Introduction

The printability of paper in gravure printing is depending on a number of properties of the paper, such as the condition of the surface, the dynamic compressibility, the wet ability and porosity of the paper. Measurement of only one of these physical characteristics does not permit prediction of the printability with certainty. With the Heliotest, which integrates all these parameters, the forecasting of printability is possible, even for papers with similar properties. The Heliotest, developed by CTP at Grenoble, France, can be used for all grades of paper for gravure printing.
In France the method is standardized in NF Q 61-002.

Principle

The Heliotest attachment consists of an engraved printing disc, a doctoring system and a special, not quick drying gravure ink.
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 sector. The disc contains three types of engraving:

- A variable halftone screen area. In this area the distance from the beginning of the print till the twentieth missing dot is measured. The longer the distance, the smoother the paper. This part of the disc is the most important part.
- A conventional screen area. This part is used for visual assessment and is of low importance.
- Four lines of dots. In these lines the total number of missing dots is counted. This is done in case the distance measured in the variable halftone screen area is too small, that is when the paper is very rough. The more missing dots, the rougher the paper.

Method of operation

- It is recommended to execute the test in the standard atmosphere; to most standards it is 23,0 ± 1,0 °C and 50 ± 2% rh.
- For the operation of the AIC2-5T2000 and Global Standard Tester 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 rubber packing with the Astralon strip on it on the sector. See W100.
4. Mount a doctor blade in the doctor blade holder. See W100.
5. For AIC2-5T2000 only:
   - 5.1. Adjust the printing force of the top printing disc shaft to 450 N (or if desired 300 or 600 N) and pay attention for the right backlash. See W100.

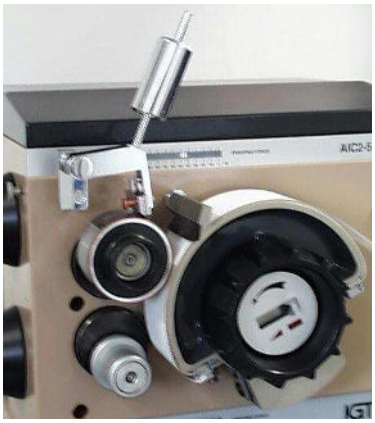

Fig. 1: Heliotest accessory AIC2-5T2000

   - 5.2. Adjust the printing speed to 1 m/s in the constant speed mode (▢).
   - 5.3. Mount the heliotest accessory on the unit:
     - 5.3.1. Place the adapting device (mounting shaft) 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.
     - 5.3.2. Fasten the device with the screw at the left hand side of the tester.
     - 5.3.3. Check that the distance between the bottom of the weight of the blade holder device and the blade holder is 25 mm; if this is not the case, adjust it.
     - 5.3.4. Remove the screw from the adapting device.
     - 5.3.5. 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.

Materials / Testing conditions		
1	IGT AIC2-5T2000 or IGT Global Standard Tester 2 or IGT Global Standard Tester 3H **********	710.000.000 412.000.000 467.000.000
	For AIC2-5T2000:	
2	Adapting device (mounting shaft)	450.054.710
3	Doctor blade holder	450.001.008
4	Heliotest disc A30 **********	402.050
	For GST 2/3H:	
5	Doctor blade holder	450.031.412
6	Heliotest disc A30	402.350.412
7	Cartridges (empty)	160.200
8	Hoses and coupling **********	160.300
9	Heliotest ink	404.003.006
10	Packing, rubber, 55 mm	404.001.006
11	Astralon strip, 55 mm	404.009.013
12	Heliotest doctor blade	450.010
Strips of paper to be tested, preferable 55*340 mm², 5 strips per sample Ruler Magnifying glass Lint free rags Velvet Ethanol or ethyl acetate		
Printing force	450 N or 300 N or 600 N	
Printing speed	Constant, 1 m/s	
The numbers 1 thru 12 are available at IGT Testing systems		

6. For GST only:
   - 6.1. Select the menu "Heliotest" in the display.
   - 6.2. If desired, set the printing force on 300, 450 or 600 N.
   - 6.3. Slide the doctor blade holder with the blade downward and pointing to the right on the two pins of the mounting plate.
7. Clean the heliotest disc with velvet and ethanol and let it dry.
8. Place the heliotest disc on the top printing disc shaft of the tester.
9. Stir the bottle with heliotest ink well.
10. Fill a (disposable) pipette with the heliotest ink.
    NOTE: If desired, for continuous working with the GST the dispensing system can be used. See the manual of the GST.

Execution

1. For AIC2-5T2000 only:
   - 1.1. Attach a test strip into the front clamp of the sector.
   - 1.2. Turn the sector into starting position.
   - 1.3. Carefully lower the doctor blade on the heliotest disc.
   - 1.4. Apply, or if necessary add a few drops of heliotest ink on the printing disc with the help of the (disposable) pipette.
     NOTE: With one charge of a few drops of heliotest ink a number of prints can be made. After this number some drops may be added without cleaning the disc and doctor blade.
   - 1.5. Turn the heliotest disc a few times CLOCKWISE so that the ink is distributed evenly on the disc.
   - 1.6. Turn the disc CLOCKWISE into the required starting position: for a print of the variable screen and dotted lines area place the doctor blade in the gap between the conventional screen area and the variable screen area.
   - 1.7. Directly move the printing disc into printing position against the test strip and make a print.
2. For GST only:
   - 2.1. Attach a test strip into the front clamp of the sector.
   - 2.2. Select "Make print" in the display.
   - 2.3. Press the side buttons to move the sector into the starting position and to move the doctor blade holder downwards.
   - 2.4. Apply, or if necessary add a few drops of heliotest ink on the printing disc with the help of the (disposable) pipette.
     NOTE 1: With one charge of a few drops of Heliotest ink a number of prints can be made. After this number some drops of ink may be added without cleaning the disc and doctor blade.
     NOTE 2: To use the dispensing system for continuous working, see the manual of the GST.
   - 2.5. Press the side buttons to distribute the ink on the printing disc and to make a print on the paper

►►

3. Take off the test strip from the sector.
4. Measure the test result as described in the chapter Assessment".
5. Repeat the points 1 through 4 for every strip. It is recommended to perform the test at least 3 times per sample.

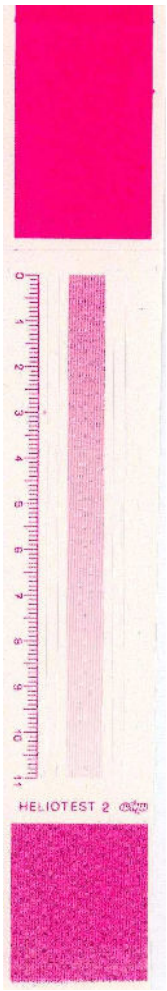

Fig. 2:
Print result

6. <u>For GST only</u>: After having finished the tests press "Enter" to lift the doctor blade from the Heliotest disc.
7. Clean and store all parts as described in the manual.
8. Make an accurate record of the conditions and the results of the test and refer to W41.

<u>Assessment</u>

1. Starting from the side with the largest dots in the variable screen area count the missing dots until the 20th one.
2. Measure the distance in mm from the 20th missing dot to the beginning of the variable screen area.
3. In the case the distance in point 2 is very small (only some mm's) count the total number of missing dots in the four dotted lines on both sides of the variable half tone.
4. Repeat points 1 and 2 or 3 for each test strip.
5. 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.
6. If needed assess the printing quality visually in the conventional screen area.

Notes:

1. No dried ink may remain in the cells of the disc. It is recommended to clean the disc with regular intervals during the tests, using a wad of cotton and/or velvet saturated with ethanol or ethyl acetate. After a completion of a series of tests the disc must be cleaned thoroughly. In the case there is dried ink in the cells clean the disc with velvet saturated with ethanol or ethyl acetate. Another method is to leave the disc overnight in ethyl acetate and afterwards cleaning with a velvet saturated with ethanol or ethyl acetate.
2. The maximum storage life of the Heliotest ink in the original packing is 1 year; if the bottle is opened the maximum life time of the ink is 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 GST with camera and analysis software as well and contains some small text corrections.*
► *2017: This leaflet is valid for the AIC2-5T2000 and GST 2/3H only, without camera and analysis software. Also it contains some small text corrections.*

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