

# THA G



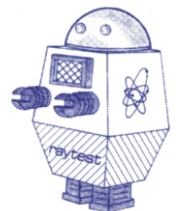
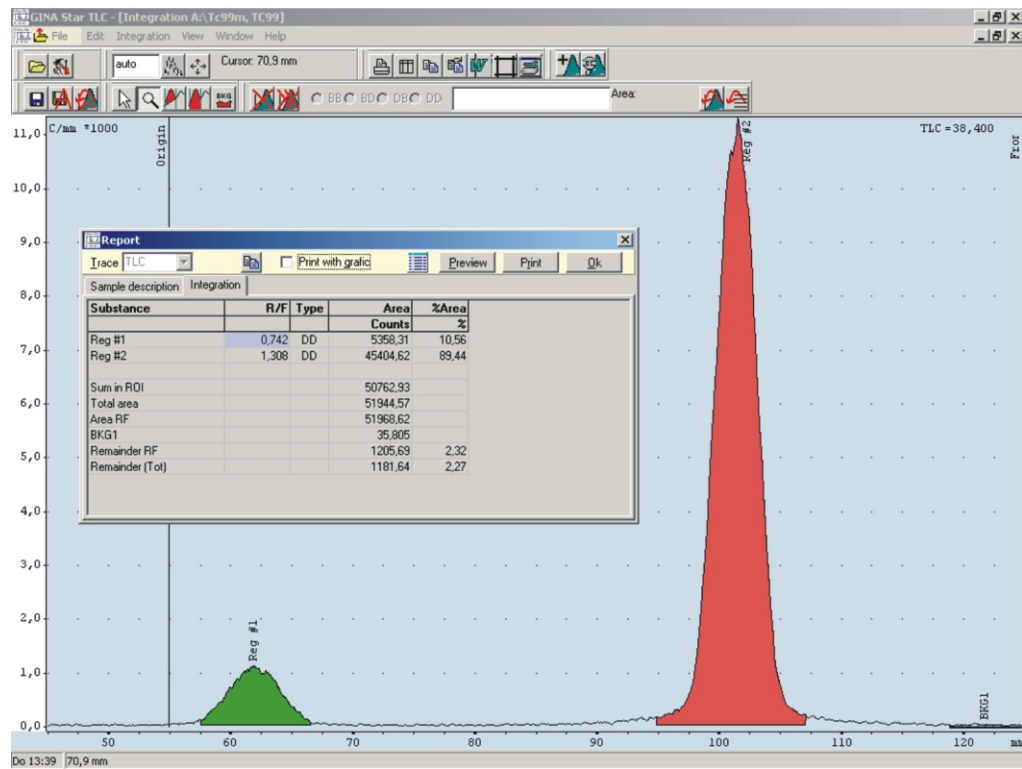
raytest

GAMMA

ISOTOPE

TLC

ANALYZER

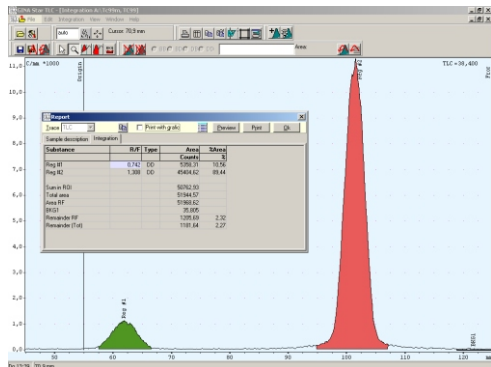


# BETA NUCLIDES

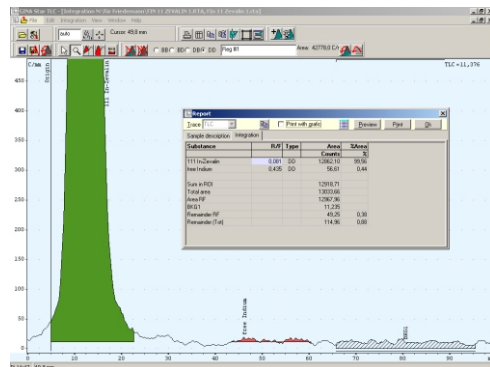
# GAMMA NUCLIDES

# POSITRON NUCLIDES

# GITA



Scintillation probe  
99m Tc on TLC

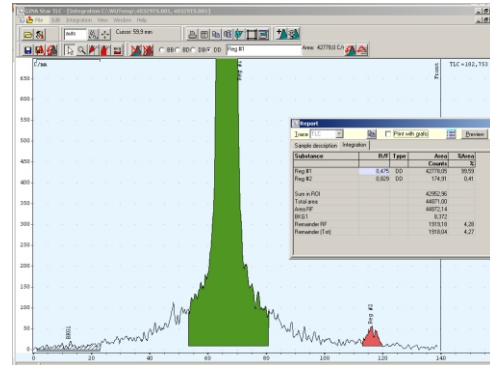


TLC of a 111 In  
labelled compound

- Scan area: 200 x 400 mm
- Scan speed: selectable
- Traces: 1 - 80
- Detectors: scintillation, GM, gasflow
- Nuclides:  $\beta$ ,  $\gamma$
- Energy: 0 - 2000 KeV
- Activity: 10 - 100.000 Bq
- Decay: corrected

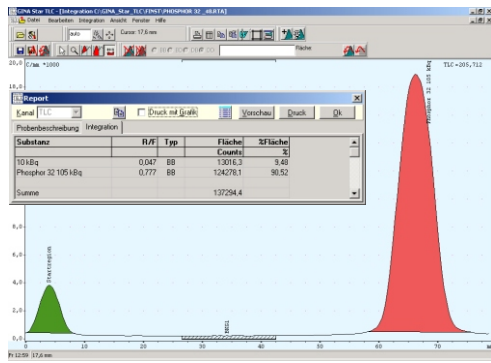


GITA with  
scintillation probe

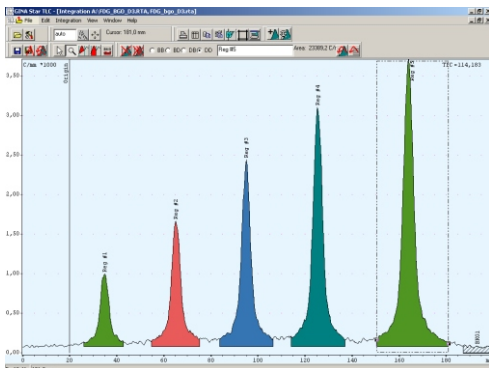


TLC of a 123 I  
labelled compound

- Collimators GITA
- Stainless steel, 3 mm, 0 - 60 KeV 125 I
- Tungsten, 5 mm, 60 - 150 KeV 99m Tc
- Tungsten, 10 mm, 150 - 250 KeV 111 In
- Tungsten, 15 mm, 250 - 450 KeV 131 I



TLC of a 32P  
labelled compound



Scintillation probe  
18F linearity on TLC

Substance	R/F	Type	Area	%Area
Reg #1	0.083	DD	5000.42	7.26
Reg #2	0.252	DD	9153.05	13.30
Reg #3	0.419	DD	13526.89	19.85
Reg #4	0.587	DD	17762.16	25.91
Reg #5	0.802	DD	23389.21	33.98
Sum in ROI			68831.74	
Total area			72784.89	
Area RF			72834.11	
BK/G1			77.334	
Remainder RF			3772.37	5.20
Remainder (Tot)			3933.16	5.41

Scintillation probe  
18F linearity result table

**QUALITY CONTROL  
TLC**

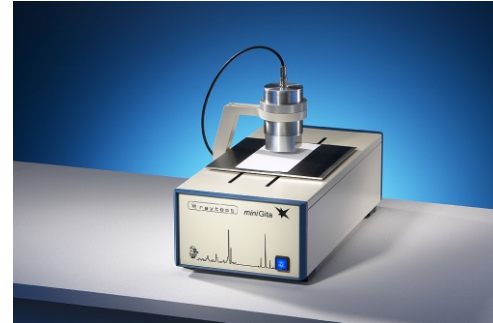
**NUCLEAR MEDICINE  
TLC**

**PET - TLC**

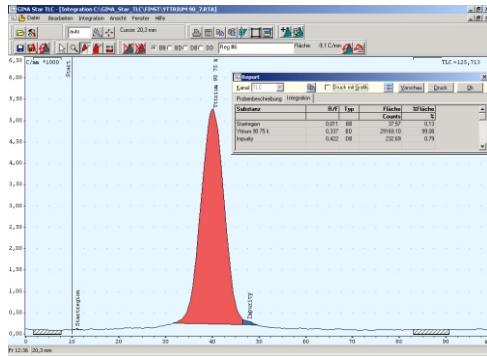


GINA Star control and evaluation software

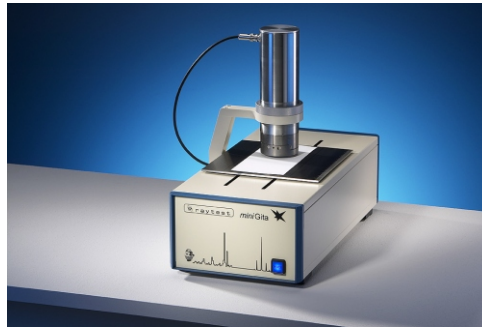
# mini GITA



mini GITA GM probe  
0 - 2000 KeV



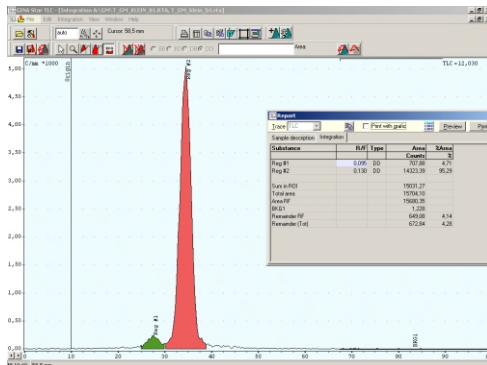
TLC of a <sup>90</sup>Y labelled compound



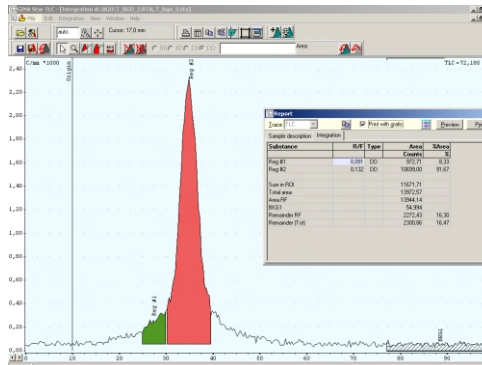
mini GITA with  
scintillation probe

Scan area: 50 x 200 mm  
Scan speed: selectable  
Traces: 1  
Detectors: scintillation, GM  
Nuclides:  $\beta$ ,  $\gamma$   
Energy: 0 - 2000 KeV  
Activity: 10 - 100.000 Bq  
Decay: corrected

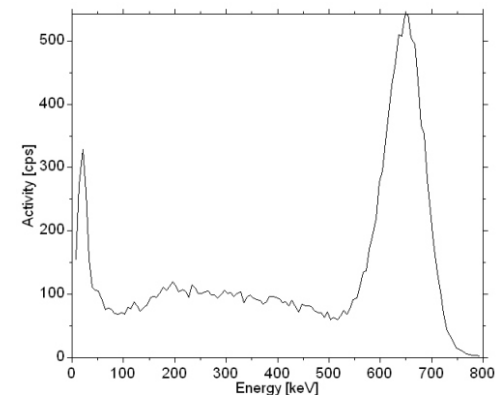
Collimators, mini GITA  
Stainsteel, 3 mm, 0 - 60 KeV 125I  
Tungsten, 5 mm, 60 - 150 KeV 99m Tc  
Tungsten, 10 mm, 150 - 250 KeV 111In  
Tungsten, 15 mm, 250 - 450 KeV 131I  
Tungsten, 20 mm, >450 KeV 18F



TLC of <sup>18</sup>F- FDG  
GM- counting tube  
(small artificial impurity aside)



TLC of <sup>18</sup>F- FDG  
BGO- scintillation probe  
(small artificial impurity aside)



Spectrum scan of <sup>137</sup>Cs  
for energy calibration

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## Technical Data mini GITA

Power Supply: 100-240 V +/- 10%  
50/ 60 Hz

Fuses: 1.6 Ampere

Power consumption: 40 VA

Dimension: 260x170x500 mm

Weight: approx. 13 kg

Operating temperature: 10°C to 40°C

Humidity: max. 70 % relative  
humidity

Detectable radiation:  $\gamma$ -radiation  
(BGO scintillation  
probe)

Background:  $^{129}\text{I}$ : 0.7 cps (20-100 KeV)

Sensitivity:  $^{129}\text{I}$  : 20 Bq in 10 min

Resolution:  $^{129}\text{I}$  : 2-3 mm  
(depending on the  
used collimator)

Detectable radiation:  $\beta$ -radiation  
GM counting tube  
(not for 3H)

Background:  $^{18}\text{F}$  : 0.1 cps

Sensitivity:  $^{18}\text{F}$  : 10 Bq in 10 min

Resolution:  $^{18}\text{F}$  : 1-2 mm

Connections: USB, power supply  
Data output: USB

## Technical Data GITA

Power supply: 100-240 V +/- 10%  
50/ 60 Hz

Fuses: 1.6 Ampere

Power consumption: 40 VA

Dimension: 700x380x560 mm

Weight: approx. 48 kg

Operating temperature: 10°C to 40°C

Humidity: max. 70 % relative  
humidity

Detectable radiation:  $\gamma$ -radiation  
(BGO scintillation  
probe)

Background:  $^{129}\text{I}$ : 0.7 cps (20-100 KeV)

Sensitivity:  $^{129}\text{I}$  : 20 Bq in 10 min

Resolution:  $^{129}\text{I}$  : 2-3 mm  
(depending on the  
used collimator)

Detectable radiation:  $\beta$ -radiation  
open proportional  
counting tube  
(Recommended for 3H  
- requires counting gas  
P10 = 90% Ar 10% Ch4)

Background:  $^{18}\text{F}$  : 0.1 cps

Sensitivity:  $^{18}\text{F}$  : 10 Bq in 10 min

Resolution:  $^{18}\text{F}$  : 1-2 mm

Connections: serial cable RS232,  
power supply



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Rita

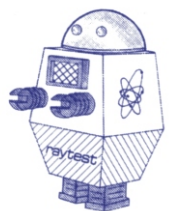
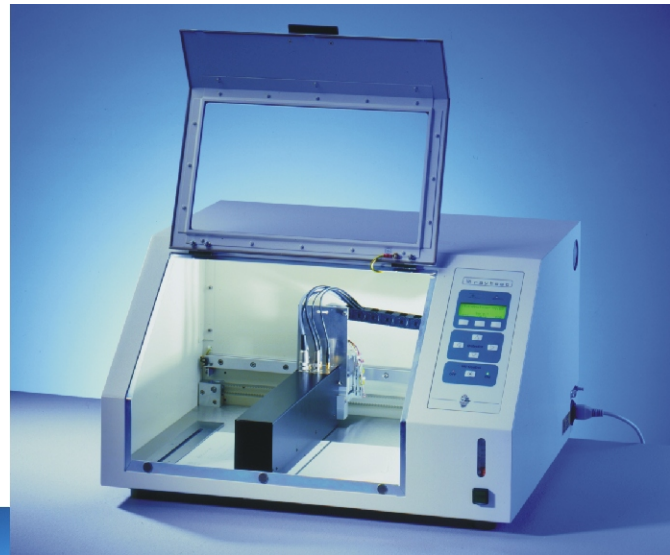


Radioactivity

Thin Layer

Chromatography

Analyzer



RADIOACTIVITY

EXCELLENT LINEARITY

HIGHEST SENSITIVITY

### Principle of measurement

Ionizing radiation can be detected by the Rita Star position sensitive proportional gas counter. Particles with high ionizing density like alphas and betas generate the greatest effect. The number of measurable isotopes is not only limited to the classical alpha or beta emitters. Many so-called gamma sources produce beta particles or conversion electrons or Auger electrons as well.

For the measurement of low energy betas such as tritium the counting tube has to be used without any window and as close as possible to the radiation source. Therefore the Rita Star detector is placed on the surface of the sample in order to close the counting chamber, to reduce gas leakage and to give a zero distance between source and detector.

### Adjustable counting wire

A unique device is used to align the counting wire with highest possible accuracy for optimum homogeneity. Design patent applied for.

### List of suitable nuclides

Rita Star is designed for maximum sensitivity for low energy beta emitting nuclides like  $^3\text{H}$ ,  $^{14}\text{C}$ ,  $^{35}\text{S}$ ,  $^{33}\text{P}$ ,  $^{32}\text{P}$ .

Gamma and positron emitting nuclides like  $^{125}\text{I}$ ,  $^{99\text{m}}\text{Tc}$ ,  $^{18}\text{F}$  can be detected with Rita Star as well, however for optimum sensitivity and resolution Gita or miniGita is recommended.

### Multiple trace Rita

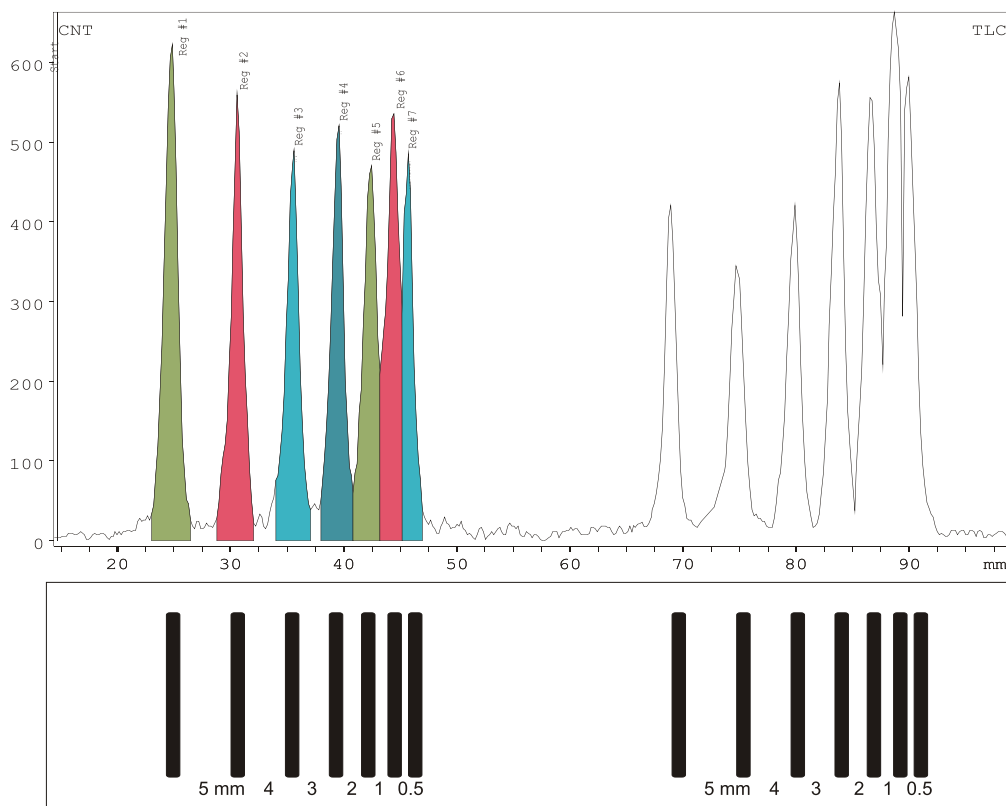
Many traces of chromatograms can be measured automatically. The position sensitive proportional counting tube is moved automatically from one trace to the next one. All TLC are evaluated and printed automatically.

2D-TLC can be measured by assembling many 1D-traces to a 2D- and for 3D-TLC image.

### Single trace Marita

1 trace of TLC can be measured automatically. The TLC-strip is inserted in a tray, which is pushed inside and elevated by a talk.

Integration C:\RITA\_Star\TEST\FINGER\_UL600\_2.RTA



### Gold plated detector

For very low beta counting the highest sensitivity is obtained with open window operation.

But open window operation means that there is a calculable risk of depositions of dust or aggressive vapours on the sensing elements of the detector.

Frequent cleaning of the detector interior by washing, wiping, brushing etc. will deteriorate the uniformity, resolution, sensitivity and dynamic range of a detector with a conventional design.

Rita Star is the unique detector for position sensitive proportional counting using a gold plated sensing element.

Imitation is not possible because a design patent is granted.

Therefore Rita Star detectors have a longer life time, can be cleaned much easier and produce much more reliable results.

### Dynamic range

From the lowest detectable activity up to highest possible count rate the dynamic range is more than 1 : 1.000.000 for reliable, linear results of spot activities.

### Performance

The detector is placed on the chromatography plate and so the sample itself closes the sensitive gas volume of the counting tube.

Therefore, the sensitive volume of the detector is small and the background count rate is very low. There are only a few counts per minute over the total length of 200 mm. The background count rate of a 1 mm dot is less than 0.1 cpm.

The sensitivity of the counting tube could be maximized, as there is no material and no distance between the source and the sensitive counting volume.

The detector has a total active length of 200 mm. For various applications the active width can be limited from 20 mm down to 15, 10, 5 and 3 mm by simple exchange of the diaphragm.

### Linearity

When a 1:1 plot is printed the peaks obtained have to be found at the same position as on an autoradiographic film.

All Rita Star counting tubes show position deviations of less than 0.5 mm over the entire length of 200 mm.

OPTIMAL RESOLUTION

WIDE DYNAMIC RANGE

FASTEST OPERATION

### Uniformity

The delay line, its holder and the tensioners of the counting wire, are so designed that the distance between wire and delay line is the same within a few thousands of a millimeter over the total length. Only selected gold plated tungsten counting wires are used for maximum precision. During production every counting tube is optimized and extensively tested.

The homogeneity defined as variations of the counting sensitivity at every position along the entire active length of the counting tube is specified to be less than +/- 5%.

### Resolution

An arrangement of <sup>14</sup>C labelled plastic strips has been used to demonstrate the resolution performance. The distance between the strips are 5, 4, 3, 2, 1 and 0,5 mm, respectively. The valley between the peaks at a source distance of 1 mm is lower than 50% of the peak height. The resolution for tritium is better than 1 mm.

As high resolution accompanies lower sensitivity, the user can select instrument settings for optimal resolution or highest sensitivity, or to make a compromise of both. Different settings of high voltage and counting channel can be preprogrammed for optimal conditions for all isotopes and applications.

### Antistatic electricity kit

On non conducting, very dry samples static electricity may affect sensitivity and resolution. A very fine grid in the opening of the diaphragm is used to reliably prevent this.

For higher energy betas beginning with carbon 14 the detector can be used with a thin window to reduce the counting gas consumption even more and to discriminate against tritium beta particles in dual label experiments.

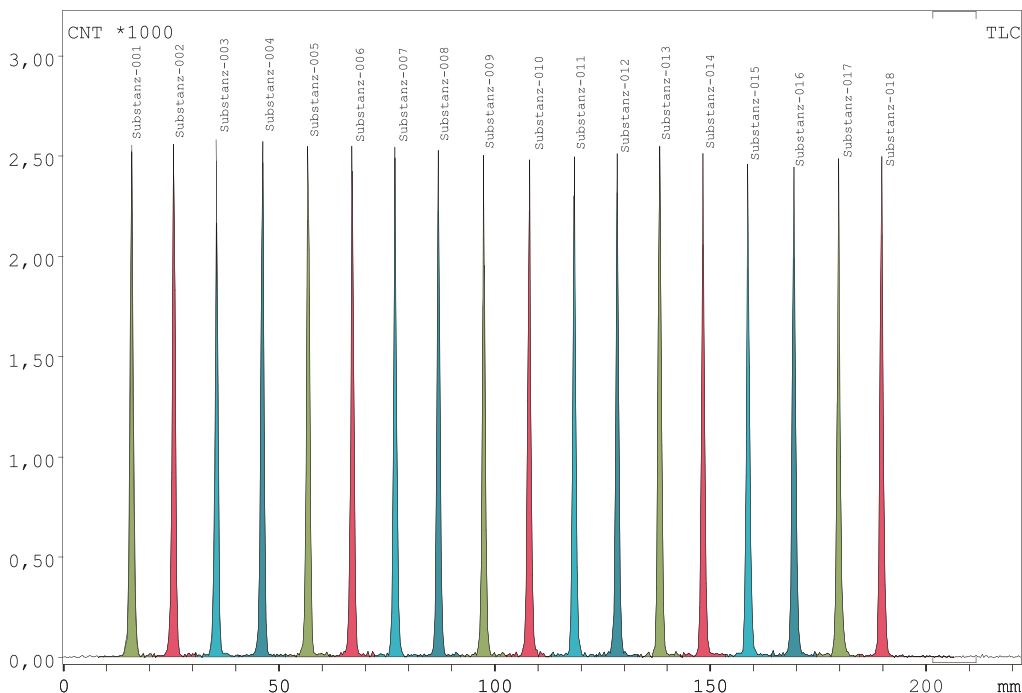
### Documentation

During the running measurement there is a live display of the growing chromatogram. X and Y scaling can be selected. All raw data are stored. All evaluation algorithms are documented. All requirements of GLP compliance are fulfilled. 1:1 formal printout is available. Reports can be customized.

### CE conformity

Rita Star has a total new design of all electronics and micro processor systems in order to fulfill the CE requirements.

Integration C:\RITA\_Star\TEST\UNIFORMITY2.RTA



Marita: manual Rita system for 1 plate 50 x 200 mm

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Raytek Scientific Ltd.  
26

## Technical data: Rita

Sample size: 2 plates  
200 x 200 mm

Power consumption: 40 VA

Operating conditions: 10 - 40°C  
Max. 70% r.H.

### Detector

Position sensitive proportional counter  
Resolution 3H: < 1 mm  
Resolution 14C: < 2 mm  
Sensitivity 3H: 1000 dpm in 10 min.  
Sensitivity 14C: 100 dpm in 10 min.  
Background: 80 cpm / 200 mm

Gas supply: P - 10 gas  
(90% Ar, 10% CH<sub>4</sub>)  
P - 5 gas conditional  
(95% Ar, 5% CH<sub>4</sub>)  
0.5 - 1 l/ min flow

Communication: RS232 C  
all parameters  
all data  
built in data display

Dimensions:  
Width: 700 mm  
Depth: 560 mm  
Height: 380 mm  
Weight: 45 kg

### System requirements

Rita Star instrument control software. Gina Star TLC evaluation software.

- Standard Pentium® or similar PC with min. 128 MB RAM
- 6 MB free disk space
- Windows 2000 or XP
- Graphics card with 1024 x 768 pixel and 16 bit color depth.
- Free serial port for instrument control

## Technical data: Marita

Sample size: 1 plate  
50 x 200 mm

Power consumption: 20 VA

Operating conditions: 10 - 40°C  
max. 70% r.H.

### Detector

Position sensitive proportional counter  
Resolution 3H: < 1 mm  
Resolution 14C: < 2 mm  
Sensitivity 3H: 1000 dpm in 10 min.  
Sensitivity 14C: 100 dpm in 10 min.  
Background: 80 cpm/ 200 mm  
Gas supply: P - 10 gas  
(90% Ar, 10% CH<sub>4</sub>)  
P - 5 gas conditional  
(95% Ar, 5% CH<sub>4</sub>)  
0.5 - 1 l/ min flow

Communication: USB 1.1  
all parameters  
all data  
built in data display

Dimensions:  
Width: 235 mm  
Depth: 500 mm  
Height: 135 kg  
Weight: 9 kg

### System requirements

Marita instrument control software. Gina Star TLC evaluation software.

- Standard Pentium® or similar PC with min. 128 MB RAM
- 6 MB free disk space
- Windows 2000 or XP
- Graphics card with 1024 x 768 pixel and 16 bit color depth



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