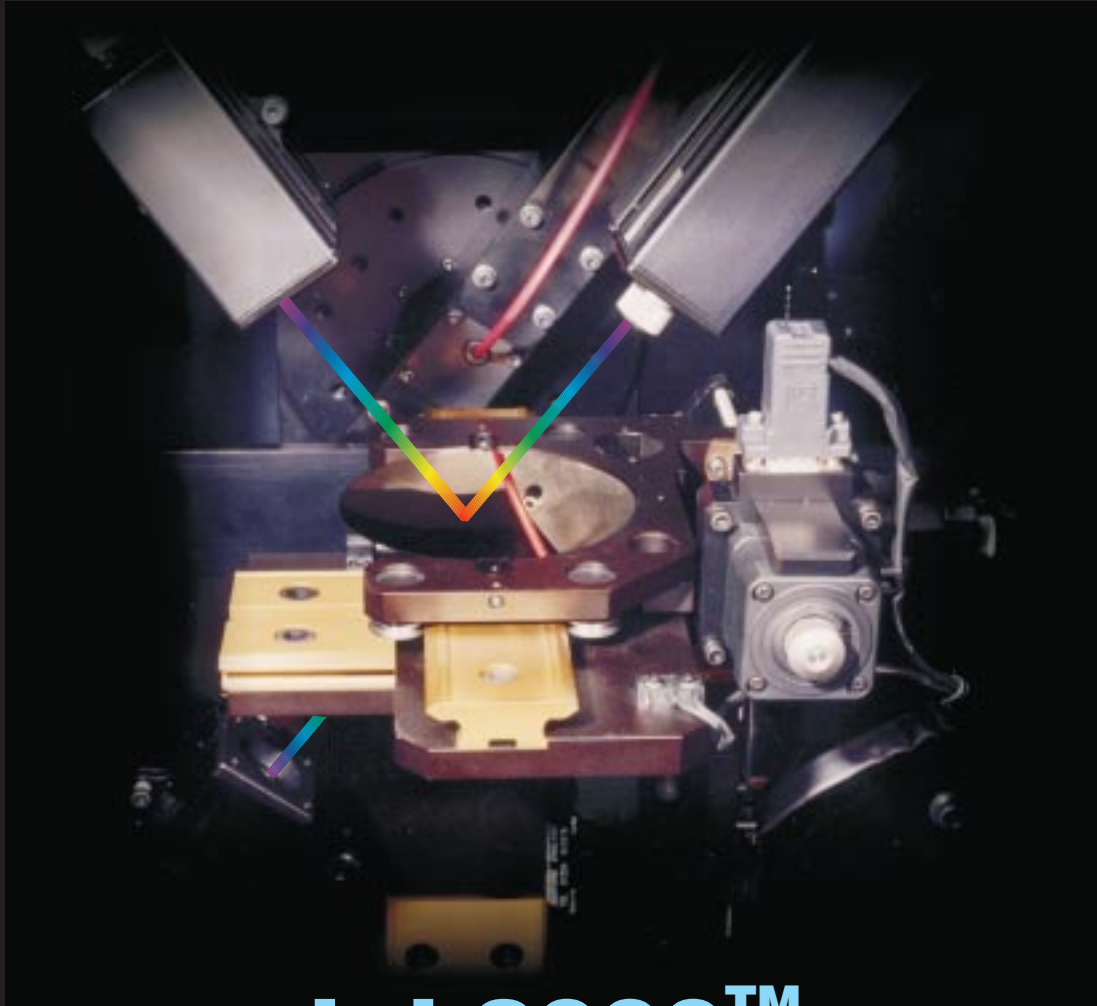


Advanced thin film characterisation

Ag
Air
Al
Al₂O₃
AlCu
AlSb
Au
BK7
CaF₂
CdTe
Co
Cr
Crown glass
Cu
Diamond
Float glass
GaAs
GaAsO
GaP
Ge
HfO₂
ITO
InAs
InGaAs
InP
InSb
Ir
KCl
MgF₂
MO
Ni
PEN
PET
Pbs
PbSe
Pd
Photo-resist
Poly-carbonate
Polyimide
Polymer
Pt
Quartz
Si
Si₃N₄
SiC
SiO
SiO₂
SiO₂
Si am
Ta₂O₅
Ti
TiNi
TiO₂
W
WO₃
ZnS
ZnSCub
ZrO₂



nkd-8000™

- Optical characterisation of thin films and substrates
- Wide wavelength range
- Optical properties of metals measured
- Ideal for R and D and QA
- Variable angle of incidence and detection in 1 degree increments
- X and y mapping
- Coherence factors for measuring uneven surface
- Measurement of t and r simultaneously
- Measures thick films
- Transmission can be measured at normal incidence
- Transparent samples can be measured
- No special sample presentation required
- Horizontal sample platform
- Non-destructive

Measures transmittance and reflectance
Determines n, k and thickness

Aquila
Instruments

What is the nkd 8000™ ?

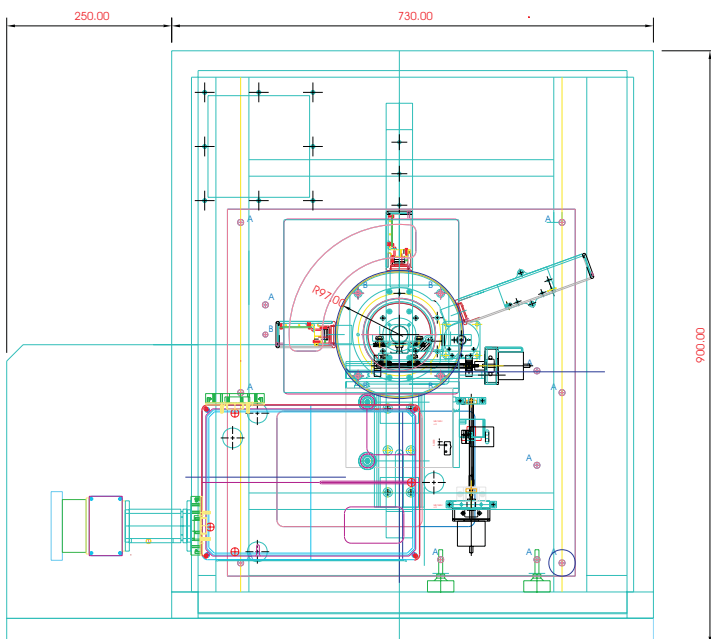
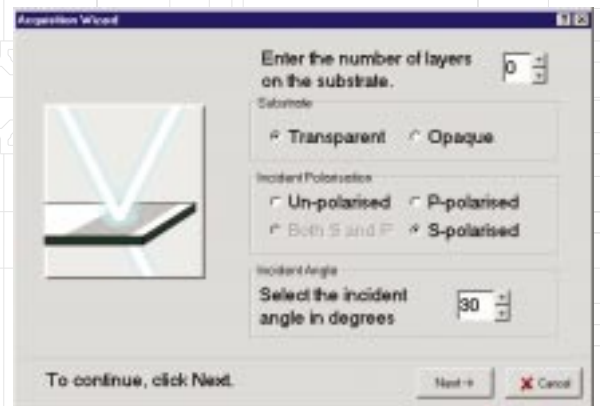


The powerful new software, electronics and hardware combine to make one of the most accurate thin-film analysis tools available. The computer automation enables the user to collect even more data with greater ease. Making it an idea tool for Laboratory, research and development, quality control, process monitoring, reverse engineering, film characterisation, thickness measurement and substrate characterisation.

The nkd-8000™ is a new revolutionary purpose built instrument for optical measurement and analysis of thin films and substrates.

It is a fully integrated scanning spectrophotometer and thin film analysis software package. It combines the accuracy of the classic nkd-7000™ with some advanced new options, such as the variable angle mechanism and the x-y mapping platform.

No special preparation of the substrate is required, transmission and reflection are measured simultaneously with n, k and thickness determined with no extra attachments.



New Features include:

- ★ Colour co-ordinate calculations
- ★ Solar calculations
- ★ Metal film calculations
- ★ Automatic polariser
- ★ Automatic reference sample scan
- ★ Temperature controlled sample holder

How does it work?

A large amount of data is collected from a robustly constructed purposely built spectrophotometer.

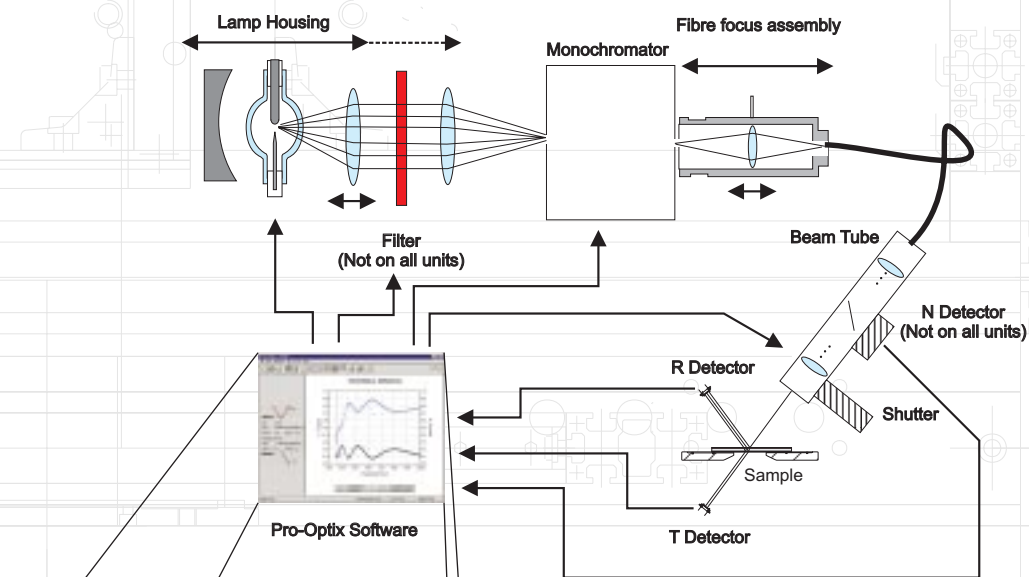
Monochromatic light is focused onto the sample by a sophisticated beam delivery device. The transmitted and reflected light are measured for p- and s- polarization. The light is measured using independent photodetectors.

The data is collected, analysed and plotted using the powerful Pro-Optix™ software. The software then uses a variety of analytical models to represent the complex refractive indices of each material in the sample.

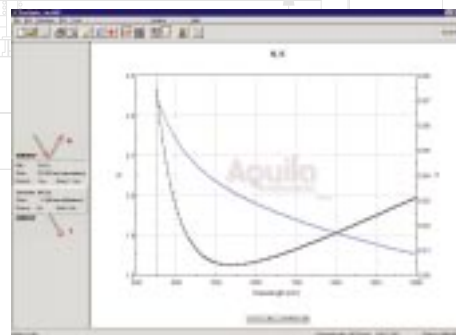
The models are designed to accurately reproduce n and k using the smallest number of free parameters.

Starting with initial parameters from the system's built-in database, the analysis algorithms use intelligent procedures to match the measured spectra.

If a particular material is not already present in the extensive database, the advanced analysis mode provides a range of tools to construct and refine a new dispersion model.



Transmission and reflection are measured simultaneously from the same spot for a selected wavelength



From the analysis mode of Pro-Optix™ the refractive index, coefficient of absorption and the thickness of the coating are accurately determined.

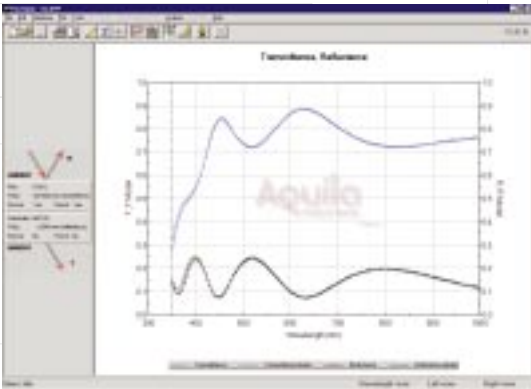
Features and benefits

Feature	Benefit
Integrated Optics, software, electronics and hardware	Single, simple turnkey solution
Measures in both p- and s- polarisation	More functionality and data equals more accurate results
Fully enclosed sample chamber	Less contamination and more reliable data
Horizontal sample platform	Can measure samples from 10mm to 300mm diameter and easy sample handling
Measures transmission and reflection simultaneously from the same spot	More consistent and accurate results and no special sample preparation is required
Powerful software	Fast analysis and multiple reflections are taken into account
Large Data base	Data base can be added to making future analysis even faster
Variety of powerful regression techniques available for analysis	Even completely unknown materials can be analysed
Multiple reflections are taken into account in the software	Any substrate, including transparent one can be used with no special preparation
Wide range of accessories	More information can be determined about the sample

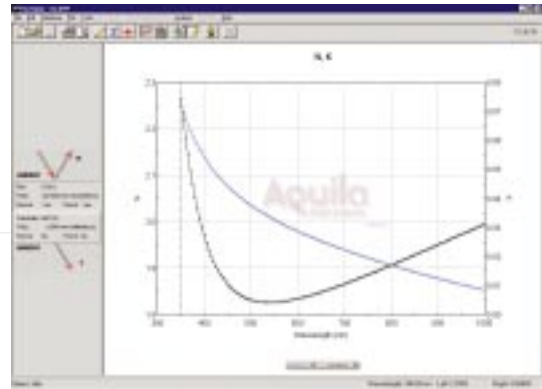


The vibration isolated and totally enclosed design limits environmental noise such as air-flow, light and E.M.C.

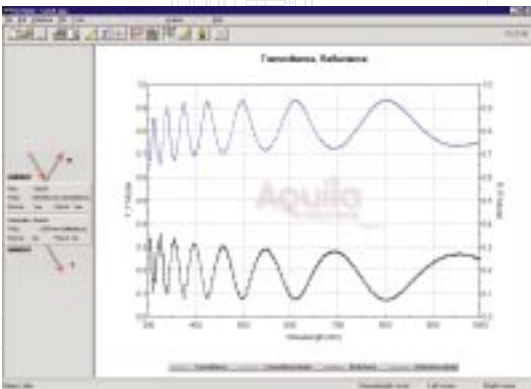
Examples



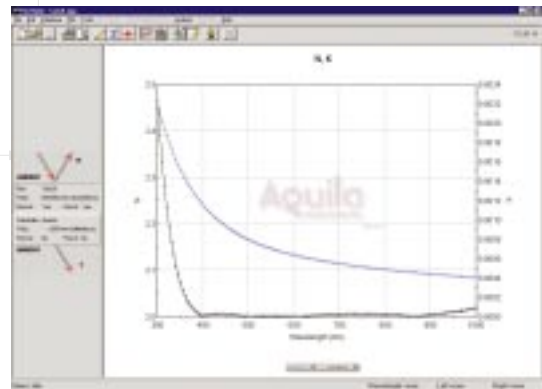
ITO on BK7 T and R



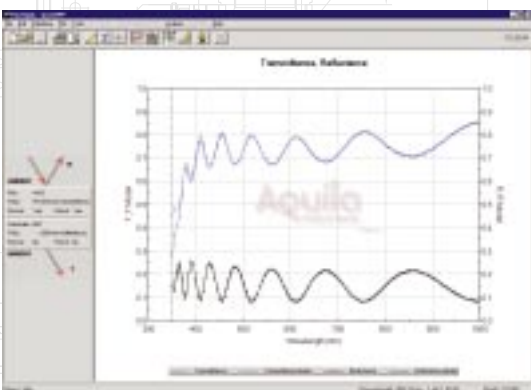
ITO on BK7 n and k



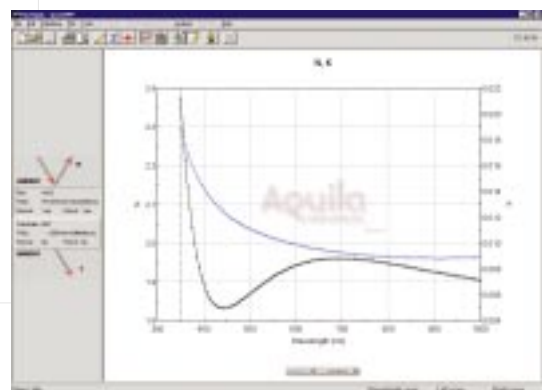
Ta₂O₅ on Quartz T and R



Ta₂O₅ on Quartz n and k



WO₃ on BK7 T and R



WO₃ on BK7 n and k

Wavelength (nm)	n	k	T	R
200	2.000	0.000	0.000	0.000
300	1.950	0.000	0.000	0.000
400	1.900	0.200	0.000	0.000
500	1.850	0.150	0.000	0.000
600	1.800	0.100	0.000	0.000
700	1.750	0.050	0.000	0.000
800	1.700	0.020	0.000	0.000
900	1.650	0.010	0.000	0.000
1000	1.600	0.000	0.000	0.000

The data can also be shown in tabular form and be cut and pasted into other standard programs

Using Pro-Optix™ to make the measurement

1. Click "start a new experiment"

2. Chose measurement parameters

3. Specify known details

4. Select wavelength range and x-y position

5. Start the scan

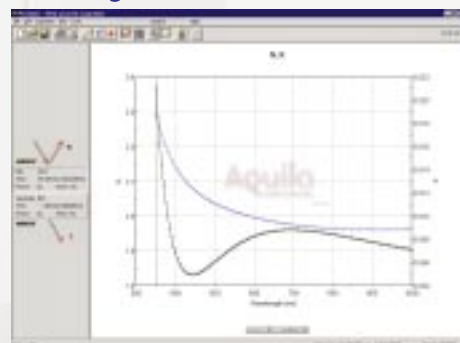
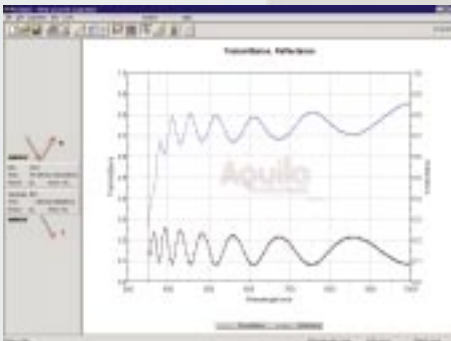
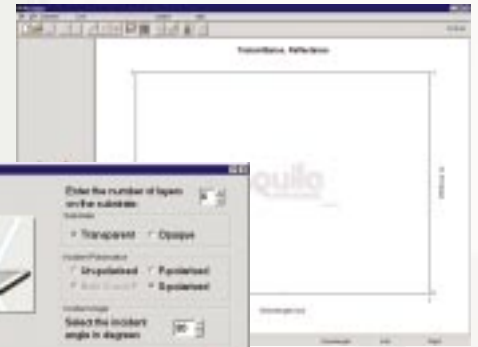
Pro-Optix™ plots the transmittance and reflectance

Using Pro-Optix™ for the Analysis

1. Select parameter and default mode

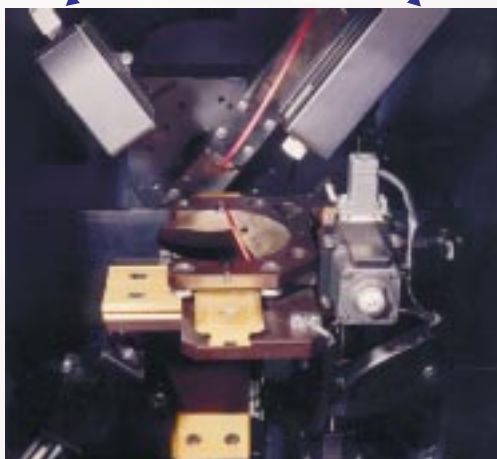
(Advanced mode is required for more complex samples)

Pro-Optix™ calculates and plots n and k and also determines the thickness

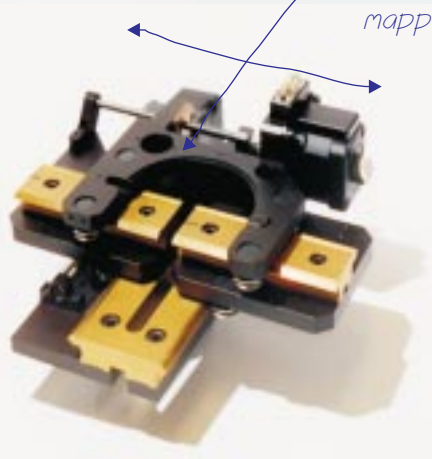


Accessories

Like these angles!



Looks useful for mapping!



Variable Angle

(shown with x-y mapping platform)

Ouch, this looks hot!!



These look handy!



Heated sample chuck

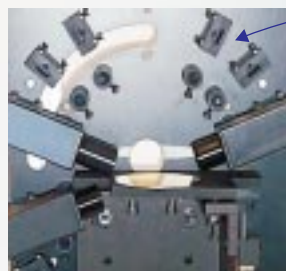
Sample inserts

(Inserts can also be made to specification)

Nice place for the PC!



3 useful angles!!



Pedestal

(Includes draw and industrial PC)

Could be needed for those small samples!



Multiple angle

This could save time!



Micro-spot beam delivery

Automatic polariser

Technical specifications

Spectral range	nkd-8000 350nm – 1000nm (standard model) nkd-8000v 280nm – 1000nm (UV enhanced model) nkd-8000r 800nm – 1700nm (infrared model) nkd-8000w 350nm – 1700nm (wide spectrum model*) * wide spectrum model is supplied with two detectors covering 350nm - 1000nm and 800nm to 1700nm which cannot be used simultaneously. An option for 350nm –2.5microns is also available
Sample size	From 10x10mm (minimum) to 250x250mm (maximum) standard system up to 100mm diameter for X-Y mapping stage
Layers	Up to 5 layers with 2 unknown parameters.
Film Thickness Range	5nm to 20 micrometers depending on sample type.
Substrates Materials	Transparent, opaque, semi-absorbing or semi-conductor. Dielectrics, polymers, semiconductors, and metals.
Incident Beam Angle	30, 50 or 70 degrees (standard unit) or any customer-specified angle 20-70 degrees continuously variable (variable angle version)
Spot size at sample	5mm (standard system), 200 micrometer option available
Power	220V, 50Hz, 2A or 110V, 60Hz, 3A
Overall Dimensions	89cm x 54cm x 72cm
Weight	105 Kg (Varies depending on type and accessories)

For further specifications or information please contact your nearest sales office

Aquila instruments Ltd reserves the right to change any details without prior notice

SIMPLE, FAST AND ACCURATE!

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