

Introduction:

In offset printing, the fact that water as well as ink is 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/m^2) 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.

The test can be carried out with the Global Standard Tester 2 with the damping unit.

This leaflet describes the method with a printing disc with rubber of 85 Shore A, W66 with a disc with rubber of 65 Shore A.

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 $50 \pm 2\%$ rh.
- For the operation of the AIC2-5T2000, Global Standard Tester, High Speed Inking Unit 4 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 ink and the equipment during >6 hours in the standard atmosphere.
2. Cut the paper strips (preferable 55 x 340 mm, 3 strips per sample per test) and mark them with top and/or bottom side, machine and/or cross direction and a code for the type of paper.
3. For AIC2-5T2000 only:
 - 3.1 Mount the top three layers of a paper packing on the sector. See W100
 - 3.2 Adjust the printing force for both printing disc shafts to 625 N and pay attention for the right backlash for both shafts. See W100.
 - 3.3 Adjust the desired printing speed in the constant speed mode (□).
 - 3.4 If desired, adjust an interval time.



Fig.1: Damping unit AIC25T2000



Fig.2: Damping unit GST2

Materials / testing conditions

1	IGT AIC2-5T2000	710.000.000
	or IGT Global Standard Tester 2	412.000.000
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
	<u>For AIC2-5T2000 only:</u>	
5	Mounting shaft	450.054.710
6	Doctor blade holder	435.054.710
7	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 *****	402.354.002.710 402.354.005.710 402.354.010.710
	<u>For GST2 only:</u>	
8	Doctor blade holder	435.031.412
9	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	402.354.002.412 402.354.005.412 402.354.010.412
10	Cartridge for damping fluid	160.200
11	Hoses and coupling	160.300
12	Sector with clamps *****	361.000.000
	<u>For AIC2-5T2000 and GST2:</u>	
13	Doctor blades for damping unit	180.431.710.001
14	Printing disc, covered with coated rubber of 85 Shore A, 50 mm, \varnothing 66.5 mm	402.377
15	Packing, paper, 55 mm	404.001.005
16	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
17	Strips of art paper, code Ka, 55 mm *****	404.009.025
18	Strips of paper to be tested, preferable 55 x 340 mm, 3 strips per sample per test	
19	Damping fluid (water or water with additives)	
20	Densitometer (if required)	
21	Cotton pads	
22	Lint free rags	
23	Ethanol	
24	Cleaning naphtha	

Damping- and printing force	625 N
Damping- and printing speed	Constant, speed at choice
Time between damping and printing	At choice
Ink film thickness (volume)	3.2 μm (0.138 cm^3)

- The numbers 1 thru 17 are available at IGT Testing Systems.
- The numbers 5, 6, 7 and 13 thru 17 can be obtained as Wet Pick and Wet Repellence Set for AIC2-5T2000, article number 435.000.710.032.
- The numbers 8 thru 11 and 13 thru 17 can be obtained as Wet Pick and Wet Repellence Set for Global Standard Tester 2, article number 435.000.412.032.
- Note the damping disc and ink to be used!
► *This leaflet contains article numbers per January 1st, 2006* ◄.

- 3.5 Place the adapting device with the thick shaft into the top accessory hole of the tester in such a way that the flat side in this shaft is pointing to the left.
- 3.6 Fasten the device with the screw at the left hand side of the tester.
- 3.7 Mount a doctor blade in the doctor blade holder. See W100.
- 3.8 Remove the screw from the adapting device.
- 3.9 Slide the blade holder device with the blade downward and the weight pointing to the right on the adapting device, turn it anticlockwise until stop and replace the screw in the adapting device to prevent sliding off the blade holder device from the shaft.
4. For GST2 only:
 - 4.1 If not present on the Global Standard Tester, mount the sector with clamps. See W100.
 - 4.2 Mount the top three layers of a paper packing on the sector. See W100

- 4.3 Select the menu “Wet pick” in the display
- 4.4 Select one of the sub menus in the display:
 - 4.4.1 “wet pick 2 fields” for a test strip with 2 different damped and printed fields
 - 4.4.2 “wet pick 4 fields” for a test strip with 4 different damped and printed fields
 - 4.4.3 “pre-wet pa 3x-4f” for a test strip where the paper has been pre-wetted for three times and the strip is damped and printed with 4 different fields
 - 4.4.4 “pre-wet disc 3x-2f” for a test strip where the damping disc has been pre-wetted for three times and the strip is damped and printed with 2 different fields
 - 4.4.5 “pre-wet disc 3x-4f” for a test strip where the damping disc has been pre-wetted for three times and the strip is damped and printed with 4 different fields
- 4.5 In the case the sector makes more than one revolution during damping and printing, take off the brush from the tester.
- 4.6 Mount a doctor blade in the doctor blade holder. See W100.
- 4.7 Slide the doctor blade holder with the doctor blade downward and pointing to the right on the two pins of the mounting plate.
- 4.8 Fill a cartridge with the damping fluid and mount it on the Global Standard Tester. See W100.
5. Clean the desired damping disc with a towel with ethanol.
6. Place the damping disc on the top shaft of the tester.
7. Cut a piece of cotton of about 5 x 50 mm and place it on the damping disc, just behind the doctor blade
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. Place the printing disc on the bottom shaft of the tester.
10. Check the functioning of the tester following the instructions in the chapter “Execution”.
11. Fill the ink pipette with the desired pick test ink.
12. Adjust the High Speed Inking Unit with the following settings:
 - 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
13. Check the functioning of the High Speed Inking Unit.

Execution:

1. Adjust the printing speed and the interval time if required.
For GST only: See W100 for interval times.
2. Attach a test strip into the front clamp of the sector.
For GST only: if the menu to pre-wet the paper is used, fasten the end of the test strip on the sector with tape.
3. Apply 0.14 cm³ of ink to one segment of the 4-segmented top roller of the inking unit and distribute the ink. NOTE: It is not advised to add some ink after a test.
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. For AIC2-5T2000 only:
 - 6.1 Insert the piece of cotton into the damping fluid and place it on the damping disc, just behind the blade.
 - 6.2 Turn the sector into starting position.
 - 6.3 Make a print. See W100.
7. For GST only:
 - 7.1 Select “Make print” in the display.
 - 7.2 Press the side buttons to move the sector into the starting position and to move the doctor blade holder downward.
 - 7.3 Release the side buttons.

- 7.4 Press one of the buttons 1- 4 to apply or to add a few drops of damping liquid on the felt of the damping unit.
- 7.5 Press the side buttons to damp and print the paper.
8. Take off the test strip from the sector.
9. Mount a strip of Ka-paper on the sector.
10. Rotate the printing disc into the starting point of the last print.
11. For AIC2-5T2000 only: Make a second print of the printing disc without damping.
12. For GST only: Press the side buttons to move the sector into the starting position and to make a second print of the disc without damping.
13. Take off the printed paper strip from the sector.
14. Measure the test result as described in the chapter “Assessment”.
15. Take the printing disc from the shaft and clean it with rags and naphtha
16. Clean the rollers of the inking unit or use the next segment for the following test.
17. Repeat points 1 thru 16 for the next test strip. It is recommended to perform the test at least 3 times per sample.
18. If desired repeat the points 1 thru 17 for other testing conditions.
19. For GST only: After having finished the tests, press “Enter” to lift the doctor blade from the damping disc.
20. Clean and store all parts as described in the manuals.
21. Make an accurate record of the conditions and the results of the test.

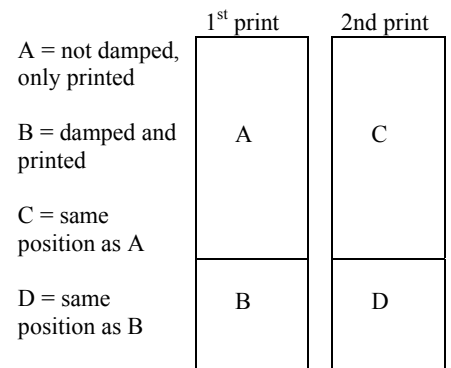


Fig. 3: Printed strips of a 2-field print

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 (d = density)

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:

$$* \text{Wet pick + wet repellence} = [(dA - dB) / dA] * 100\% \quad (a)$$

$$* \text{Wet pick} = [(dC - dD) / dC] * 100\% \quad (b)$$

$$* \text{Wet repellence} = (a) - (b) \quad (c)$$

The results of this calculation mean the following::

- **No wet pick / no wet repellence:** (a) = 0
- **Wet pick:** (b) > 0. A higher value = more wet pick.
- **Wet repellence:** (c) > 0. A higher value = more wet repellence

Notes:

1. The test results of the AIC2-5T2000, 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. The maximum storage life of the Pick test ink in the original, closed packing is 1 year; in an opened packing 3 months.

► *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.