

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/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 dampening 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 AIC2-5T2000 and Global Standard Tester 2, both with the dampening unit.

This leaflet describes the following methods:

- W32 Printing disc with rubber 85 Shore A.
- W66 Printing disc with rubber 65 Shore A.

Principle

The dampening unit consists of an engraved dampening disc with doctor blade and a printing disc. An excess of dampening fluid is applied to the disc, which is then metered by a doctor blade. The amount of fluid remaining on the dampening 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 dampening 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 \pm 1,0 $^{\circ}\text{C}$ and 50 \pm 2% rh.
- For the operation of the AIC2-5T2000 and Global Standard Tester, 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 ink and the equipment during >6 hours in the standard atmosphere.
2. Cut the paper strips 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 packing on the sector.

NOTE: Only the top three layers of a paper packing are used.

Mount them on the sector. See W100.

4. For AIC2-5T2000 only:

- 4.1. Adjust the printing force for both printing disc shafts to 625 N and pay attention for the right back lash for both shafts. See W100.
- 4.2. Adjust the desired printing speed in the constant speed mode (\square).
- 4.3. If desired, adjust an interval time.
- 4.4. 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.
- 4.5. Fasten the device with the screw at the left hand side of the tester.
- 4.6. Mount a doctor blade in the doctor blade holder. See W100.
- 4.7. Remove the screw from the adapting device.

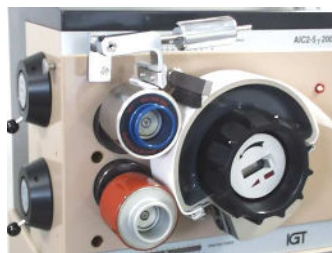


Fig.1: Dampening unit
AIC2-5T2000



Fig.2: Dampening unit GST2

Materials / Testing conditions

1	IGT AIC2-5T2000 or IGT Global Standard Tester 2	710.000.000 412.000.000
2	IGT High Speed Inking Unit 4 or IGT inking unit AE FOUR	466.000.710 465.000.710
3	Top roller with 4 segments for conventional inks	466.003.003
4	IGT ink pipette	408.000.200

For AIC2-5T2000 only:		
5	Mounting shaft	450.054.710
6	Doctor blade holder	435.054.710
7	Dampening disc for 0,25 μm of water or dampening disc for 0,5 μm of water or dampening disc for 1,0 μm of water	402.354.002.710 402.354.005.710 402.354.010.710
8	Printing disc, rubber 85 Shore A, 50 mm, (W32) or printing disc, rubber, 65 Shore A, 50 mm (W66)	402.377 402.687

For GST2 only:		
9	Doctor blade holder	435.031.412
10	Dampening disc for 0,25 μm of water or dampening disc for 0,5 μm of water or dampening disc for 1,0 μm of water	402.354.002.412 402.354.005.412 402.354.010.412
11	Printing disc, rubber 85 Shore A, 50 mm (W32) or printing disc, rubber, 65 Shore A, 50 mm (W66)	402.634 402.687

12	Doctor blades for dampening unit	180.431.710.001
13	Packing, paper, 55 mm	404.001.005
14	IGT pick test ink nr. 1, low tack or IGT pick test ink nr. 2, medium tack or IGT pick test ink nr. 3, high tack	404.800.001 404.800.002 404.800.003
15	Strips of reference paper C2846, 55 mm	404.009.029
16	Strips of paper to be tested, preferable 55*340 mm ² , 3 strips per sample Dampening fluid (water or water with additives) Densitometer (if required) Cotton pads Lint free rags, ethanol and cleaning naphtha	
Dampening- and printing force		625 N
Dampening- and printing speed		Constant, speed at choice
Time between dampening and printing		At choice
Ink film thickness (volume)		3,2 μm (0,14 cm ³)
► The numbers 1 thru 16 are available at IGT Testing Systems.		

- 4.8. 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.

5. For GST2 only:

- 5.1. Select the menu "Wet pick" in the display.
- 5.2. Select one of the sub menus in the display:
 - 5.2.1. "wet pick 2 fields" for a test strip with 2 different damped and printed fields.
 - 5.2.2. "wet pick 4 fields" for a test strip with 4 different damped and printed fields.
 - 5.2.3. "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.
 - 5.2.4. "pre-wet disc 3x-2f" for a test strip where the dampening disc has been pre-wetted for three times and the strip is damped and printed with 2 different fields.
- 5.3. "pre-wet disc 3x-4f" for a test strip where the dampening disc has been pre-wetted for three times and the strip is damped and printed with 4 different fields.
- 5.4. In the case the sector makes more than one revolution during dampening and printing, take off the brush from the tester.
- 5.5. Mount a doctor blade in the doctor blade holder. See W100.
- 5.6. Slide the doctor blade holder with the doctor blade downward and pointing to the right on the two pins of the mounting plate.
6. Clean the desired dampening disc with a towel with ethanol and let it dry.
7. Place the dampening disc on the top printing disc shaft of the tester.

►►

8. Cut a piece of cotton of about 5*50 mm² and place it on the dampening disc, just left of the doctor blade).
9. Insert the piece of cotton into the dampening fluid and place it on the dampening disc just left of contact point between blade and disc.
10. 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.
11. Place the printing disc on the bottom shaft of the tester.
12. Fill the ink pipette with the desired pick test ink.
13. For High Speed Inking Unit 4 only:
Adjust the unit with the following settings:
 - ☐ Water bath: 23,0 °C
 - ☐ Top roller: 4-segmented, rubber for conventional inks
 - ☐ Mode: 2
 - ☐ Startup time: 10 s
 - ☐ Distribution time: 20 s
 - ☐ Distribution speed: 0,5 m/s
 - ☐ Inking time printing discs: 15 s
14. For inking unit AE FOUR only: see manual or W100.

Execution

1. Adjust the printing speed and the interval time if required.
2. For GST only: See W100 for interval times.
3. Mount a test strip on the sector by attaching the beginning of the test strip into the front clamp and fixing the end of the test strip on the sector with a piece of tape.
4. Apply 0,14 cm³ of ink to the inking unit and distribute the ink during the preset or desired time.
NOTE: It is not advised to add some ink after a test.
5. Place a printing disc on the printing disc shaft of the inking unit and ink the printing disc during the preset or desired time.
6. Take the printing disc from the inking unit and place it on the bottom printing disc shaft of the tester.
7. For AIC2-5T2000 only:
 - 7.1. Turn the sector into starting position.
 - 7.2. If necessary apply some drops of dampening fluid on the piece of cotton.
 - 7.3. Make a print. See W100.
8. For GST only:
 - 8.1. Select "Make print" in the display.
 - 8.2. Press the side buttons to move the sector into the starting position and to move the doctor blade holder downward.
 - 8.3. If necessary apply some drops of dampening fluid on the piece of cotton.
 - 8.4. Press the side buttons to make a print.
9. Remove the test strip from the sector.
10. Mount a strip of reference paper C2846 into the front clamp of the sector.
11. Turn the printing disc into the starting point of the last print.
12. Make a second print of the printing disc without dampening.
13. Remove 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 and let it dry.
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 dampening 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 and refer to the testing method and the number of fields and speed:
 - 21.1. W32: Printing disc with rubber 85 Shore A.
 - 21.2. W66: Printing disc with rubber 65 Shore A.

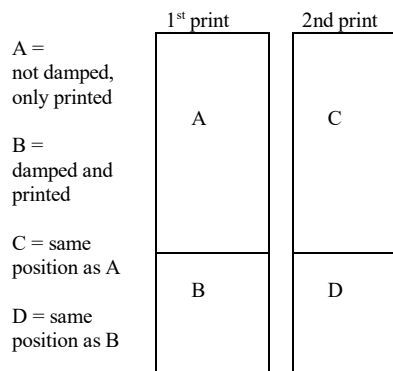


Fig. 3: Printed strips of a 2-field print

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 IGT 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 maximum storage life of the IGT pick test ink in the original, closed packing is 1 year; in an opened packing 3 months.

► 2006: In comparison to older IGT leaflets, this leaflet is valid for the AIC2-5T2000 and Global Standard Testers as mentioned.

► 2012: This leaflet is valid for the AE FOUR as well and contains some small text corrections.

► 2017: This leaflet contains some small text corrections and a change in the testing procedure.