

# Quartz Control Plates and Temperature Controllable Quartz Control Plates

## WITH UKAS ACCREDITED CERTIFICATES OF CALIBRATION FOR POLARIMETER STANDARDISATION

A quartz plate consists of one (or two) thin discs of optically worked crystalline quartz mounted in a tube, forming a "standard" sample for a polarimeter. These are the ideal standards for quality control laboratories as the quartz plate comes with a Certificate of Calibration accredited by UKAS, the United Kingdom Accreditation Service. The UKAS mark on the certificate of Calibration is your assurance that the laboratory (in this case Optical Activity Ltd.) issuing the certificate has been stringently assessed by independent experts and that the measurements are traceable to National and International Standards.

### Optical Properties of Quartz

Crystalline Quartz resembles an ordinary uniaxial crystal. When a beam of light passes through such a crystal, the light is split into two beams polarised at right angles. In the special case of uniaxial crystal cut perpendicular to its optic axis, the state of polarisation for a beam passing through the crystal remains unchanged. Quartz however is Optically Active. This phenomenon of optical activity was discovered in 1811 by Arago, who observed that with quartz, unlike an ordinary uniaxial crystal, the plane of polarisation is also rotated with respect to the incident beam. A number of crystals, both uniaxial and biaxial, are optically active, quartz being the best known example.

Quartz exists in two forms; one form, called Dextro-Rotary quartz, rotates polarised light in a clockwise direction, Laevo-Rotary quartz rotates in an anti-clockwise direction.

The specific rotation of quartz (i.e. the rotation of a 1mm thick plate) at a 20°C for light of wavelength 589.4400nm (sodium yellow) is 21.7 degrees. Variations with both temperature and wavelength are well known for quartz.

### Optical Activity Quartz Control Plates

All Optical Activity quartz control plates are manufactured to the specifications laid down by I.C.U.M.S.A. (The International Commission for Uniform Methods of Sugar Analysis) and are available with or without the facility for temperature control of the plates. The quartz disc or discs are mounted in a central cell, which provides the best protection from dirt or careless handling. In the temperature controllable version, the central cell is thermally insulated from the supporting sections and can be



connected to a thermocirculator to control the temperature by flowing fluid.

Optical Activity quartz plates are supplied in a fitted wooden box for safe storage.

Optical Activity quartz plates can be used in most polarimeters which accept the standard 30mm diameter end collars. Optionally, plates can be supplied adapted to fit polarimeters which require larger support collar diameters.

### Standard Rotation Values Available (normally ex-stock) are nominally:-

Angular degrees	+34°, +17° or +8.5°
International Sugar Scale (°Z)	+99, +50 or +25

Other rotations, either positive or negative, can be made to special order. If a plate of rotation less than 8.5° (less than 25°Z) is required, this must be made as a double plate because the minimum thickness of any quartz plate meeting the I.C.U.M.S.A. specification is 0.4mm. Smaller rotation standards are made by using one dextro and one laevo-rotatory quartz disc, the difference in rotation giving the required positive or negative rotation. Any rotation up to 90° can be provided for general use in checking and calibrating polarimeters, however only plates up to a maximum thickness of 1.6mm giving a rotation of  $\pm 34^\circ$  (100°Z) come within the I.C.U.M.S.A. specification.



OPTICAL ACTIVITY LIMITED

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Optical Activity is a UKAS accredited calibration laboratory for the calibration of polarimeters and quartz control plates. All Optical Activity quartz control plates are supplied with a UKAS accredited Calibration Certificate. The metal mount is engraved with a serial number for unique identification along with the optical rotation value at a temperature of 20°C and at the wavelength 589.4400nm (unless otherwise requested). A temperature calibration table is also supplied for each plate.



0527

Quartz Plate Rotation (all values are nominal)	Order Code
<b>Non-temperature controllable plates with UKAS certificate:-</b>	
99°Z (International Sugar Scale)	03-01
50°Z (International Sugar Scale)	03-02
25°Z (International Sugar Scale)	03-03
34 angular degrees	03-04
17 angular degrees	03-05
8.5 angular degrees	03-06
Special single plate, rotation to choice between 8.5 and 90 angular degrees (25 and 100°Z) positive or negative	03-07
Special double plate, rotation to choice between 0.5 and 8.5 angular degrees (1.5 and 25°Z) positive or negative	03-08
<b>Temperature controllable plates with UKAS Certificate:-</b>	codes as above but add 03-11

Dimensions	Non-temperature controllable	Temperature controllable
Length	120mm	172mm
Support collar diameter	30mm*	30mm*
Maximum height above optical centre	15mm	45mm
Weight (approx.)	255g	400g
<b>WOODEN BOX:</b>		
Size (l x d x h)mm	160x62x52	233x78x53
Weight	200g	550g

\*Larger diameters available

Your Local Distributor



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