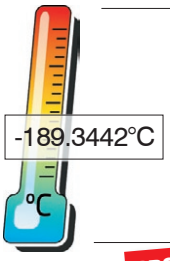


471 Simple Argon **Triple Point Apparatus**

PROVISIONAL DATA*

- Affordable
- Robust and simple to use
- Accurate to ±0.5mK - 4 hour plateau typical

The Isotech Argon Triple Point Apparatus is a robust, simple to use and affordable solution for the realisation of the argon triple point.

Many laboratories use liquid nitrogen comparators which are convenient and can be low cost but the nitrogen boiling point is not on the ITS-90. More seriously the LN point is below that of Argon. Many standard platinum resistance thermometers (SPRTs) are filled with a mixture of argon and oxygen and at -195°C will be under a partial vacuum which affects the self-heating of the SPRT leading to a larger calibration uncertainty.

For many laboratories the high cost and complexity of previously available argon systems has been a barrier.

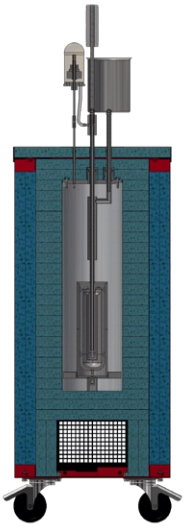
Now after years of research Isotech have introduced a new system that is more affordable, simple to use and will allow more laboratories the benefits of being able realise the argon triple point.

The Isotech system requires no electricity; the only consumable is liquid nitrogen - the 6N Pure argon is contained in a pressure vessel. A filling tube allows liquid nitrogen to initially cool this volume to approximately -195°C. Weights are then added to a pressure release valve to increase the nitrogen's boiling temperature to just above the argon cells triple point.

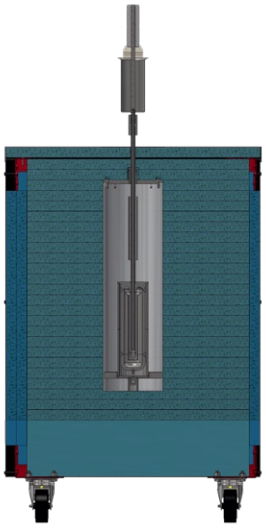
The argon settles into its triple point for around four hours, allowing an SPRT inside the re-entrant tube to be calibrated. At the argon T.P. to an accuracy of ±0.5 mK,

K = 2

http://www.isotech.co.uk/argon



Sectional view from front

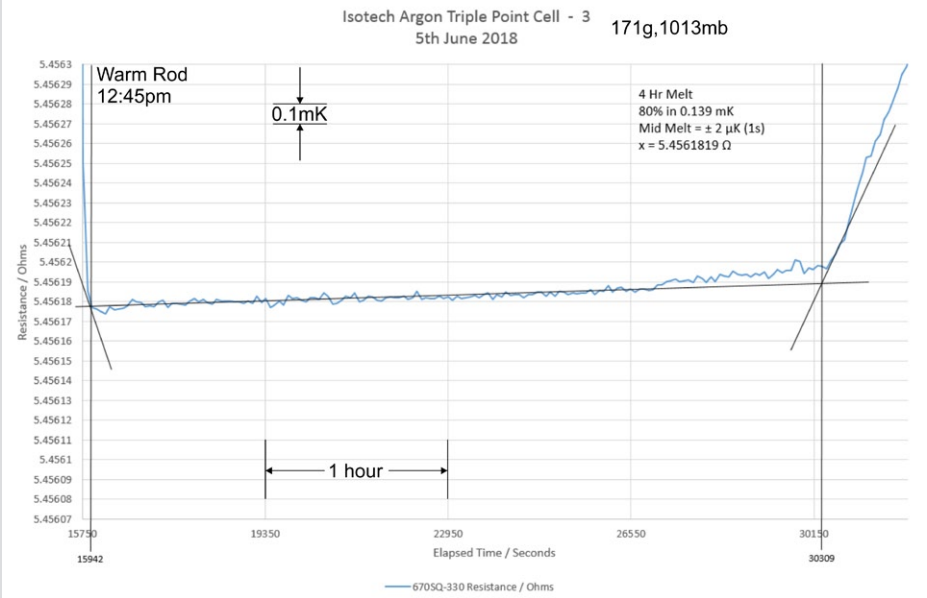


Sectional view from side

ISOTHERMAL TECHNOLOGY LTD UKAS LABORATORY Nº 0175	Date of issue	
	Issue Nº	
Argon T.P. Cell Premium Calibration - ±0.5 mK UCT	Authorised by	
Budget Nº.		

Note number (below)	Source of uncertainty	Value ±	Unit	Probability distribution	Divisor	Sensitivity c_i	Standard uncertainty u_i (unit)	Degrees of freedom v_i or v_f	u_i^2	u^4/v_i
1	Standard deviation	0.000069	C	normal	1.00	1	0.000069	11	0.000000005	2.06E-18
2	SPRT Spurious heat flux, noise etc (Std cell)	0.000005	C	normal	1.00	1	0.000005	22	0.000000000	2.8E-23
3	SPRT Spurious heat flux, noise etc (Test cell)	0.000006	C	normal	1.00	1	0.000006	22	0.000000000	5.9E-23
4	micro K linearity	0.000007	C	normal	2.00	1	0.000004	i	0.000000000	0
5	micro K resolution	0.000002	C	rectangular	1.73	1	0.000001	i	0.000000000	0
6	Test and Std cell slope differences	0.000183	C	rectangular	1.73	1	0.000106	i	0.000000011	0
7	Measured H/H uncertainty in Std Cell	0.000178	C	rectangular	1.73	1	0.000103	i	0.000000011	0
8	Measured H/H uncertainty in Test Cell	0.000017	C	rectangular	1.73	1	0.000010	i	0.000000000	0
9	Estimated H/H uncertainty in Std Cell	0.000017	C	rectangular	1.73	1	0.000010	i	0.000000000	0
10	Estimated H/H uncertainty in Test Cell	0.000017	C	rectangular	1.73	1	0.000010	i	0.000000000	0
11	Sprt self heating max Δt in Std cell	0.000141	C	rectangular	1.73	1	0.000082	i	0.000000007	0
12	Sprt self heating max Δt in Test cell	0.000167	C	rectangular	1.73	1	0.000097	i	0.000000009	0
13	Lead moisture effects	0.000010	C	rectangular	1.73	1	0.000006	i	0.000000000	0
14	Temp effect of oil bath on Std resistor	0.000001	C	rectangular	1.73	1	0.000001	i	0.000000000	0
15	Calibration of Std resistor	0.000002	C	normal	2.00	1	0.000001	i	0.000000000	0
16	Uncorrected Drift of Std Resistor	0.000000	C	rectangular	1.73	1	0.000000	i	0.000000000	0
17	Uncertainty Of standard cell	0.000280	C	normal	2.00	1	0.000140	i	0.000000020	0
u_c	Combined uncertainty			normal			0.000250	1895	0.000000062	2.1E-18
U	Expanded uncertainty			normal	k for v_f	2.00	0.000500	1895		

k =	2.00	0.000500



Model	471
Temperature Range	-189.3442°C
Uncertainty	+0.5mK at *k*=2
Dimensions	Width - 380mm Depth - 615mm Height - 1250mm (900mm high to top of cabinet)

For More Data and the Latest Information:
www.isotech.co.uk/argon