

## **Dichrograph model CD6 / Jobin Yvon Division d'Instruments S.A.**

### **Contributors**

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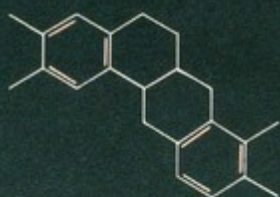
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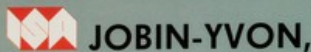
# DICHROGRAPH

## MODEL CD6



**JOBIN  
YVON**  
DIVISION d'INSTRUMENTS S.A



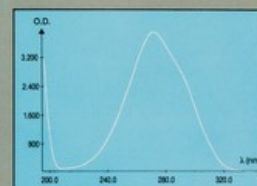
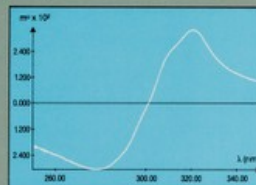
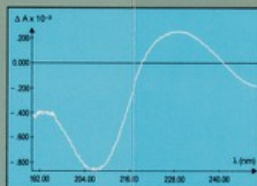
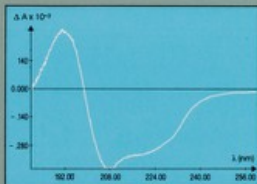
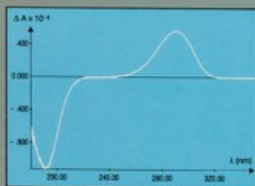


The world leader in optical spectroscopy, has long been involved in the field of circular dichroism spectrometry. The first commercially available spectrometer was patented in 1960 in collaboration with ROUSSEL-UCLAF. Since that time, a highly successful series of circular dichroism spectrometers has followed and JOBIN-YVON now presents the latest high performance model, the DICHROGRAPH CD6.

With over 15 years experience and several hundred installed units in the field, JOBIN-YVON is ideally placed to understand the analytical requirements of users of circular dichroism spectrometers. This latest instrument is the result of both past experiences and an exchange of ideas with many leading circular dichroism specialists. It is designed to meet the analytical needs of biochemistry, biotechnology and pharmaceutical laboratories where accurate and reliable measurements of circular dichroism (and related optical activity) are of ever-increasing importance.

The DICHROGRAPH CD6 retains the exceptional optical quality perfected during the development of its predecessors, the Mark III, IV and V. The carefully designed and airtight sample compartment, which has a minimum of dead volume, will satisfy all but the most exotic applications. No other circular dichroism spectrometer can match the sensitivity and throughput of the DICHROGRAPH CD6 in the important UV range down to 180 nm. This applies equally well to measurements of circular dichroism, linear dichroism, absorption and flux.

The comprehensive software is packed with many state-of-the-art features, but remains above all simple to use. This will enable you to exploit your DICHROGRAPH CD6 to the full. Compact, elegant and ergonomically designed, the DICHROGRAPH CD6 is a high performance and rapid circular dichroism spectrometer which might well become the most precious analytical tool in your laboratory!!!



### Configuration

The DICHROGRAPH CD6 consists of:

1. an optical bench incorporating a stabilised, high intensity xenon lamp double prism monochromator, photoelastic modulator, sample compartment and detector.
2. high speed digital electronics for controlling all the basic instrument functions including: monochromator scanning, slit width (bandpass), data acquisition and instrumental functions (gain, detector HT)
3. a computer, typically IBM® PC®/AT® or PS® (or a suitable compatible computer) configured as follows:
  - 1.2 Mbyte floppy disk, 20/40 Mbyte hard disk and 640 K RAM
  - 80286 (or 80386) processor and 80287 (or 80387 co-processor)
  - enhanced graphics adapter (or VGA) and enhanced colour monitor
  - DOS 3.2. (or most recent equivalent) operating system with document
  - serial and parallel output ports
4. a digital plotter and a dot matrix printer
5. a comprehensive software written in TURBO-PASCAL

### Options and Accessories

A wide range of accessories is available for related techniques and measurements:

- extension of wavelength range from 800 to 1000 nm
- linear dichroism attachment
- analyser for ORD measurements
- magnetic circular dichroism attachments
- heated and cooled sample cells
- chromatography micro-cell
- stopped-flow and fluorescence (FDSD) accessories.

## SPECIFICATIONS

- double monochromator equipped with 2 artificially grown quartz prisms
- spectral range : 180-800 nm (may be extended to 1000 nm)  
Lower mechanical limit 175 nm
- 250 Watt xenon source with regulated current power supply
- software-controlled, constant bandpass slits (variable from 0 - 5 mm)
- photoelastic modulator\* operating at 18.5 kHz
- shutters at entrance and exit of sample compartment
- "selected" high sensitivity Hamamatsu R-376, 28 mm end window PMT
- maximal speeds : 42 nm/s for wavelength calibration  
0,75 mm/s slit opening / closing
- minimum step size : 0,1 nm wavelength scanning  
0,5 microns slit width
- reproducibility :  $\pm 0,1$  nm below 500 nm  
 $\pm 0,2$  nm above 500 nm
- baseline stability : 0,5 millidegrees / day after 1 hour warm-up in a thermostated room
- RMS noise : measured under the following conditions  
- optical density = 1  
- 5 s integration time  
- 1 nm bandpass (2 nm at 185 nm)

C.D.		O.R.D.	
185 nm	$2,5 \times 10^{-5} \Delta A$	300 nm	0.5 m°
200 nm	$2,5 \times 10^{-5} \Delta A$	400 nm	0.4 m°
300 nm	$3 \times 10^{-6} \Delta A$	500 nm	0.4 m°
400 nm	$2,5 \times 10^{-6} \Delta A$	600 nm	0.5 m°
600 nm	$3 \times 10^{-6} \Delta A$		

- full scale sensitivity : 0.10  $\Delta A$  (3300 millidegrees)  
maximum signal resolution:  $10^{-8} \Delta A$  ( $0.33 \times 10^{-3}$  millidegrees) at maximum gain
- wavelength accuracy :  
180-200 nm  $\pm 0.1$  nm  
200-300 nm  $\pm 0.1$  nm  
300-400 nm  $\pm 0.5$  nm  
400-500 nm  $\pm 2$  nm
- absorption range : 0 - 4 optical density full scale
- integration time : 1 ms - 60 s
- electrical requirements : 220 V single-phase, with earth - 1 kW
- water flowrate : 1 - 1.5 l/min
- nitrogen flush : at switch-on : 22 l/min for 15 minutes. During operation : 2 - 3,5 l/min. Pressure : 1 - 2 bar
- overall dimensions :  
optical bench : 110 (w) x 60 (d) x 30 (h) cm  
electronics : 45 (w) x 35 (d) x 15 (h) cm  
\* Licence ANVAR-ESPCI

## SOFTWARE PACKAGE

### 1. Automated spectrometer functions

- wavelength calibration
- slit width calibration
- constant bandpass
- purging of monochromator and sample compartment
- gain selection
- PMT high voltage
- sample compartment shutters

### 2. Acquisition modes

- CD calibration with a choice of different calibration standards
- simultaneous measurements of CD and absorbance (or LD and ORD)
- measurement of flux
- scan and integration routines in up to 5 independent spectral windows
- intensity versus wavelength or time
- measurement with or without automatic baseline subtraction
- choice of units for CD measurements : ellipticity, molar ellipticity,  $\Delta A$ , molar CD or any customer specified unit
- choice of units for ORD measurements : millidegrees, molar or specific ORD, or any customer specified unit
- automatic ORD correction
- choice of wavelength units

### 3. Manipulations and data treatment :

- scalar mathematical functions (+, -, x, /)
- log, ln, 1st and 2nd derivatives
- addition, subtraction and division of spectra
- summation of up to 99 selected spectra
- comparison and overlay of spectra
- smoothing (Savitsky-Golay)
- digital filtering
- baseline correction and manual error correction
- automatic peak finding/labelling
- area calculation
- 3-D viewing and plotting
- automatic "glueing" of spectra acquired in adjacent windows

### 4. Utilities

- data conversion into ASCII format
- generation of specific formats for digital plotter
- report generation
  - instrumental conditions
  - detector settings
  - record of all mathematical manipulations performed
  - user-added comments



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