

## Introduction

This IGT Information leaflet belongs to the series of other IGT Information Leaflets for the IGT AIC2-5T2000 and Global Standard Testers. This leaflet gives a description of some procedures, which are of big importance to carry out the testing methods described in the other leaflets. These procedures are described in the manuals as well.

For details of these (preparation)procedures consult the manual of you equipment.

### For AIC2-5T2000 and GST

## Packing, mounting

### 1. Types of packing:

- 1.1. Rubber packing. This type of packing must be mounted into the clamps of the sector with the rubber side up.
- 1.2. Rubber packing with Astralon strip. This type of packing must be mounted into the clamps of the sector with the Astralon strip on the rubber side and with the astralon/rubber side up.
- 1.3. Paper packing. This packing consists of 6 layers of a special type of paper. To use it with the equipment, the 4 bottom layers must be torn along the perforation. The 6 layers of the packing must be inserted into the front clamp and the 2 longest layers into the back clamp.
2. The modern versions of the AIC2-5T2000 and GST are equipped with clamps in which the packing is stretched with a standard force semi-automatically. The pictures underneath show the method to mount a packing.

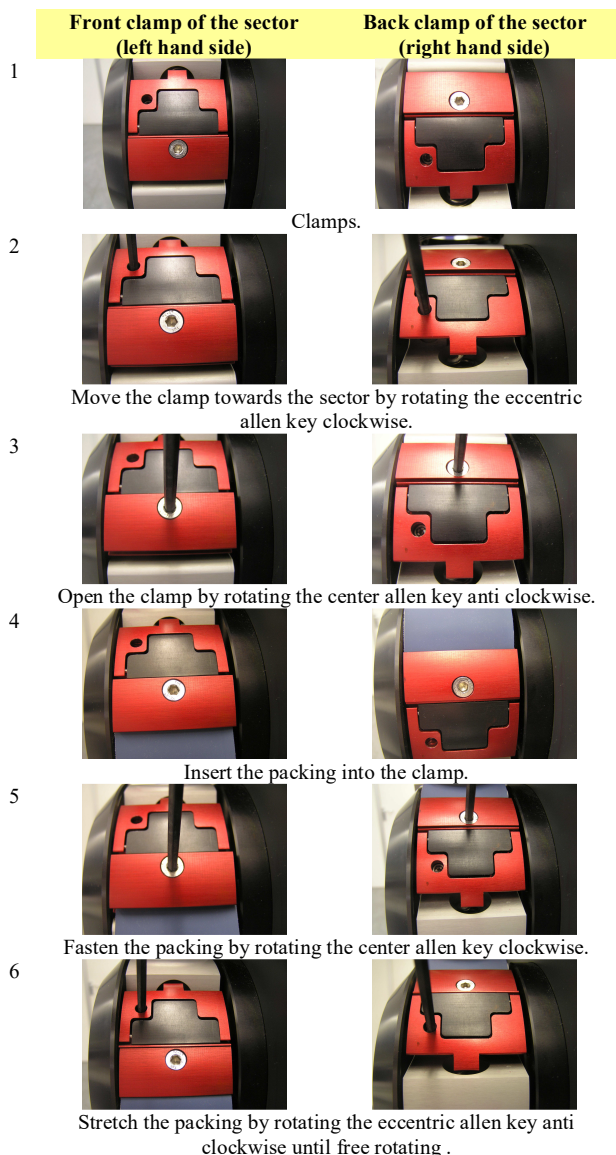


Fig. 1: Sector clamps

3. The older versions of AIC2-5T2000 and GST are equipped with clamps in which the packing is stretched with a standard force with the help of tools:
  - 3.1. Insert the packing into the clamps. (The packing clamps are the bottom-most clamps).
  - 3.2. Fasten the packing by tightening the big screws.
  - 3.3. Stretch the packing with a stretching force of 40 Nm.
  - 3.4. Roll out the packing by making 10 "dry" prints using the printing disc, the printing force and printing speed to be used in the test.
  - 3.5. After these 10 prints stretch the packing again with 40 Nm.
  - 3.6. If it is noticed that the stretching force has been decreased during the rolling out procedure of the points 6 and 7, repeat the points 6 and 7 until the stretching force of the rolling out procedure does not change.

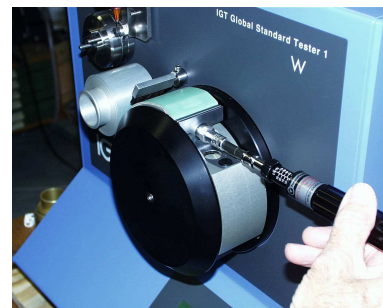


Fig. 2: Older type of sector clamps

## Printing discs with black rubber and rubber blanket

In the W-leaflets the following standard printing discs for conventional inks are mentioned:

- 402.634 Disc with black rubber, 85 Shore A, 50 mm
- 402.687 Disc with black rubber, 65 Shore A, 50 mm
- 402.089 Disc with rubber blanket, 50 mm

Sometimes, dependent to the roughness of the paper, it can be necessary to change the type of printing disc to have a better print quality. In general, the disc 402.634 is for very smooth papers, the disc 402.687 is for smooth until rough papers and the disc 402.089 for very rough papers.

In the case UV inks are used, the printing discs 402.634 and 402.687 have to be changed into 402.090 (rubber for UV, 65 Shore A). The disc 402.089 has to be changed into 402.091 (rubber blanket for UV)1. For other types of printing discs consult IGT.

## Top rollers of High Speed Inking Unit4 or Inking Unit AE FOUR

In the W-leaflets the top roller 466.003.003 with 4 segments for conventional inks is mentioned as the standard top roller. In the case UV inks are used, the top roller 466.003.003 has to be changed by 466.003.009. For other types of top rollers consult IGT.

## Doctor blade, mounting into a doctor blade holder

1. Degrease the doctor blade with ethanol.
2. Mount the doctor blade into the doctor blade holder. The bevel of the doctor blade has to stick out of the doctor blade holder and has to point to the side of the screws of the doctor blade holder.
3. Place the doctor blade holder with the blade pointing to the right on the two pins of the mounting plate.
4. Check the right position of the doctor blade: the bevel has to point to the right (see figure 1) and the place where the ink is applied to the system is NOT at the side of the bevel.

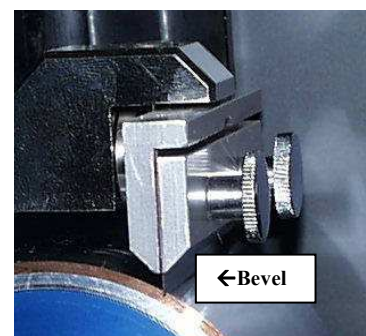


Fig. 3: Bevel at the side where no ink is applied



## For AIC2-5T2000

**Printing force, adjusting**

1. If necessary, mount a packing on the sector.
2. Place a printing disc on the printing disc shaft.
3. Move the sector into starting position.
4. Move the printing disc into printing position against the sector.
5. Check the backlash. If the backlash is too little or too much, adjust it; see the chapter "backlash" in this W-leaflet.
6. Adjust the printing force to the desired value.
7. Move the printing disc out of printing position.

**Back lash, checking and adjusting**

1. If necessary, mount a packing on the sector.
2. Place a printing disc on the printing disc shaft.
3. Move the sector into its starting position.
4. Move the printing disc into printing position against the sector.
5. Adjust the printing force to 500 N.
6. Move the handle of the lifting mechanism at the left hand side of the unit slowly clock wise. Until about 45 until 90° a free movement without a strong resistance will be noticed and the pointer in the scale will not move. After this 45 until 90° a stronger resistance will be noticed and from this moment on the pointer in the scale will move a little bit. If this all is the case the back lash is good. If this all is not the case, the back lash is not good and must be adjusted. To do follow the next points.
7. Loosen the Allen bolt in the ring around the handle of the lifting mechanism at the left hand side of the instrument.
8. Place the special key into the two holes of the shaft of the lifting mechanism.
9. Turn the shaft clock wise and/or anti clock wise to the point at which a transition from no resistance to a stronger resistance is noticed.
10. At this point hold the shaft on its place and move the ring with the handle backward down until the angle is about 45°.
11. At this point fasten the Allen bolt in the handle and take away the special key.
12. Check the back lash as mentioned in the points before.



Fig. 4: Special key for back lash

**Printing procedure**

1. **No interval time:**
  - 1.1. Move the sector into starting position.
  - 1.2. Press one of the two buttons to start the motor and keep the button pressed.
  - 1.3. Move the printing disc into printing position.
  - 1.4. Press the other button as well and keep both buttons pressed to make the print.
  - 1.5. As soon as the sector has stopped in its end position release both buttons.
  - 1.6. Move the printing disc out of printing position.
2. **With interval time :**
  - 2.1. Move the sector into starting position.
  - 2.2. Press one of the two buttons to start the motor and keep the button pressed.
  - 2.3. Move both printing discs into printing position.
  - 2.4. Press the other button as well and keep both buttons pressed to make the print:
    - 2.4.1 After the sector has stopped in the interval position, keep pressed both buttons during the counting down and to make the print in the second part of the test strip (adjusted interval time).
    - 2.4.2 After the sector has stopped in the end position, release the side buttons.
  - 2.5. Move the printing discs out of printing position

**Interval times, description**

By using two printing discs on both shafts of the AIC2-5T2000 the interval times on the printed strip are:

1. **By printing without extra interval time (1 field):**  
 NOTE: the interval time is dependent to the speed.  
 0,35 s at 0,2 m/s      0,07 s at 1 m/s      0,023 s at 3 m/s  
 0,1 s at 0,7 m/s      0,035 s at 2 m/s
2. **Printing with extra interval time (2 fields):**
  - 2.1. The 1<sup>st</sup> interval time is dependent to the speed (see remark above), the 2<sup>nd</sup> interval time is the 1<sup>st</sup> interval time plus the set interval time.
  - 2.2. To set an interval time with the interval timer it is noted that the interval time dependent to the speed plays a role as well, e.g.: a speed of 0,2 m/s gives an interval time between the top and bottom printing disc of 0,35 s automatically. If an interval time of 3 s is wished, the interval timer has to be set at  $3 - 0,35 = 2,65$  s. As the accuracy of the instrument is 0,1 s, this value has to be rounded to 2,7 s.

## For GST

**Cartridge, filling with a fluid**

1. Be sure the small orange cap is present at the small opening (the needle side) of the cartridge.
2. Pull off the orange cap from the big opening of the cartridge.
3. If present, take off the white plunger from the cartridge.
4. Fill the cartridge with the fluid for about 75%.
5. Press the white plunger into the cartridge until it just has contact with the ink.
6. Place the big orange cap on the cartridge or follow the instructions to mount the cartridge on the tester.



Fig. 5: Filling a cartridge

**Cartridge, mounting on the tester**

1. Pull off the orange cap from the big opening of the cartridge.
2. Press the yellow or black tube connection at the big opening of the cartridge and turn it 90 degrees to fix it.
3. Remove the little orange cap from the needle side.
4. Mount the needle on the cartridge by rotating.
5. Place the complete cartridge with the needle downward in the mounting clamp of the mounting plate (or if a ring is mounted for a certain accessory, into this ring until stop and fasten it with the screw).
6. Position the needle in the middle of the disc (and in the case there is a doctor blade into the direction of this blade).
7. Connect the white or black hose connection of the other side of the tube at the white or black dose air connection of the instrument by rotating.

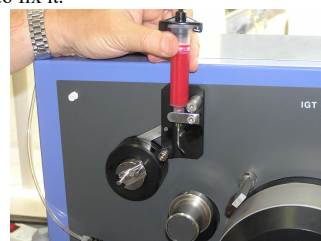


Fig. 6: Mounting a cartridge

**Sector, mounting**

1. Turn the sector into the starting position.
2. Switch off the power supply.
3. Insert the special key into the screw in front of the safety plate and rotate it for about a quarter of a revolution anti clockwise.
4. Take off the safety plate.
5. Unscrew the three big hexagonal socket screws.
6. Slide off the sector from the shaft.
7. Hold the sector to be mounted in the starting position and place it in this position on the shaft.
8. Place the three hexagonal socket screws and fasten them.
9. Place the safety plate in front of the sector
10. Insert the special key into the screw in front of the safety plate and rotate it for about a quarter of a revolution clockwise.
11. Switch on the power supply.
12. Check the position of the sector. If not good, repeat the points in this chapter.



### Photopolymer plate, mounting on the sector without clamps

1. If the sector without clamps is not on the tester, mount it on the tester as described in the chapter "Sector, mounting".
2. Turn the sector into starting position.
3. Mark the point of the sector, which is pointed to the upper shaft. This point is mentioned the starting point.
4. Take off the sector as described in the chapter "Sector, mounting".
5. Place the sector flat on the table.
6. Fix a layer of double-sided foam tape around the sector. Pay attention that the seam in the tape is at the starting point of the sector.  
**NOTE:** The seam must be under an angle of about 30° to the one side of the sector.
7. Fix the photopolymer printing form with the glossy side on the foam tape. Pay attention that the seam in the printing form is at the starting point of the sector.  
**NOTE:** The seam must be under an angle of about 30° to the other side of the sector.
8. Place a strip of cello tape on the seam of the photopolymer, over the sides of the sector.
9. Mount the sector with the printing form on it on the tester as described in the chapter "Sector, mounting".

### Printing procedure

1. No interval time:
  - 1.1. Select "Make print" in the display.
  - 1.2. Press the side buttons to move the sector into starting position, to move the printing disc into printing position and to make the print.
  - 1.3. After the sector has stopped in the end position, release the side buttons.
2. With 2 interval times:
  - 2.1. Select "Make print" in the display.
  - 2.2. Press the side buttons to move the sector into starting position, to move both printing discs into printing position and to make a print in the first part of the test strip (interval time dependent to the printing speed).
  - 2.3. For interval time < 5 s:
    - 2.3.1 After the sector has stopped in the interval position, keep pressed both buttons during the counting down and to make the print in the second part of the test strip (adjusted interval time).
  - 2.4. Interval time > 5 s:
    - 2.4.1 After the sector has stopped in the interval position the side buttons can be released.
    - 2.4.2 After the interval timer has count down to about 2 s, press the side buttons to continue counting down and to make the print in the second part of the test strip (adjusted interval time).
  - 2.5. After the sector has stopped in the end position, release the side buttons.
3. 4 and 10 interval times:
  - 3.1. Select "Make print" in the display.
  - 3.2. Press the side buttons to move the sector into starting position, to move the upper printing disc into printing position, to make a print with the upper printing disc and to move the sector into starting position again.
  - 3.3. Interval time < 5 s:
    - 3.3.1 Keep pressed both side buttons to make the print with the bottom printing disc for the next interval times.  
**NOTE:** if the following interval times will be > 5 s release the side buttons and continue with point 3.4.
  - 3.4. Interval time > 5 s:
    - 3.4.1 After the sector has stopped in the starting position, release the side buttons.
    - 3.4.2 After the interval timer has count down to about 2 s, press the side buttons to continue counting down and to make the print with the bottom printing disc shaft for the first interval time.
  - 3.5. After the sector has stopped for the next interval time, release the side buttons.
  - 3.6. Repeat points 3.3 and/or 3.4 for the next interval times.
  - 3.7. After the sector has stopped after the last interval time, release the side buttons.

### Interval times for GST2, description

By using two printing discs on both shafts of the GST2 the interval times in the different menus are:

1. 2 interval times
  - 1.1. The 1<sup>st</sup> interval time is dependent to the speed (see "no interval times" underneath); the 2<sup>nd</sup> interval time is the 1<sup>st</sup> interval time plus the set interval time.

- 1.2. To set an interval time with the interval timer it is noted that the interval time dependent to the speed plays a role as well, e.g.: a speed of 0,2 m/s gives an interval time between the top and bottom printing disc of 0,35 s automatically. If an interval time of 3 s is wished, the interval timer has to be set at  $3 - 0,35 = 2,65$  s. As the accuracy of the instrument is 0,1 s, this value has to be rounded to 2,7 s.

2. 4 interval times: (i = set interval time)
 

1 <sup>st</sup> interval time is about 2 s	3 <sup>rd</sup> interval time is (2 + 3i) s
2 <sup>nd</sup> interval time is (2 + i) s	4 <sup>th</sup> interval time is (2 + 6i) s
3. 10 interval times: (i = set interval time)
 

1 <sup>st</sup> interval time is about 2 s	6 <sup>th</sup> interval time is (2 + 15i) s
2 <sup>nd</sup> interval time is (2 + i) s	7 <sup>th</sup> interval time is (2 + 21i) s
3 <sup>rd</sup> interval time is (2 + 3i) s	8 <sup>th</sup> interval time is (2 + 28i) s
4 <sup>th</sup> interval time is (2 + 6i) s	9 <sup>th</sup> interval time is (2 + 36i) s
5 <sup>th</sup> interval time is (2 + 10i) s	10 <sup>th</sup> interval time is (2 + 45i) s
4. No interval times  
By printing without an extra time interval, the interval times between both discs are:
 

0.35 s at 0.2 m/s	0.07 s at 1 m/s	0.023 s at 3 m/s
0.1 s at 0.7 m/s	0.035 s at 2 m/s	

### For inking unit AE FOUR

Settings for AE FOUR when HSIU is used with mode 2:

Top roller : 4-segmented, rubber for conventional inks  
Distribution time : 30 s  
Distribution speed: 0,6 m/s  
Inking time printing discs: 15 s

Settings for AE FOUR when HSIU is used with mode 3:

Top roller : 4-segmented, rubber for conventional inks  
Distribution time : 60 s  
Distribution speed: 0,3 m/s  
Inking time printing discs: 30 s

### Cleaning instructions printing discs and top rollers

## See appendix CLEANING INSTRUCTIONS FOR PRINTING DISCS AND TOP ROLLERS

- 2006: In comparison to older IGT leaflets, this leaflet is valid for the AIC2-5T2000 and Global Standard Testers as mentioned.
- 2012: The leaflet is valid for the IGT AMSTERDAM as well and contains some small text corrections.
- 2017: The leaflet is valid for the IGT AIC2-5T2000 and all GST's and contains some small text corrections.



## APPENDIX

### CLEANING INSTRUCTIONS FOR PRINTING DISCS AND TOP ROLLERS

#### 1. Important notes

These cleaning instructions can be used to clean printing discs (aluminium, rubber, rubber blanket and halftone photopolymer) and top and metal rollers of IGT inking units. For the old types of printing discs with coated rubber see section 3.

- For cleaning, use only soft, lint free rags. During cleaning, use only slight force with the rags on the rubber to prevent wear of the rubber. The solvent must do the job!
- Never soak the printing disc or top roller in the cleaning solvent and do not leave them in contact with the solvent for longer time.
- Never use an ultrasonic bath to clean aluminium discs; this may destroy the aluminium.
- To dry the disc after cleaning, an air stream of e.g. a hair dryer at low temperature can be used, pay attention that the temperature of the disc/roller does not get higher than 30°C. Thereafter, let the disc reach room temperature again.
- In general, also the environmental friendly cleaning agents, used to clean the rubber blankets, can be used. If you don't have experience with them, be careful, these may damage the rubber! Many of these products leave a protective film on the blanket, drying this film takes sometimes more than one hour!

#### **WARNING!**

All mentioned chemicals are highly inflammable and may cause explosive fumes if used in insufficient ventilated areas! These solvents and its fumes may cause skin, smell or breath irritation. For that reason, always wear protective clothing, gloves, goggles and masks where applicable.

#### 2. Printing discs and rollers of inking unit

This section is valid for printing discs (aluminium, rubber, rubber blanket and halftone photopolymer) and top and metal rollers for the inking unit

- Clean printing discs, top and metal rollers with lint free rags soaked in ethanol or cleaning naphtha with boiling traject between 135°C and 180°C and containing less than 2% aromatics.
- Before using the disc or roller again, dry it and/or let the solvent evaporate and thereafter let the disc reach room temperature again.
- If the drying time of the discs with rubber or rubber blanket is too long, the discs can be cleaned with a mixture of 40% cleaning naphtha and 60% ethanol.

#### 3. Printing discs with coated rubber

This section is only valid for the older type of printing discs with coated, brown rubber

- These discs can be cleaned with cleaning naphtha with boiling point between 135°C and 180°C. **No other cleaning solvents are allowed!**
- Before using the disc again let the solvent evaporate.

#### 4. Back ground information

Printing discs must be cleaned. IGT has good experience with an off-the-shelf product called StarWash. This is a mixture of a cleaning naphtha and an ester (chemical reaction product between an alcohol and acid). It is made by Fuji Chemicals and delivered under different local brand names, in Europe supplied by Wifac. This product works well on all older printing discs and top rollers. From a cleaning point of view, it is also perfect for the new black rubber compounds on the 402.6xx printing discs but there are issues with the drying time.

#### **Background**

The cleaning naphtha dissolves the a-polar components of the ink and the ester the more polar components, therefore a wide range of components can be washed away. However, esters have a disadvantage: they create in general a rubber swell. Because of that, it takes a long time before a rubber printing disc is dry after cleaning, while fast drying is necessary when making weighed prints for color matching or other critical applications.

#### **Rubber swell reduction**

Cleaning naphtha and alcohols do not give rubber swell on the rubbers used by IGT. Because of this, IGT started a development to make a mixture of cleaning naphtha and ethanol for an optimal combination of cleaning and drying properties. Naphtha's with a lower boiling point do mix better with ethanol. The lower boiling point is caused by the shorter length of the hydrocarbon chains mentioned by a lower number after the C in the chemical formula.

For alcohol, we used 96% ethanol with 5% methanol. More water in the ethanol will have a negative influence on the mixture. This is laboratory quality ethanol.

#### **Result**

Thus, we came to a mixing rate of 40 % Cleaning naphtha with 60 % alcohol to clean the new rubber discs. The mixture of naphtha/ethanol cleans well and evaporates fast. After cleaning the disc, the weight of the disc is within 15 seconds on the dry weight again. This makes the mixture suited for making weighed prints.

#### **Important considerations**

There are a lot of different "cleaning naphtha's" sold under different names like white spirit, petroleum naphtha and with different levels of purity. All of them are a mixture of hydrocarbons like kerosene, petrol and gasoline. However, in many types there are up to 25% impurities which are no (cleaning) problem if burned in a stove or a car but which are harmful for high purity rubbers like the rubbers on IGT rollers. Because of this and because you are using it all day and thus exposed to the vapor we prefer an aromatic free naphtha. Generally, it can be stated that if the liquid is not fully clear it contains impurities and is less suitable for our purpose.

Our preference is for a cleaning naphtha mixture of C7-C12 chains with a boiling trajectory between 135°C and 180°C and less than 2% aromatics. A lower boiling point also means a lower flash point. Without good ventilation or exhaust the mixture can lead to an explosive air mixture. That is why lower boiling points are not advised.

Almere, 2017-03-22