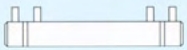
POLARIMETER TUBES

OPTICAL ACTIVITY LIMITED

POLARIMETER SAMPLE TUBES *AND* CELLS

SERIES A1 STANDARD SINGLE SAMPLE TUBES IN STAINLESS STEEL - with solid machine-turned brass end caps, plated for long life (the sample fluid comes into contact only with stainless steel and glass). The A1 tubes have two fillers; the sample is poured into one filler from an ordinary laboratory beaker, the second filler allows air to escape, minimising formation of bubbles. Any bubbles that do form can be removed easily by gently tilting the tube (rubber stoppers are available if required – part no. 05-24).

SERIES A2 JACKETED FLOW TUBES AND SMALL BORE TUBES - for flow or single sample applications. The tube inlets and outlets are extremely close to the end windows so that in flow applications there is no dead volume where bubbles or sample can be trapped. This unique design feature means that the small bore versions are easy to fill – use a hypodermic syringe which fits the luer taper in the filler tubes of the 4 and 2.5mm bore sizes. All A2 tubes are made of stainless steel, with plated brass end caps and are robust and indestructible in normal use.



SERIES A2 UNJACKETED SMALL BORE TUBES - maximum path length with minimum volume. If temperature control is required, select from the A2 jacketed series which are identical except for the addition of the thermostatable jacket.

SERIES A4 SMALL VOLUME CELLS - stainless steel with two fillers which have female luer tapers. For single sampling, use a hypodermic syringe (with standard luer taper end) to fill the cells; air is forced out of the second filler, eliminating all bubbles. A4 cells are also very suitable for flow applications or for filling with an autosampler as the cell design forces the sample fluid to flow across the window ensuring complete purging with no dead volume. Optionally we can supply A4 cells with screw couplings for microbore tubing.

SERIES A4 JACKETED - small volume cells. The 50 and 25mm

The superb range of quality polarimeter sample tubes manufactured by Optical Activity can be used in almost all polarimeter applications – and so, if you need to measure the tiniest amount of an expensive essential oil, or if you have litres of sample – one of our tubes is sure to be suitable. Our range is extensive and has been continually added to for over 20 years, but if you still don't see the tube you need, we will design and make a special – just let us know what you want.

Our tubes and cells use the internationally standard 30mm diameter collars. Tubes are to class A standard as specified by I.C.U.M.S.A. Where the tube material is stainless steel this is in all cases Type EN 58 (316) quality stainless steel. End windows are made from highly annealed strain free Crown glass, held in position by Nitrile O-rings (Viton O-rings are available to special order for use with solvents such as chloroform which attack Nitrile). The seal is glass to metal or glass to glass, essential for accurate tube length determination. The O-rings simply relieve pressure on the end windows, preventing strain, and do not come into contact with the sample in ordinary use.

To obtain the best results from your polarimeter, it is important to select the most appropriate tube for the particular sample to be measured. If your polarimeter will accept a wide variety of types and sizes of tubes, it makes the instrument more versatile. All Optical Activity polarimeters can be used with tubes as long as 200mm or as short as 5mm, with various tube bores (we offer from 8mm down to 1.5mm as standard), single sample or flow tubes which may be temperature controlled or not as required. If this choice proves confusing at first, the notes on the back of this leaflet are intended to assist you in choosing the best tube for your own use.

Adaptors are available to allow Optical Activity tubes to be used in other manufacturers' instruments which are designed to take non-standard diameter tubes.

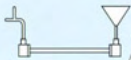
			PART NO.		BORE mm	PATH LENGTH mm	APPROX VOLUME ml.	FOR FLOW APPLI-CATIONS	ACCEPT LUER TAPER
A1	8 x 200	stainless steel	04-01	*	8	200	10	No	No
	8 x 100	s.s.	04-02	*	8	100	5	No	No
A2	8 x 200	jacketed s.s.	04-03	*	8	200	10	Yes	No
	8 x 100		04-04	*	8	100	5	Yes	No
	4 x 200		04-05	*	4	200	2.5	Yes	Yes
	4 x 100		04-06	*	4	100	1.3	Yes	Yes
	2.5 x 200		04-07	*	2.5	200	1.0	Yes	Yes
	2.5 x 100		04-08	*	2.5	100	0.5	Yes	Yes
A2	4 x 200	unjacketed s.s.	04-09		4	200	2.5	Yes	Yes
	4 x 100		04-10		4	100	1.3	Yes	Yes
	2.5 x 200		04-11		2.5	200	1.0	Yes	Yes
	2.5 x 100		04-12		2.5	100	0.5	Yes	Yes
A4	5 x 50	s.s.	04-15	*	5	50	1.0	Yes	Yes
	5 x 25		04-16	*	5	25	0.5	Yes	Yes
	5 x 10		04-17	*	5	10	0.2	Yes	Yes

path length stainless steel A4 cells are available jacketed for sample temperature control using fluid flow from a thermocirculator. (If temperature control is required for a 5 or 10mm path length cell, a thermostatable 'shoe' is available – part no. 04-27)

SERIES A4-P CELLS - all the features of the A4 series cells, but made from glass-loaded PTFE, suitable for acid samples.

SERIES F5 JACKETED TUBES - similar to the series A2 stainless steel jacketed flow tube, but with stainless steel funnel and siphon breaker fitted for rapid sampling; simply use a piece of plastic or similar tubing to run the siphon breaker outlet to a collection/waste vessel and pour samples one after another into the funnel. Each succeeding sample will displace the previous one provided approximately 50ml of fluid is available (optimum sample volume depends on tube size and type of sample).

SERIES F5 UNJACKETED TUBES - as series F5, for applications where sample temperature control is not required.



SERIES P6 PRESSURE TUBES - suitable for in-line flow use; will stand pressures up to 3 bar (not jacketed). All stainless steel construction. Inlet/outlet tube outside diameter 6.35mm (¼ inch) suitable for standard ¼ inch pressure fittings (such as 'Swagelok™' or 'Gyrolok™' – not supplied with the tube but available from Optical Activity on request).

SERIES G7 GLASS SINGLE SAMPLE TUBES - similar in design to the series A1 tubes with two fillers, offered for customers measuring acid samples which would attack stainless steel. The glass tubes have stainless steel collars and good quality machine-turned, plated brass end caps. Samples are poured directly into the 15mm diameter glass fillers from a beaker.

	5 x 5		04-18	*	5	5	0.1	Yes	Yes
	2.5 x 25		04-19	*	2.5	25	0.125	Yes	Yes
	2.5 x 10		04-20	*	2.5	10	0.05	Yes	Yes
	2.5 x 5		04-21	*	2.5	5	0.025	Yes	Yes
	1.5 x 10		04-22		1.5	10	0.02	Yes	Yes
	1.5 x 5		04-23		1.5	5	0.01	Yes	Yes
A5	5 x 50	jacketed s.s.	04-24		5	50	1.0	Yes	Yes
	5 x 25		04-25		5	25	0.5	Yes	Yes
	2.5 x 25		04-26		2.5	25	0.0125	Yes	Yes
A4-P	5 x 50	PTFE	04-60	*	5	50	1.0	Yes	Yes
	5 x 25	PTFE	04-61	*	5	25	0.5	Yes	Yes
F5	8 x 200	jacketed s.s.	04-30	*	8	200	10	Funnel	No
	8 x 100		04-31	*	8	100	5	Funnel	No
F5	8 x 200	unjacketed s.s.	04-32		8	200	10	Funnel	No
	8 x 100		04-33		8	100	5	Funnel	No
P6	8 x 200	s.s.	04-40		8	200	10	Yes	No
	8 x 100		04-41		8	100	5	Yes	No
G7	8 x 200	glass	04-50	*	8	200	10	No	No
	8 x 100	glass	04-51	*	8	100	5	No	No

** The most popular sizes of tubes, usually available ex-stock are marked with an asterisk. Delivery of other types may take a little longer.*

OTHER SIZES or SPECIAL DESIGNS can be made to order. Please ask for a quotation.

Tubes With Temperature Sensor

If you have an Optical Activity PolAAr 3 series polarimeter, these instruments have the facility for accepting a sample tube temperature sensor. All the above flow tubes (series A2, A4, F5 or P6) are optionally available with fitted temperature sensor (add part No. 04-09 when ordering). For single sample tubes (series A1 or G7), a dipping temperature sensor is available (part No. 04-91).

Made in England

OPTICAL ACTIVITY LIMITED
Bury Road Industrial Estate,
Ramsey, Huntingdon,
Cambridgeshire PE26 1NF, England.
Telephone: +44 (0)1487 813913
Fax: +44 (0)1487 812789
Email: sales@opticalactivity.com
Website: www.opticalactivity.com

Dealer Stamp

OPTICAL ACTIVITY LIMITED

SAMPLE TUBE SELECTION GUIDELINES

TUBE TYPE

For a comparatively small number of samples, brought for measurement one at a time, a SINGLE SAMPLE tube is ideal – generally less expensive than a flow type tube – and often useful for measuring odd samples if a flow system is normally used.

With a large number of samples, especially large batches of similar samples, a FLOW TUBE, connected for rapid sampling, will save time – samples can be poured one after another into a funnel without removing the tube from the polarimeter. This system works well with all samples except those that are highly viscous

Dissimilar samples – such as those with different solvents – are probably best measured in single sample tubes. A flow system can be used, provided steps are taken to thoroughly clean and dry the tube between samples.

Quantity of sample available. If you have plenty of sample, with flow tube connected for rapid sampling, you can use one sample to displace the previous one – this is the quickest method, however, you will obviously need more sample than simply to fill a clean, dry tube.

For an autosampling system, or continuous monitoring of flowing fluids, a flow type tube MUST be selected.

PATH LENGTH

Optical rotation is directly proportional to path length – the longer the tube, the greater the overall accuracy – it is therefore desirable to use the longest tube possible, however, there are other considerations:

SAMPLE QUANTITY – less fluid is needed to fill a shorter tube,

DARK SAMPLES – a shorter tube will allow you to get sufficient light through to make a measurement (transmission decreases logarithmically with path length, optical rotation directly, thus halving the path length will give much more light while reducing the accuracy by only 50 per cent),

FLOWING SAMPLES – a long path length may integrate the changes you are looking for,

COMPARISON WITH OTHER WORK – it may be convenient to select a particular tube length to allow direct comparison (provided the accuracy is adequate) with published figures. The 'standard' length for specific rotation is 1dm (100mm); the sugar industry uses 200mm in the definition of the International Sugar Scale.

TUBE BORE

The main considerations are sample quantity, darkness and viscosity. Smaller bore tubes obviously require less sample, however, larger tubes are generally easier to fill (and clean) especially as the viscosity of the sample increases.

If the bore of the sample tube is smaller than the beam diameter of your polarimeter, light will be lost by beam obstruction. In Optical Activity polarimeters, the beam diameter is 4mm. Tubes with bores less than 4mm will partially obstruct the beam and, while not affecting the accuracy of the instrument, will reduce the optical density tolerance. Tubes with bores of 2.5 or 1.5mm cannot therefore be considered suitable for dark, coloured or cloudy samples. A 4 or 5mm bore tube is a good compromise to minimise the amount of sample while remaining easy to fill and not obstructing the beam.

TEMPERATURE CONTROL

For the most accurate work, we generally advise controlling the temperature of the sample tube by use of a chiller thermocircular for which a jacketed tube is necessary (IF the temperature coefficient is known, an alternative is to measure the sample temperature and apply the necessary correction) however, consideration of the overall accuracy required may indicate that this is not essential. It will depend on the rate that the optical rotation of the sample (at the concentration being measured) varies with temperature – some samples are not very temperature dependent, others vary rapidly with the temperature.

Above and below – models from the PolAAr Series Polarimeters – see separate brochure