**Introduction:**

At the moment of printing a quantity of ink or varnish is absorbed by the surface of the paper. This amount is determined by the absorption of liquid in the surface recesses (roughness) and the absorption into the paper pores at the surface. With the in this leaflet described test method the sum of the two phenomena is determined: the oil absorption or varnishability. The reciprocal value of this is called print penetration.

It is quite safe to assume that, when various batches of paper of the same type are supplied by the same manufacturer and the oil absorption test renders the same result, both the roughness and the absorption have remained the same. It is most unlikely that, for instance, the effect of the roughness has increased in exactly the same ratio as that of the absorption has decreased.

Due to its simplicity the test method is very suitable to be used in quality control systems.

The test is suitable to evaluate three paper properties:

- Varnish ability: In the case of varnishability a low oil absorption and thus a long stain is essential. For that reason the varnishability is expressed directly as the stain length in mm.
- Print penetration: A large stain indicates a low roughness/absorption of the paper. It seems to be logical to use the reciprocal value of the stain length multiplied by 1,000 as an identifier of this property (i.e. 1,000/stain length in mm). This is then called the print penetration.
- Felt and wire side: see W60

The method has been standardized in the Dutch standard NEN 1836.

**Principle:**

Between the printing disc and a paper strip on the sector of an IGT-printability tester a drop of oil with a volume of 5.8 ± 0.3 mg is spread to a stain (see figure 2). The length of the stain is measured. The stain length is increasing when the roughness and/or absorption of the paper is decreasing.

**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 follow the instructions of the manual, IGT information leaflet W100 and the displays accurately.

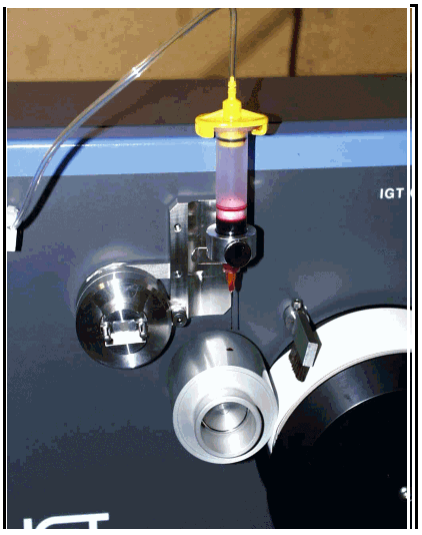
• Handle the samples carefully.

Preparation

1. Condition the papers, the test liquid 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. Adjust the printing force of the upper printing disc shaft to 1000 N and pay attention for the right backlash. See W100.
5. Adjust the speed to increasing speed (◢), end speed 1.2 m/s.
6. Check and if needed, move the slide in front of the sector into the increasing speed mode (◢).
7. Mount the syringe holder into the top hole for mounting accessories.
8. Place the syringe PE14 with needle into the holder (see fig. 1).
9. Adjust the holder in such a way that the syringe needle is positioned vertically and centred above the printing disc.

| **Materials / testing conditions** | | |
|---|---|---|
| 1 | IGT AIC2-5 from type AA | 414 |
| 2 | Printing disc, aluminium, 50 mm | 402.088 |
| 3 | Holder for syringe | 409.002.022 |
| 4 | Syringe PE14 | 409.002 |
| 5 | Dibutylphthalate with 1% sudan red | 409.003 |
| 6 | Packing, rubber, 55 mm | 404.001.006 |
| 7 | Strips of paper to be tested, preferable 55 x 340 mm, 5 strips per sample | |
| 8 | Ruler | |
| 9 | Lint free rags | |
| 10 | Ethanol or cleaning naphtha | |
| Printing force | 1000 N | |
| Printing speed | Increasing, end speed 1.2 m/s | |
| Quantity of test liquid | 1 drop, 5.8 mg ± 0.3 mg | |
| The numbers 1 thru 6 are available at IGT Testing Systems. The numbers 3 thru 6 can be obtained as Print Penetration Set for AIC2-5 from type AA, article number 409.414.008. | | |

10. Remove the syringe from its holder and fill it with dibutyl phthalate with 1% sudan red. (The plunger of the syringe must be above the air inlet after filling: this is done by moving the plunger upwards while the needle is kept in the liquid).
11. Mount the loaded syringe into the holder and move the drop catcher under the needle at the same time. With regular intervals a drop is falling out of the syringe.
12. Check the functioning of the AIC2-5 with the print penetration set following the instructions in the chapter “Execution".



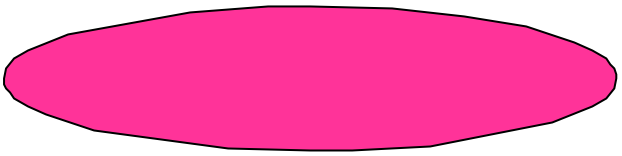

Execution

1. Place the printing disc on the printing disc shaft.
2. Attach a test strip in the front clamp of the sector.
3. Turn the sector into starting position.
4. Press one of the side buttons to start the motor.
5. Move the printing disc into printing position against the test

strip.

6. Turn the drop catcher away until one single drop has fallen on the printing disc and replace the drop catcher in the caching position.
7. Press the other side button as well to make a “print”; the drop is spread into a stain.
8. After the sector has stopped, release the side buttons.
9. Move the printing disc out of printing position.

Fig. 1: print penetration set



10. Remove the test strip from the sector.

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11. Measure the stain length as explained in the chapter “Assessment” immediately after the test. In case the stain length is not measured right after the test, the stain length has to be marked with marking dots.
12. Take off the printing disc from the shaft.
13. Clean the disc with rags and cleaning solvent and let it dry.

14. Repeat the points 1 thru 13 for every test strip.
15. After having finished the test, clean and store all parts as described in the manual.

Fig. 2: test result

Assessment

1. Measure the length of the stain to the nearest mm. Thus the stain length or varnishability is determined.
2. If required determine the print penetration with the formula:

*printing penetration = 1000 : stain length in mm*

3. Repeat point 1 and 2 for each test strip.
4. Calculate the average and if required the spreading and/or standard deviation. In some cases it may be useful to mention the highest and lowest values as well.

**Notes:**

1. The test results of the AIC2-5 and the Global Standard Testers 1 and 1-W compare well with one another, on the condition that they have been carried out under the same conditions.

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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

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