

**Introduction:**

In general it is very difficult to carry out small-scale gravure printing tests. It is difficult to keep the ink with its volatile solvents constant during a test and this is also valid for water based inks. For laboratory trials there is a need for a system that uses only little ink and paper.

A good solution is the Global Standard Tester with the gravure attachment. With this system it is possible to make gravure prints under different testing conditions with different types of printing forms. The prints can be used for testing properties of ink and paper as e.g.: colour, adhesion, light fastness, smoothness, and so on. Instead of paper one may read substrate as many other materials such as boards, plastic films, foils, and so on.

There are 2 testing methods for the dry properties of the ink and the smoothness of the substrate:

- Method “gravure 180°”. In this method the printing form is inked only one time and directly after inking the print is made (IGT information leaflet W67 for smoothness and W82 for colour)
- Method “gravure 360°”. In this method the printing form is inked twice and directly after each inking a print is made, so 2 prints are made after each other (IGT information leaflet W73 for smoothness and W83 for colour).

There can be a difference in the ink transfer and printing quality between these two methods. This is also dependent to the combination of ink, substrate and the testing conditions.

This leaflet describes the method of 360° to make prints for testing the colour of gravure ink and other dry properties.

**Principle:**

The gravure attachment consists of an engraved printing form (disc), a doctoring system and an impression cylinder. Some drops of the ink are put on the printing disc, the surplus of ink is wiped off and a print is made on the substrate, which has been attached to the impression cylinder. After the first time of inking the engraved disc the first print is made, after that the disc is inked again so the cells are filled better and the 2<sup>nd</sup> print is made. In general this 2<sup>nd</sup> print is used for the assessment.

The standard printing form has 11 fields of 70 l/cm (175 l/inch) and depth from 11 to 33 µm . Other engravings are available.

The print can be used for examining the colour of gravure ink and to test other dry properties.

**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.



Fig. 1: Gravure accessory

- For the operation of the Global Standard Tester follow the instructions of the manual, IGT information leaflet W100 and the display accurately.
- Handle the samples carefully.

Materials / testing conditions		
1	IGT Global Standard Tester 2 or IGT Global Standard Tester 3H	412 467
2	Mounting set	431.421.054
3	Engraved printing disc	402.153.412*)
4	Packing, photopolymer, 55 mm	403.010.001
5	Compressible mounting tape	403.011.001
6	Doctor blade GST	431.412.029
7	Sector without clamps (only for Global Standard Tester 3H)	364.000.166
8	Ink to be tested	
9	Strips of paper to be tested, preferable 55 x 700 mm, 3 strips per sample	
10	Tape	
11	(Disposable) ink pipettes	
12	Lint free rags	
13	Velvet	
14	Ethanol or ethyl acetate or solvent of the ink	
Printing force		500 N (preset)
Printing speed		0.2 m/s (preset)
The numbers 1 thru 7 are available at IGT Testing Systems. The numbers 2 thru 6 can be obtained as Gravure Set for Global Standard Tester 2 and 3H, article number .....		
*) Other printing discs are available.		

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 700 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. If not present, stick the photopolymer with the double sided tape on the sector. See W100.
4. If not present on the Global Standard Tester, mount the sector without clamps. See W100.
5. Select the menu “Gravure 360° colour” in the display.
6. Note the testing conditions in the display and collect the items mentioned.
7. For continuous working only: shake the bottle with gravure ink well, fill the cartridge with ink and mount it on the Global Standard Tester. See W100.
8. For some tests only: shake the bottle with ink well and fill a (disposable) pipette.
9. Degrease the doctor blade with rags with ethanol.
10. Mount the doctor blade in the doctor blade holder. See W100
11. Slide the doctor blade holder with the blade downward and pointing to the right on the two pins of the mounting plate.
12. Clean the printing disc with a velvet and ethanol.
13. Place the printing disc on the (top) shaft of the tester.
14. Check the functioning of the gravure system following the instructions in the chapter “Execution”.
15. Mark the starting point on the photopolymer with a marker.

Execution:

1. Mount a test strip with tape at the beginning of the strip at the starting point on the photopolymer and fasten the end of the strip with tape as well.
2. Select “Make print” in the display.
3. Press the side buttons to move the sector into the starting position and to move the doctor blade holder downward.

## W83 for IGT Global Standard Tester 2 and 3H

4. For continuous working by use of cartridge: press one of the buttons 1 – 4 to apply a few drops of ink on the printing disc.
5. For some prints only by use of ink pipette: apply some drops of ink on the printing disc with a (disposable) pipette.
6. Press the side buttons to distribute the ink on the printing disc and to make a print.
7. After the sector has stopped, release the side buttons.

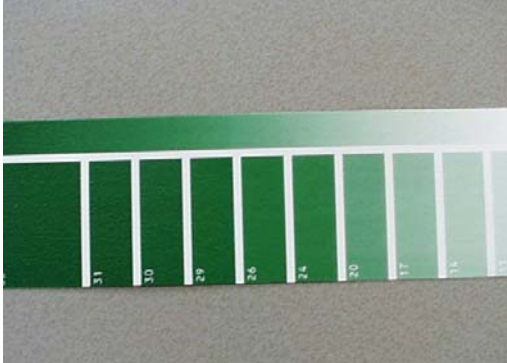


Fig. 2: gravure print

8. Press “Enter” to lift the doctor blade from the printing disc.
9. Take off the printing disc from the shaft and clean it directly with a velvet with the solvent of the gravure ink.
10. Place the printing disc on the printing disc shaft.
11. Take off the doctor blade holder from the unit and clean the doctor blade with rags and the solvent of the ink.
12. Slide the doctor blade holder with the blade downward and pointing to the right on the two pins of the mounting plate.
13. Remove the test strip from the sector.
14. Measure the test result as described in the chapter “Assessment”.
15. Repeat the points 1 through 14 for every strip. It is recommended to execute the test at least three times per combination of ink and substrate.
16. After having finished the tests clean and store all parts as described in the manual.
17. Make an accurate record of the conditions and the results of the test.

### Assessment:

1. For colour measurement: Check the colour visually in comparison with the original sample or measure the colour with a spectrophotometer at the desired location of the print.
2. For dry properties: Check the desired dry properties according to the testing method at the desired location of the print
3. 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.

### **Notes:**

1. The test results of the Global Standard Testers 2 and 3H compare well with another on the condition that the tests have been carried out under the same testing conditions. However, the test is very sensitive for very small variations in the equipment, printing discs and doctor blades.
2. No dried ink may remain in the cells of the disc. In the case there is dried ink in the cells clean the disc with velvet saturated with the solvent of the ink. Another method is to leave the disc overnight in ethyl acetate and afterwards cleaning with a velvet saturated with the solvent.

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.