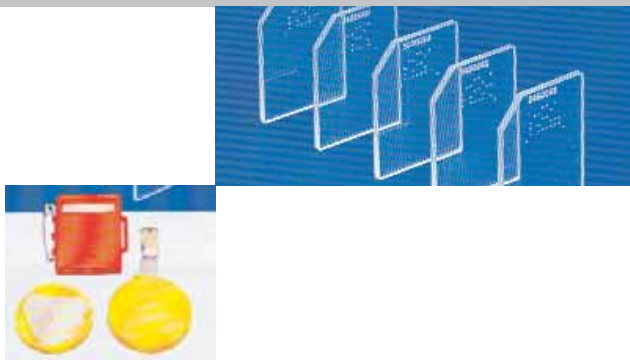


The Autoscan 60 is designed to read detectors after the tracks have been chemically etched, a technique which offers advantages both in dosimetric performance and in the practical aspects of running a dosimetry service

## Autoscan 60

The first production Track Etch Reader for neutron and radon dosimetry



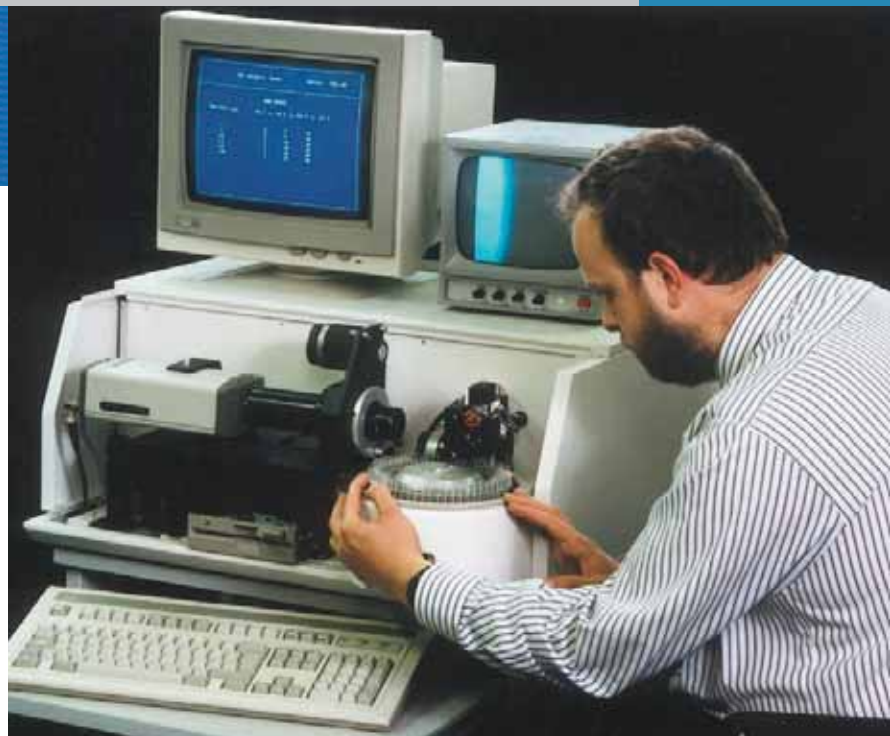
### System Elements

**Detectors:** These are small rectangular pieces of PN3 Polymer engraved with a unique identity.

**Dosemeters:** The dosemeters consist of one or more detectors assembled into a holder and configured for a particular application.

**Carousels:** For ease of handling, up to 60 exposed detectors are loaded on to a carousel before processing, and are then carried by the carousel during the pre-etch, etch, wash, dry and read stages.

**Etching tanks:** These constant temperature baths contain the etchant under stable conditions.



Exposures to heavy ionising particles are generally measured by counting the tracks they produce in a film of nuclear emulsion or polymer. The Autoscan 60 can accept a carousel loaded with up to 60 polymer detectors. It reads their identity codes and determines the track counts automatically. A carousel loaded with 60 typically exposed detectors may be read within 30 minutes.

Detectors are assembled into different holders to provide doseimeters for different applications. Applications are chiefly found in the dosimetry of radon and of thermal,

low intermediate and fast neutrons. Exposed detectors are processed by chemical etching. This method of visualising the tracks has important advantages, in comparison with the counting of tracks in nuclear emulsions (NTA) and with electrochemical etching.

The setup conditions of the Autoscan 60 cannot be altered during routine use, but may be adjusted over a wide range for experimental purposes, allowing the limits of operation to be investigated, optimised or extended and providing scope for further applications.

## System Specifications

The Autoscan 60 is a stand-alone Reader for track etch detectors. A loaded carousel is placed in the Reader where it is driven by the motor. The positions containing detectors may be keyed in beforehand to save processing time. After a detector has been automatically driven to the read station it is edge-illuminated via a light guide. Light scattered from the tracks produces intense spots which are imaged by a motorised microscope and scanned by a CCTV camera. The scanned image is stored and analysed and the identity code and track count retained in memory. Results are available on disc or hard copy for use by external recordkeeping systems. The basic Autoscan 60 includes sufficient computing power for dose management software to be accommodated as an optional extra.

### Technical Specifications

#### Detectors

|                       |  |
|-----------------------|--|
| Material:             | PN3 polymer  |
| Overall dimensions:   | 20 H x 25 W x 1.5 D mm (.75 H x 1 W x .06 D inches)  |
| Neutron energy range: | approx. 200 keV to greater than 15 MeV without radiators. Thermal and near thermal with radiators. |

#### System

|                               |  |
|-------------------------------|--|
| Fast neutron dose range:      | <0.2 mSv to 20 mSv inherently linear. Doses up to 100 mSv can be measured by alternative procedures.   |
| Typical sensitivity settings: |  |
| Am-Be neutrons:               | 200 to 400 tracks.cm <sup>2</sup> per mSv (planar holder, normal incidence) 125 to 250 tracks.cm <sup>2</sup> per mSv (pyramid holder, any angle of incidence) |
| Radon:                        | 0.7 to 2.5 tracks.cm <sup>2</sup> per kBq.m <sup>3</sup> .h  |
| User selectable:              | Settings are user-selectable to match the spectrum, dynamic range and degree of background rejection   |

#### Reader

|                     |   |
|---------------------|---|
| Automatic Mode:     | Stabilised track illumination and grey level threshold  |
| Manual Mode:        | User control of track illumination and grey level threshold   |
| Analysis time:      | 60 elements within 30 minutes (doses <10 mSv)   |
| Displays:           | i. Auto-running display of track count as acquisition occurs<br>ii. Raw Data Histogram (distribution of pixels at each image grey scale level)<br>iii. Histograms (distribution of individual track image areas)  |
| Databases:          | i. System Parameters<br>ii. Historical Results (last 6000 detectors)<br>iii. Histogram Data (last 400 histograms)   |
| Data Export:        | i. Automatic ASCII text files<br>ii. Selectable Data Interchange Format (DIF) files for loading to spreadsheets<br>iii. PCX graphics file of histograms for export to DTP applications etc.<br>iv. Log of illumination adjustments as an ASCII text file<br>v. Selectable archiving to external store |
| Camera:             | 13 mm (0.5") CCD composite video, 579 x 5.83 elements   |
| Image Analyser:     | 512 x 512 pixels each with a 256 level grey scale for intensity   |
| Processor:          | 386S X 33 motherboard with 4 MB RAM   |
| Displays:           | i. 640 x 480 pixel VGA Colour Monitor (results display).<br>ii. 23 cm (9") monochrome composite video monitor (displays track images)   |
| Disc Drives:        | one 9 cm (3.5") high density floppy disc plus 40 MB hard disc   |
| Environmental:      | Temperature: 10 °C to 35 °C (50 °F to 95 °F)  |
| Humidity:           | up to 70% non-condensing  |
| Power requirements: | 196 to 264 Vac, 50 Hz, 3 A or 100 to 125 Vac, 60 Hz, 6 A  |
| Dimensions:         | 140 H x 70 W x 78 D cm (55 H x 28 W x 31 D inches)  |
| Weight:             | 67 kg (148 lbs) nett, 120 kg (265 lbs) packed for shipping  |

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