

REFRACTIVE INDEX & °BRIX TEMPERATURE RELATIONSHIP

Calibration Oil Component Code: 90-230

Type: BSDC

Batch: BSDC18

TEMPERATURE	REFRACTIVE INDEX	°BRIX	TEMPERATURE	REFRACTIVE INDEX	°BRIX
10.0°C	1.52138	91.32	45.0°C	1.50725	86.21
15.0°C	1.51935	90.60	50.0°C	1.50524	85.47
20.0°C	1.51732	89.87	55.0°C	1.50324	84.72
25.0°C	1.51530	89.14	60.0°C	1.50124	83.98
30.0°C	1.51328	88.41	65.0°C	1.49924	83.23
35.0°C	1.51127	87.68	70.0°C	1.49725	82.48
40.0°C	1.50926	86.94	75.0°C	1.49525	81.73
$R.I. = (1.525440E+00) + (-4.069655E-04 \times \text{Temperature}) + (5.978973E-08 \times \text{Temperature}^2)$					
$^{\circ}\text{Brix} = (9.276574E+01) + (-1.437472E-01 \times \text{Temperature}) + (-4.502747E-05 \times \text{Temperature}^2)$					

Refractive index values detailed in the table were calculated from a 2nd order polynomial fit of empirical data, as shown above, which is valid over the range 10 to 75°C. Values used to determine this relationship were produced from a statistical evaluation of averaged refractive index data.

Equivalent °Brix values are derived from ICUMSA SPS-3 (2000) Equation 2. When using these values to calibrate at the refractometer's operating temperature, sucrose temperature compensation should not be applied to °Brix readings.

The refractive index of the sample was measured on a high accuracy refractometer at 589.3nm in a temperature controlled room. Refractometer calibration was set prior to testing with high purity water. Refractive index values for water were obtained from "Revised Formulation for the Refractive Index of Water and Steam as a Function of Wavelength, Temperature and Density", adopted by the International Association for the Properties of Water and Steam (IAPWS) and available as part of NIST Standard Reference Database 10¹. Refractive indices calculated from the formulation are absolute refractive indices; conversion to refractive index against air requires division by the respective absolute refractive index of air (NIST Engineering Metrology Toolbox²).

Maximum residual of polynomial data fit: ±0.00005 R.I.

Date of analysis: 24th August 2009

Authorised signatory



A.Darkins
Technical Services Manager

Calibration oils are guaranteed until the expiry date, provided they are stored as directed. However, B+S can only consider queries regarding a batch of samples if unopened bottles are returned before the expiry date. In no event will Bellingham + Stanley Ltd. be liable for direct, indirect, incidental or consequential damages resulting from the use of this product.

Material Safety Data Sheet for this product is available from the B+S website or on request.

Equivalent °Brix values and refractive indices at temperatures other than 20.0°C are not covered by the current UKAS Scope of Accreditation of Bellingham + Stanley Ltd. °Brix values greater than 85.00 are extrapolated from the relationship given in ICUMSA SPS-3 (2000) Equation 2.

¹NIST Standard Reference Database 10, Version 2.21, A.H.Harvey, A.P.Peskin, S.A.Klein

²NIST Engineering Metrology Toolbox: Refractive Index of Air Calculator (<http://emtoolbox.nist.gov/Wavelength/Abstract.asp>)

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