

# Instrument Manual

## Sr90/Y90 TLD-IRRADIATOR MODELL 2210

Serial-No.: 010205.....

TLD-Irradiator serves the calibration of  
TLD chips, -sticks or maps.



# 0. Prefaces

## Contents and purpose

This manual serves for the support of the instructed personnel for  
operation TLD-Irradiators

and to the guarantee of its employment fitness.

## References

In this manual the references have

## Caution, Attention and Note

the following meaning:

**Caution:** This heading is used, if inaccurate obeying or disregarding of instructions or procedures can lead to injuries.

**Attention:** This heading is used, if inaccurate obeying or disregarding of instructions or procedures can lead of the damage of the equipment.

**Note:** This heading is used, if one makes attention to special peculiarities.

## 1. Range of application

The Tld-irradiator MODELS 2210 is a versatile calibration system and serves the calibration of TLD chips, - sticks with 2, 3 or 4 elements.

For this is a Sr90/Y90 radiation source used by 33 MBq (0.9mCi) with an activity.

The equipment can be operated both at a 230V/50Hz and at a 115V/60Hz alternating voltage system.

## 2. Technical manual

TLD-Irradiator is built in a portable condition housing.

The front side of the housing contains the following modules from on the left of to the right:

- the electronic tax and control unit
- the thrust subject
- the calibration factor announcement.

On the back is a cold equipment installation plug in combination with the in out rocker switch, the safeguard subject and the voltage switch as slidegate valve.

On the front side of the tax and control unit are LED displays:

- One also, „**power**” designated green LED, which indicates whether the equipment is switched on.
- One also, „**more shutter**” designated white 3-Farben-LED-Anzeige to optical control of the Device status.
- A tracer with the designation , is started „**start**” which procedure the calibration.

On the right side of the equipment are the thrust subject and the counter.

The thrust subject can be equipped with carrier disks. There are 3 different types:

- Combination disk for 50 chips and rods
- Disk for 50 micro cubes
- Disk for 5 TLD maps

On the front of the counter are keys for adjusting the counter value.

Example: During a mains voltage of 230V/50Hz the disk turns in the Irradiator with a speed of 1 revolution/minute.

If 90 revolutions are necessary for the irradiation, the counter desired value must be adjusted to 90.

The counter counts the revolutions by a pulse generator and increases its actual value around 1 by each impulse.

If the counter resembling and the output contact are the same the calibration procedure switches off. The carrier disk in the thrust subject is located in basic position, the LED display, shutter shines green and an acoustic signal sounds.

The counter desired value of the input field should indicate at least the value to 1.

The carrier disk can be taken off after opening the thrust subject. After pressing of the key, „reset” at the counter the equipment is ready for a further calibration procedure.

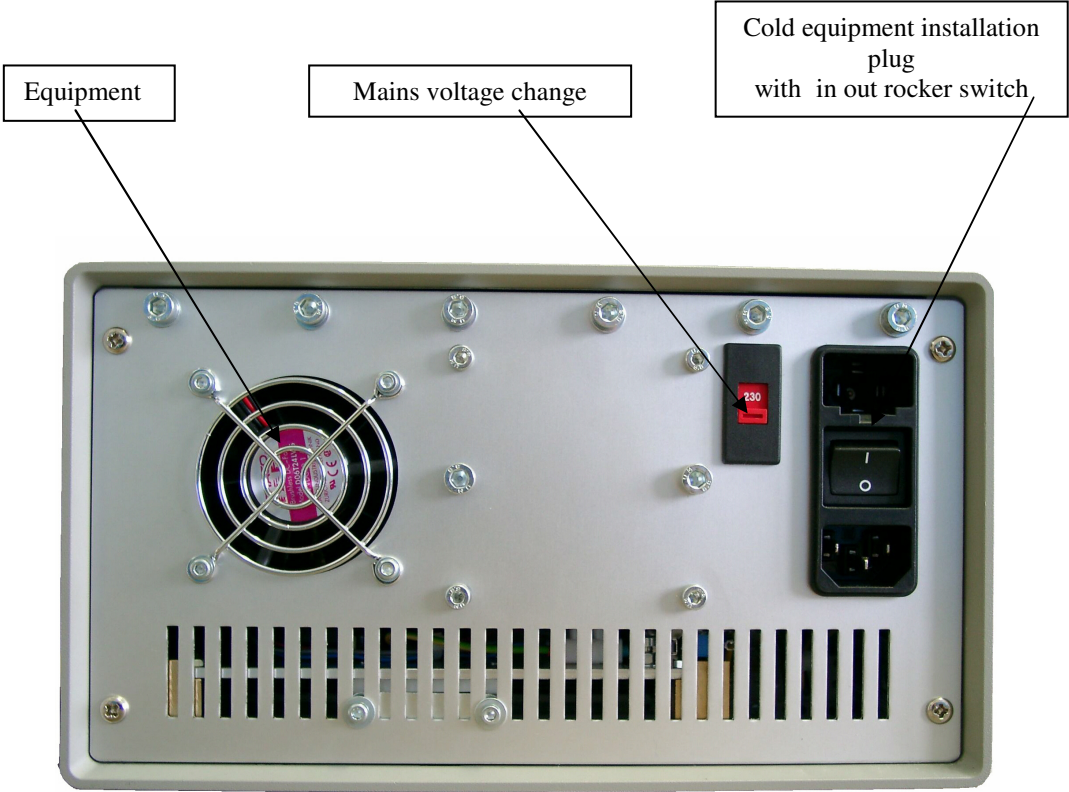
During the calibration procedure the disk, propelled by an alternating current synchronous geared motor, turns with the elements which can be illuminated continuously under the opened source screen.

With a frequency of 50 cycles per second the speed 1 rotation / minute is.

With a frequency of 60 cycles per second the speed 1.2 rotations / minute is.

If one opens the thrust subject during the process, the drive stops, the source screen is closed.

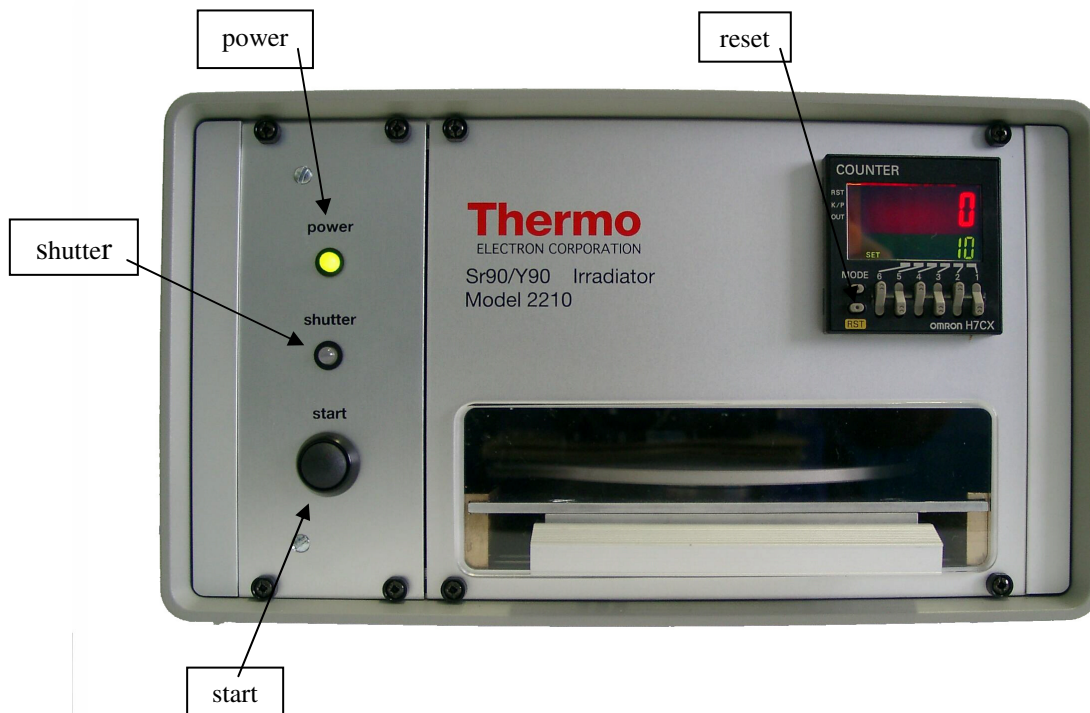
On the back a cold equipment installation plug is combined with an in out rocker switch. Here furthermore is a safeguard subject with two contact-voltage-proof fuse holders inserted. At a mains voltage change over switch are the tensions 230V/50Hz and 115V/60Hz selectable.



<b>Mains voltage change over switch</b>	<b>230V fuse 125mA</b>	<b>Mains voltage 230V/50Hz</b>
	<b>115V fuse 250mA</b>	<b>Mains voltage 115V/60Hz</b>

## 2.1 Function of the serving and indicators

Serving and/or indicating	Position/ announcement	Result / Function
green LED „power“	does not shine	Equipment switched off
	shines	Equipment switched on
white LED „shutter“	does not shine	Map disk not in basic position shutter closed
	shines green	Map disk in basic position shutter closed
	shines red	Map disk does not turn shutter after start did not open Map disk turns
	shines yellow	Calibration procedure starts
Tracer „start “	briefly pressed	Calibration procedure starts
Tracer „reset“ (in the counter)	Briefly pressed (after reaching the counter value)	Equipment for further Calibration procedure ready



### 3. Technical data of the equipment

Manufacturer:	Günther Scheliga Gerätebau * Steuerungstechnik * Industrieservice Aachener Str. 79 D-52249 Eschweiler  Tel.: 02403 / 838484 Fax: 02403 / 839108 E-mail: <a href="mailto:elektro-scheliga@t-online.de">elektro-scheliga@t-online.de</a>
Typ:	01 02 04 ...../ 01 02 05.....
Capacity:	50 chips/plate (combi disc) 5 maps with 2, 3 or 4 elements (card disc)
Source:	90Sr / (Y90)
Source activity:	33 Mbq (0.9 mCi)
Dose / Revolution:	40 $\mu$ Gy (4mrad) äquivalent 90Co Gammadosis
Max. calibration factor:	10 <sup>6</sup> -1
Reproductibility:	< $\mu$ Gy (0.1mrad)in 10 cm distance
Mains voltage:	230V/50Hz~; 115V/60Hz~
Micro fuse:	125mA (230V) 250mA (115V)
Battery in the counter:	Lithium buffer batttery with one life span of 10 years
Dimensions:	260 mm x 155 mm x 265 mm (BxHxT)
Weight:	ca. 9,5 Kg

## 4. Manual

### Caution

Please read the manual carefully and completely, before you take the equipment in enterprise!

## 4.1 Safety precautions

### Caution

The equipment corresponds to the relevant safety regulations.

Repairs may be accomplished only by authorized specialists!

Inappropriate repairs can result substantial dangers for the user, for which the manufacturer is not responsible!

If the equipment is purpose-alienated used, the manufacturer takes for this no guarantee!

### Attention

Before start-up examine whether the mains voltage indicated on the tension selector switch agrees with your local mains voltage.

Operate the equipment only standing on an even and horizontal surface.



## 4.2 Operating instructions

In order to serve duly the equipment, **first** is to be clarified it, **which kind of Tld elements** are to be calibrated.

If it concerns **TLD maps**, then the photograph plate is to be used for maps (**card disc**). Five maps can be put, with the map corner outward, on the plate. Two dowel pins prevent that the maps shift during the rotation.



When **TLD chips** and/or **TLD-sticks** are calibrated, you take the plate with the blind holes arranged at the edge (combi disc), into which the elements are to be put down.



Then the thrust subject is put to be pulled out up to the notice and the appropriate plate is put on the thorn. It is to be noted that the follower pin of the equipmentfirm mother board sits in the groove of the plate. Otherwise the plate is to be turned so for a long time, until the pin engages.

## 4.2.1 Table for calibration factor

The next step consists of stopping by means of the shown table the calibration factor at the counter.

Calibrating Element	Type of plate	Dose / Revolution	Type of net	Source, activity	Calibration factor
Standard Harshaw Typ 3.2x3.2x0.89	combi disc	40 $\mu$ Gy (4mrad)	230V, 50Hz	Sr 90, 33MBq	

## Note

Calibration data for other dosimeters and/or plates can be determined easily with an TLD-analyzer (e.g. Harshaw model 4000 TLD).

The determined desired value can be entered by the appropriate manipulation of the keys at the counter. After effected input those, the „**reset**” key is to be pressed in order to put the counter exit back.

Input errors can be repaired by the repetition of the procedure.

After effected input of the desired value the calibration process is started by the short manipulation of the push-button „ **start** ”.

At the same time with the start of the engine the source screen is opened by electromagnets. The change of the color the white LED with the designation „**shutter** ”in yellow indicates that the source screen opened duly.

While the counter in the large display indicates the revolutions already accomplished to the calibration, while in the small display the total calibration factor is indicated.

The calibration process is terminated automatically, as soon as the actual value corresponds to the desired value. Those „**shutter**”- LED lights up green and an acoustic signal sounded. This means that the source screen is closed and the carrier disk stands in zero-position.

The acoustic signal can be switched off by the manipulation to that „**reset** ”- key at the counter. At the same time the counter is put back.

## 4.3 Error recognition and recovery

If the red, lights up „shutter“-LED announcement with the start of the calibration process, the source screen did not open. Repeat the starting process after the equipment were completely switched off. If the Irradiator does not show the desired reaction after renewed switching on and operation of the push-button, please inform the service.

Those, changes „shutter“-LED announcement on red, to the completion of the calibration procedure the source screen was not closed. Usually this error can be repaired by switching off and renewed switching on of the equipment on. Should be nevertheless still indicated after switching on of the errors on, **expressly** it is pointed out that the equipment **may not be opened under any circumstances by unauthorisierem personnel! From the opened radiation source substantial dangers can result, for which the manufacturer is not responsible! Please you contact the service immediately, which then will you inform about the further steps.**

During the calibration process if the thrust subject is opened, the process is interrupted and the source screen is closed. After latches of the thrust subject and press that „start“- key the procedure is continued.

## 5. Maintenance

This section contains measures and data for maintenance of the equipment.  
The equipment is to a large extent maintenance-free implemented.

### Caution

The equipment may be waited only by instructed and entitled personnel.  
Before opening the equipment it is to be guaranteed that the power supply plug pulled and the equipment is unstressed!

**The sealed screws of the source cover may be loosened under no circumstances.**  
**This may be accomplished only by the authorized personnel of the equipment manufacturer!**

### 5.1 Visual check

Examine the equipment on:

- a. outside damage such as notches, tears, deformation, abrasion and corrosion.
- b. bolt connections for tightness.
- c. completeness.
- d. conductions for break and abraded positions as well as for aging of the isolation.
- e. electrical patch cords on damage and corrosion as well as for tightness.

### 5.2 Cleaning of the equipment

The equipment may be only cleaned with a mild cleaning solution and a dampened cloth. It may not arrive under any circumstances to humidity into the controls.

### 5.3 Exchange of the counter

As an integral back-up battery secures the calibration at power breakdown up to 10 years, the counter has to be exchanged after the expiration of this time. The supply voltage of the counter must be checked before installation. The exchange could be done by the manufacturer of the device.

## 6. Scope of supply

1 Sr90/Y90 TLD-IRRADIATOR

1 Mains connection line (3m long)

1 Set of fuses (installs)

1 Documentation ( CD )

## 6.1 Spare parts and part numbers and prices

All prices are stand March 2009 and are adjusted to the annual price increases.

The value added tax will be separately billed according to valid amount at time of delivery.

Designation	Order No.:	€ / Piece
Control card with start butten, Power and Shutter – LED For equipment with serial no.: 940603/1	940603/1-1	No longer available
Control card with start butten, Power and Shutter – LED For equipment with serial no.: 010202.....	010202001A	385,00
Control card with start butten, Power and Shutter – LED For equipment with serial no.: 010203.....	010203001B	385,00
Control card with start butten, Power and Shutter – LED For equipment with serial no.: 010204...../ 010205	010204001C	385,00
Drawer screen with grasp and assembly strip	010203002	66,50
Counter	0102030003	275,00
Shutter magnet with magnet holder, angle and micro – switch	0102030004	108,85
Source block with threaded bushing, faceplate and Shutter	0102030005	191,95



Designation	Order No.:	€ / Piece
Holder plate with safety closure, reinforcing bar and clamp holder	0102030006	45,30
Plate with axle and switching magnet	0102030007	78,60
Slide plate with bearing flange, friction bearing and bushing	0102030008	136,75
Belt pulley for motor and plate incl. gear belt	0102030009	90,25
Initiator with fastener	0102030010	62,65
Motor with gear	0102030011	175,50
Blower 24VDC, incl. fastening screws and protective screen	0102030012	44,35
Power transformer 115V / 230V	0102030013	71,40
Supply voltage changeover-switch 115V / 230V incl. connecting cable to power transformer	0102030014	40,60
Power plug with switch, fuse holder and ( 2 ) fuses	0102030015	46,90

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Designation	Order No.:	€ / Piece
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Bar holder with pull-off for slide-plate incl. Micro-switch	0102030016	91,35
Source block for check source VZ 2687, cpl. with washer and spring	0102030017	85,20
Housing with extension kit, front panel and rear panel	0102030018	437,50
1 set bar device with serial no.: 940603/1 and 010202...		No longer available
Counter for device with serial no.: 940603/1		No longer available
Counter for device with serial no.: 010202.....		No longer available Use counter from device with serial no.: 010203....

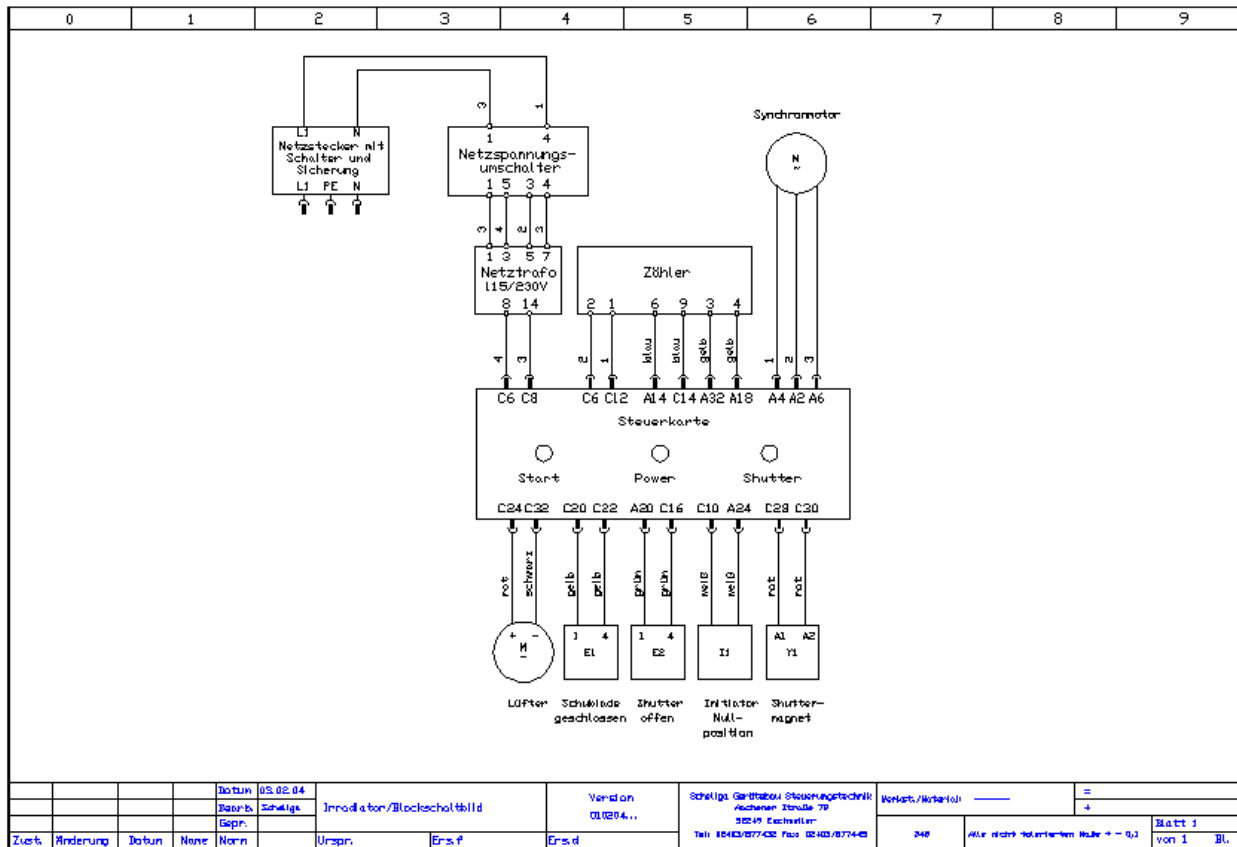
Note!

Plaes consider the serialnumber of the equipment during order of spare parts of the control card!

The positions (sliding plate) and (rails) can only are supplied as unit, and installed by manufacturers.

All rights reserved!

# 7. Block diagram



E1 Micro switch drawer closed

E2 Micro switch shutter openly

I1 Initiator zero-position

Y1 Shutter magnet

M- equipment exhaust

M~ synchronous motor

## 8. EMV test

Inspection station:	Phoenix EMV-Test Königswinkel 10  32825 Blomberg
Information of the test:	Electrical breakdown sending tests Electrical noise immunity tests
<u>Tests based on:</u>	
Breakdown sending:	EN 55022 radiated breakdown sending of 1994 EN 55022 Interference voltage of 1994  The limit values and requirements based on EN 50081-1 of 1992
Noise immunity:	ENV 50140 radiated noise immunity of 8/93 ENV 50141 line-led noise immunity of 8/93 EN 61000-4-2 ESD of 1995 EN 61000-4-4 BURST of 1995  The limit values and requirements based on EN 50082-2 of 1995
Inspection result:	All requirements from the tests where kept by the equipment
Remark:	All examinations to assign the CE indication on the base of EMVG where successfully completed at the time of examination.

# 8. Equipment inspection VDE 0701

Prüfprotokoll Instandsetzung, Änderung und Prüfung elektrischer Geräte Prüfgrundlage DIN VDE 0701 Teil 1 + VBG 4			
<b>Auftraggeber:</b> Scheliga Gerätebau Steuerungst Aachener Straße 79 52249 Eschweiler Scheliga 02403/877432	<b>Auftrags-Nr.:</b> <b>Auftragnehmer:</b> Scheliga Gerätebau Steuerungst Aachener Straße 79 52249 Eschweiler <b>Prüfer:</b> Nüsser 02403/877432		
<b>Gerät / Art:</b> Irradiator <b>Hersteller:</b> Scheliga Gerätebau Steuerungst <b>Serien-Nr.:</b> Sr90 / Y90 2210 <b>Ident-Nr.:</b> 010204.... <b>Schutzklasse:</b> I			
<b>Messgerät:</b> EUROTTEST 701/702 S; Serien-Nr.: 12928 <span style="float: right;"><b>nächste Kalibrierung:</b> 0305</span>			
<b>Prüfung vom:</b> 11.05.2004 - 08:51:13 <span style="float: right;"><b>Druck vom:</b> 14.05.2004 - 07:07:09</span> <b>Auswertung:</b> PC-SOFT 3.0 (Autom.)			
<b>Sichtprüfung:</b>	i.O.    nicht i.O. X		
<b>Messungen</b>	<b>Messbereich / Methode</b>	<b>Messwert</b>	<b>Grenzwert</b>
R-PE	R-PE / 20VAC, I-K>200mA	0,07 Ohm	0,30 Ohm
R-ISO	R-ISO / 500VDC, I-K<5mA	> 19.99 MOhm	1,00 MOhm
I-EA	I-EA / 40VAC, I-K<2mA	0,05 mA	3,50 mA
I-ABL (I-SL)	I-ABL / Direkt, Ri~2K	0,01 mA	3,50 mA
I-ABL (I-BR)	I-ABL / Direkt, Ri~2K	0,01 mA	0,50 mA
<b>Funktionsprüfung und (falls erforderlich) Prüfung der ergänzenden Festlegungen:</b>			X
<b>Bemerkung:</b> <i>Nachfolgende Geräte werden nach gleichen Kriterien gebaut. Prüfprotokolle der Geräte können, unter Angabe der Geräteseriennummer, bei uns eingesehen werden.</i>			
<b>Ergebnis:</b> <b>Der Prüfling hat die Prüfung bestanden!</b>			
<b>Verantwortlicher Unternehmer:</b>		<b>Prüfer:</b>	
Eschweiler, 13.05.2004, Scheliga		Gerätebau - Steuerungstechnik - Industriescrive <b>Günther Scheliga</b> Aachenerstr. 79 52249 Eschweiler Tel.: 02403 / 877432 Fax: 02403 / 877445 	
Ort, Datum, Unterschrift, Stempel		Eschweiler, 11.05.2004, Nüsser	
Ort, Datum, Unterschrift, Stempel		Ort, Datum, Unterschrift, Stempel	

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Aufbewahrungsfrist &gt; 3 Jahre bis 05.07

## TLD-Map opener / TLD-Holderopener

To open the dosimeter maps is offered a map opener.

The map opener makes fast access possible to the TLD crystals by automatic opening of the maps.

Further information on request.

