping disc for 1.0 µm of water	402.354.002 402.354.005 402.354.010
5	Doctor blades for damping unit	xxxxxx
6	Printing disc, covered with coated rubber of 85 Shore A, 50 mm	402.333
7	Packing, paper, 55 mm	404.001.005
8	Huber pick test ink, low tack or Huber pick test ink, medium tack or Huber pick test ink, high tack or Huber pick test ink, very high tack	404.800.001 404.800.002 404.800.003 404.800.004
9	Strips of art paper, code Ka, 55 mm	404.009.004
10	IGT ink pipette	408.200
11	Strips of paper to be tested, preferable 55 x 340 mm, 3 strips per sample	
12	Damping fluid (water or water with additives)	
13	Densitometer (if required)	
14	Cotton pads	
15	Lint free rags	
16	Ethanol	
17	Cleaning naphtha	
Damping- and printing force		625 N (preset)
Damping- and printing speed		at choice
Time between damping and printing		at choice
Ink film thickness		3.2 µm
The numbers 1 thru 11 are available at IGT Testing Systems. The numbers 3 thru 9 can be obtained as Wet Pick and Wet Repellence Set for AIC2-5 from type AA, article number xxxxxx. Note the damping disc and ink to be used!		

2. Cut the paper strips (preferable 55 x 340 mm, 3 strips per sample) and mark them with top and/or bottom side, machine and/or cross direction and a code for the type of paper.
3. Mount the top three layers of a paper packing on the sector. See W100.
4. Adjust the printing force for both printing disc shafts to 625 N and pay attention for the right backlash for both shafts. See W100.
5. Adjust the speed to constant (□), speed at choice.
6. If needed, adjust the interval time, time at choice.
7. Check and if needed, move the slide in front of the sector into the constant speed mode (□).
8. Mark the printing disc with a line or dot at the core to use that point as the starting point of the disc by making a print.
9. Mount a doctor blade in the doctor blade holder. See W100.
10. Place the mounting shaft with the thick part into the top accessory hole of the tester until the black rubber O-ring is touching the housing of the tester; fasten the mounting shaft with the socket head screw on the left hand side of the tester.
11. Place the supporting plate with the pin pointing out on the thicked part of the mounting shaft and against the O-ring. The slanting side of the supporting plate is to rest onto the black excenter-shaft of the top printing disc retainer and fasten it with the socket-head screw in the plate.
12. If not present, place the damping disc on the top shaft.
13. Slide the doctor blade holder with the blade in it on the mounting shaft and against the thicked part of the shaft. And lower it on the damping disc.

14. Slide the weight on the mounting shaft and join it with the doctor blade holder resting on the damping disc.
15. Turn the blade holder and weight anticlockwise till it is stopped by the pin of the supporting plate.
16. Take off the damping disc from the shaft.
17. Clean the damping disc with a towel with ethanol.
18. Place the damping disc on the top shaft of the tester.
19. Cut a piece of cotton of about 5 x 50 mm, immerse it into the damping fluid and then place it on the damping disc, turn the blade holder and weight carefully clockwise to rest the doctor blade on the damping disc and turn the damping disc clockwise. The damping disc must be wetted.
20. Place a printing disc on the bottom shaft of the tester.
21. Check the functioning of the AIC2-5 following the instructions in the chapter "Execution".
22. Fill the ink pipette with the pick test ink.
23. Adjust the High Speed Inking Unit with the settings mentioned in note 2.
24. Check the functioning of the High Speed Inking Unit.

Execution:

1. If required, adjust the printing speed and the interval time.
2. Attach a test strip into the front clamp of the sector.
3. Apply 3.2 µm of ink to the inking unit and distribute the ink. See note 3 or the manual of the inking unit.
4. Place a printing disc on the printing disc shaft of the inking unit and ink the printing disc during the preset time.
5. Take the printing disc from the inking unit and place it on the bottom printing disc shaft of the tester.
6. Rotate the printing disc with the marking point closest to the sector.
7. Turn the sector into starting position.
8. Press one of the side buttons to start the motor.
9. Move the damping and printing disc into printing position against the test strip.
10. Press the other side button as well to make a print.
11. After the sector has stopped in the end position, release the side buttons.
12. Move both discs out of printing position.
13. Remove the test strip from the sector.
14. Mount a strip of Ka-paper on the sector.
15. Turn the sector into starting position.
16. Adjust the speed to 1 m/s and switch off the interval timer.
17. Rotate the printing disc into the starting position of the last print.
18. Press one of the side buttons to start the motor.
19. Move only the printing disc into printing position against the test strip.
20. Press the other side button as well to make a print.
21. After the sector has stopped in the end position, release the side buttons.
22. Move the disc out of printing position.
23. Remove the test strip from the sector
24. Measure the test result as described in the chapter "Assessment".

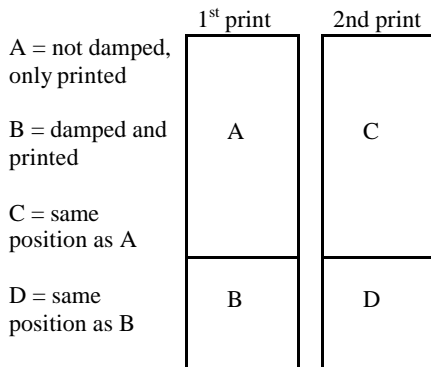


Fig. 2: Printed strips

25. Take the printing disc from the shaft and clean it with rags and naphtha
26. Clean the rollers of the inking unit or use the next segment for the following test.
27. Repeat points 1 thru 26 for the next test strip.
28. After having finished the tests, clean and store all parts as described in the manuals.
29. Make an accurate record of the conditions and the results of the test.

Assessment:

1. VISUALLY (d = density)

* **No wet pick / no wet repellence:** dA = dB and dC = dD. There are no paper particles on the printing disc after the first print.

* **Wet repellence:** dA > dB and dC < dD. There are no paper particles on the printing disc after the first print.

* **Wet pick:** dA > dB and dC > dD. There are paper particles on the printing disc after the first printing.

2. DENSITOMETRICALLY

After the ink has dried measure the density of the areas A, B, C and D (dA, dB, dC and dD). The drying time of the Huber ink is about 30 minutes. Calculate the wet pick and wet repellence with the following formulas:

$$\text{Wet pick + wet repellence} = \frac{dA - dB}{dA} \times 100\% \quad (a)$$

$$\text{Wet pick} = \frac{dC - dD}{dC} \times 100\% \quad (b)$$

$$\text{Wet repellence} = \frac{dA - dB}{dA} - \frac{dC - dD}{dC} \quad (c)$$

Interpret the results from this calculation as follows:

* **No wet pick / no wet repellence:** (a) = 0

* **Wet pick:** (b) > 0. The higher the value, the stronger the wet pick.

* **Wet repellence:** (c) > 0. The higher the value, the more wet repellence

Notes:

1. * The test results of the AIC2-5 and Global Standard Tester 2 compare well with another on the condition that the tests have been carried out under the same testing conditions.
2. * It is advised to use the following settings for the High Speed Inking Unit 4:
 - Water bath : 23.0° C (73.4° F)
 - Top roller : 4-segmented, rubber for conventional inks
 - Mode : 2
 - Starting time : 5 s
 - Distribution time : 10 s
 - Distribution speed : 1.2 m/s
 - Inking time printing discs: 5 s
3. * To reach an ink film thickness of 3.2 µm on the High Speed Inking Unit 4 with a 4-segmented top roller a quantity of 0.138 cm³ has to be applied. It is not advised to add some ink after a test.
4. * The interval times between damping and printing in the different menus are (i = set interval time):
 - 4.1 **1 field (no extra interval time)**
By printing without an extra time interval, the interval times at different speeds are:
0.35 s at 0.2 m/s 0.07 s at 1 m/s 0.023 s at 3 m/s
0.1 s at 0.7 m/s 0.035 s at 2 m/s
 - 4.2 **2 fields (interval times)**
The 1st interval time is dependent to the speed (0.2 m/s gives an interval time of 0.35 s and 0.7 m/s gives 0.1 s), the 2nd interval time is set with the interval timer.
5. * The maximum storage life of the Pick test ink in the original, closed packing is 1 year; in an opened packing 3 months.

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.