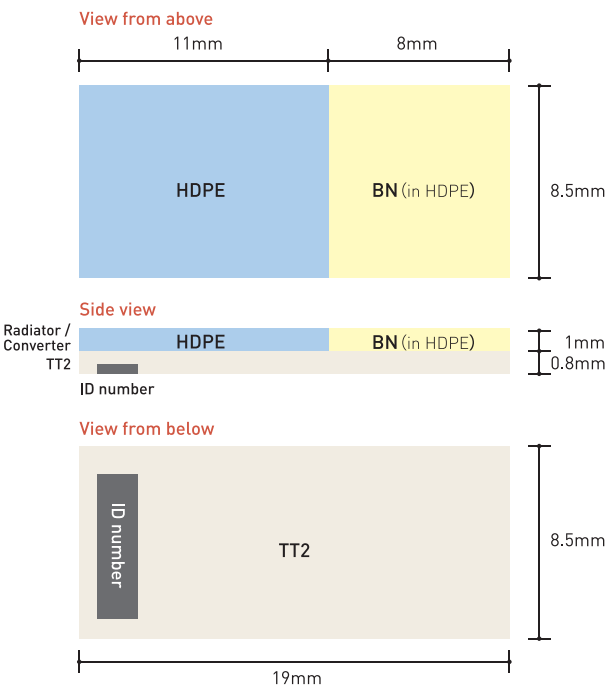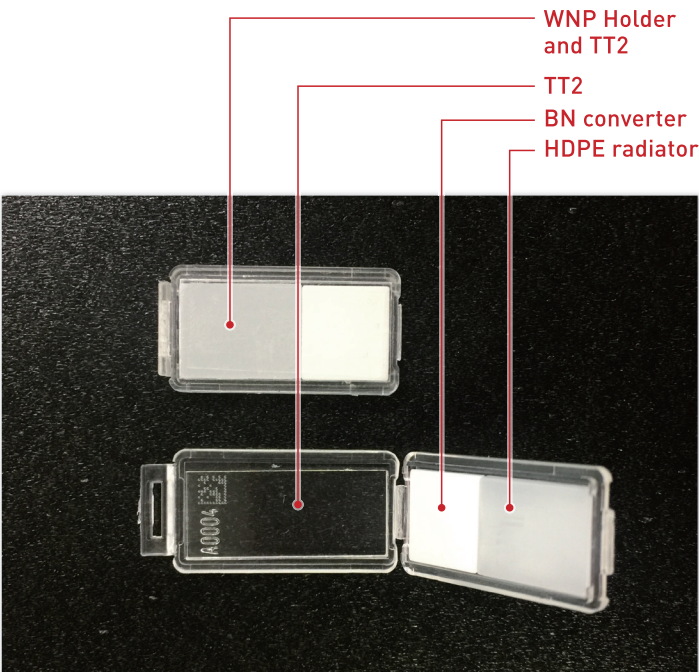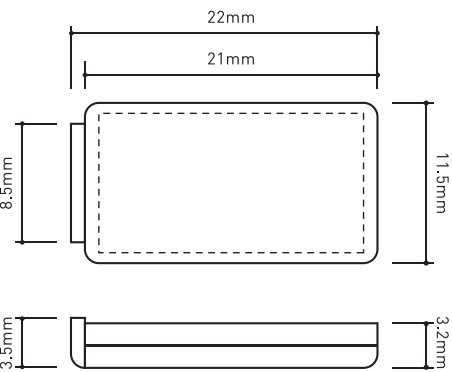Neutron dosemeter for individual monitoring

Wide-range Neutron Pit (WNP) System

Wide-range Neutron Pit (WNP) is our original neutron dosemeter system.
The dosemeter consists of TechnoTrak2 (TT2) detector and WNP holder.
Two kinds of filters, radiator and converter are built into WNP holder,
and enable to mesure wide-range energy of neutron,
namely fast to thermal neutrons.
High Density Poly Ethylene (HDPE) and Boron Nitride (BN) are used for
the radiator and converter, respectively.
In addition, we suggest the efficient etching method and high accuracy
microscope reader.
The WNP System was developed based on CTC dosimetry service
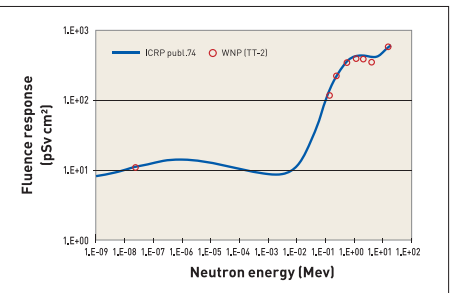which meets ISO 21909-1.

Structure of WNP holder

View from above

11mm | 8mm

| HDPE | BN (in HDPE) |

8.5mm

Side view

Radiator / Converter
TT2

| HDPE | BN (in HDPE) |

1mm
0.8mm

ID number

View from below

ID number | TT2

8.5mm

19mm

Size of WNP holder

22mm
21mm
8.5mm
11.5mm
3.5mm
3.2mm

Excellent energy characteristic

Energy characteristics of WNP

ICRP publ.74   WNP (TT-2)

Fluence response (pSv cm²)

Neutron energy (Mev)

1.E+03
1.E+02
1.E+01
1.E+00
1.E-09 1.E-08 1.E-07 1.E-06 1.E-05 1.E-04 1.E-03 1.E-02 1.E-01 1.E+00 1.E+01 1.E+02

WNP Holder and TT2
TT2
BN converter
HDPE radiator

Analyzed area information
Classified into groups of size of etch pits
Analyzed surface of TechnoTrak by Microscope

＊Above is a pit image of the heavy ions.

TLS-1000 Reader

Automated separation between etch pit and dust
Conventionally, dusts are distinguished from etch pits by human eyes, entailing human errors. Now, dusts are automatically excluded based on more accurate determination by the application algorithm.

Automatically eliminate the adhered dust

Specifications

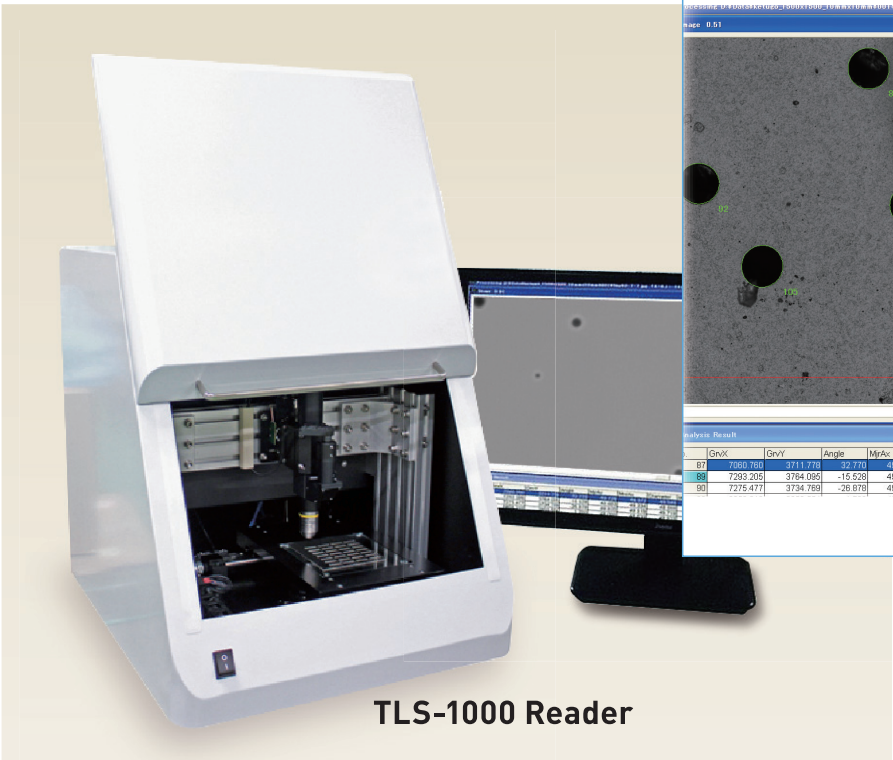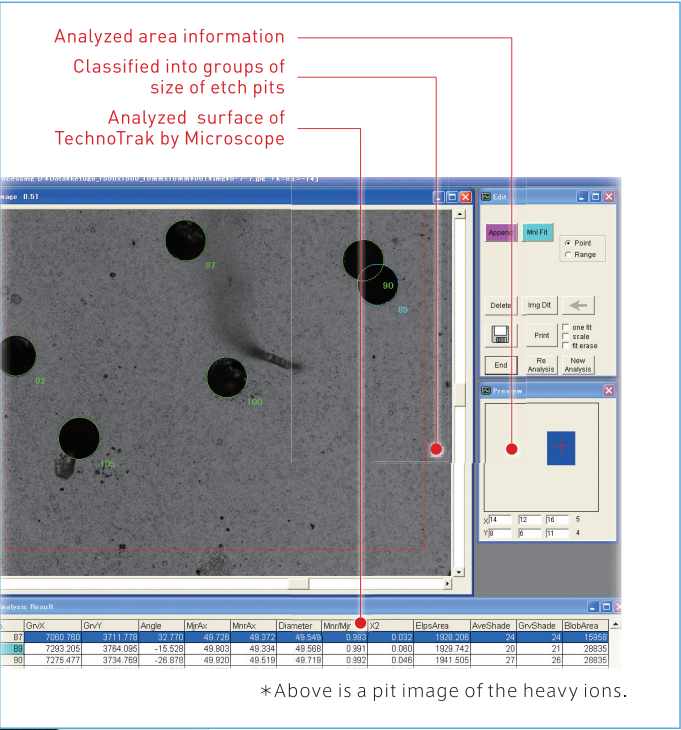|		
Dosemeter	Detector	TechnoTrak2 (TT2) 360 detectors/sheet
		8.5 mm x 19 mm with ID number
	Holder	WNP Holder
		Radiator: High Density Poly Ethylene (HDPE)
		Converter: Boron Nitride (BN)
		Size: W11.5 x D22 x H3.5 mm (see drawing left)
	Energy range	Neutron: 0.025 eV to 15 MeV
	Dose range	Fast neutron: 0.1 mSv to 60 mSv
		Thermal neutron: 0.1 mSv to 8 mSv
	Neutron sensitivity (²⁴¹Am-Be)	1240 ± 30(1σ) etch-pits/cm²/mSv (with HDPE)
	Background noise	20 ± 20(1σ) etch-pits/cm²
	ID	1 alphabet and 4 digits number
Reader	Dissolution	0.550 µm/pixel
	Viewing field	1.268 mm2 (1.126 mm x 1.126 mm)
	Auto focus	Contrast mode/Surface detection mode
	ID reading	Automatic ID recognition unit
	Readout time	It can measure 100 TT2 detectors within 2 hours successively.
	Continuous reading	100 detectors
	Analysis function	PitFit2 can present the distribution chart of pit.
	Power supply	200 V, Power Consumption 500 VA or less
	Power consumption	Max. 500 W
	Dimentions/weight (excluding PC unit)	W660 x D610 x H600 mm, 60 kg
	Imaging	Multi-layer imaging:Automatical recognition of adhered dusts in the image

Products
- TechnoTrak2 / WNP holder
  Reader (Microscope):TLS-1000
  Etching kit (optional)

Applications
- Personal dosemeter