

# E-Line 90 Refractometer

## Instruction Manual



E-Line Refractometer top side



E-Line Refractometer under side

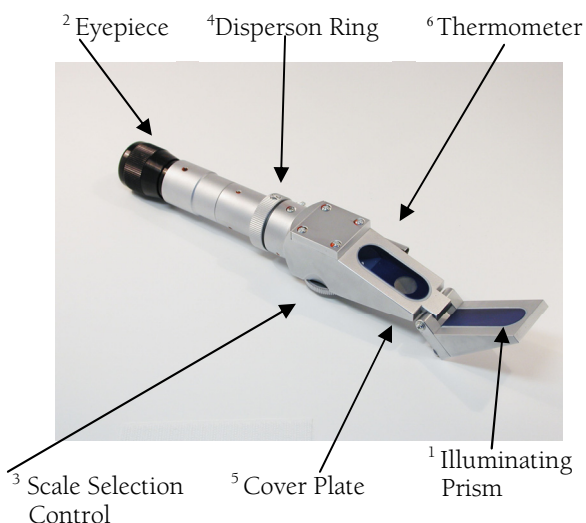


Table 1

Specification	
Range	0-90 °Brix
Scale One	0-42 °Brix
Scale Two	42-71 °Brix
Scale Three	71-90 °Brix
Minimum Division	0.2 °Brix

The E-Line 90 is a full scale Brix refractometer ideal for use in the food industry and other applications requiring concentration measurements over a wide measurement range.

### Applying the sample to the refractometer:

Lift the illuminating prism<sup>1</sup> and apply the sample to the measurement prism. Close the prism and view the borderline (light/dark demarcation line) through the eyepiece<sup>2</sup>.

### Taking a reading:

Depending on the concentration of the sample, select the range of measurement<sup>(Table 1)</sup> by adjusting the scale selection control<sup>3</sup>. If the concentration is unknown, apply the sample and step through the ranges until a clear borderline is found. Adjustment of the dispersion ring<sup>4</sup> will sharpen the borderline and should be set so that no colour (blue/red) can be seen near the demarcation line. For dark samples, adjust the cover plate<sup>5</sup> to allow more light to enter the prism.

The concentration of the sample can be measured at the point the borderline crosses the scale. Take care to ensure that the reading is taken from the correct scale range.

Adjust the reading by measuring the temperature<sup>6</sup> of the instrument and adding the correction factor as shown on Table 2. Refractive Index values can be obtained by using a conversion table available from Bellingham + Stanley Ltd.

### Calibration:

Water may be used for checking the zero of the instrument, whilst accurately made sugar solutions are ideal for checking points further up the scale. When using water or sugar standards, always apply temperature correction (Table 2). Solid test plates may also be used but do not require temperature correction. The E-Line 90 does not have a facility to adjust calibration and in the event that the calibration is found to be incorrect, please contact Bellingham + Stanley Ltd. **For further information on calibration materials, visit the Bellingham + Stanley website.**



### Warning

Always check sample Health & Safety Data before applying to the refractometer.

When applying samples to the prism which are likely to cause harm to skin or eyes, wear appropriate protective clothing and glasses.

This refractometer is a precision optical instrument and should be handled with care. Do not drop or subject it to sharp knocks.

Optical glass is relatively soft and care should be taken not to scratch the prism surface. Do not use metal spatulas or glass rods to apply samples but instead use softer materials such as plastic.

Order Code	Description
44-806	E-Line 90 Refractometer



# Bellingham + Stanley Ltd.

Longfield Road, Tunbridge Wells, Kent TN2 3EY, United Kingdom.

Telephone: +44 (0) 1892 500400 Fax: +44 (0) 1892 543115

Website: [www.bellinghamandstanley.com](http://www.bellinghamandstanley.com) Email: [sales@bellinghamandstanley.co.uk](mailto:sales@bellinghamandstanley.co.uk)

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## Correcting the reading for temperature:

The refractometer is calibrated to read correctly at 20°C. The refractive index of the measured sample will vary with temperature and the reading must be corrected to take account of this. Please use the Table 2 below to adjust your reading accordingly.

## Temperature Correction Table (Table 2)

This table gives mass fraction corrections to refractometric tables for sucrose solutions at 589nm for temperature different from 20°C. Taken from ICUMSA, Appendix 2, SPS-3 (1998) page 8.

Temperature (°C)	Measured Sucrose °Brix (Mass Fraction)																	
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
15	-0.29	-0.30	-0.32	-0.33	-0.34	-0.35	-0.36	-0.37	-0.37	-0.38	-0.38	-0.38	-0.38	-0.38	-0.38	-0.38	-0.37	-0.37
16	-0.24	-0.25	-0.26	-0.27	-0.28	-0.28	-0.29	-0.30	-0.30	-0.30	-0.31	-0.31	-0.31	-0.31	-0.31	-0.30	-0.30	-0.30
17	-0.18	-0.19	-0.20	-0.20	-0.21	-0.21	-0.22	-0.22	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.23	-0.22
18	-0.12	-0.13	-0.13	-0.14	-0.14	-0.14	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15
19	-0.06	-0.06	-0.07	-0.07	-0.07	-0.07	-0.07	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.07
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07
22	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
23	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23	0.22
24	0.27	0.28	0.29	0.29	0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.30	0.30
25	0.34	0.35	0.36	0.37	0.38	0.38	0.39	0.39	0.40	0.40	0.40	0.40	0.40	0.39	0.39	0.38	0.38	0.37
26	0.42	0.43	0.44	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.47	0.47	0.46	0.46	0.45
27	0.50	0.51	0.52	0.53	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.55	0.55	0.54	0.53	0.52
28	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.64	0.64	0.65	0.65	0.64	0.64	0.63	0.63	0.62	0.61	0.60
29	0.66	0.67	0.68	0.70	0.71	0.71	0.72	0.73	0.73	0.73	0.73	0.73	0.72	0.72	0.71	0.70	0.69	0.67
30	0.74	0.76	0.77	0.78	0.79	0.80	0.81	0.81	0.82	0.82	0.81	0.81	0.80	0.80	0.79	0.78	0.76	0.75
31	0.83	0.84	0.85	0.87	0.88	0.89	0.89	0.90	0.90	0.90	0.90	0.89	0.89	0.88	0.87	0.86	0.84	0.82
32	0.92	0.93	0.94	0.96	0.97	0.98	0.98	0.99	0.99	0.99	0.99	0.98	0.97	0.96	0.95	0.93	0.92	0.90
33	1.01	1.02	1.03	1.05	1.06	1.07	1.07	1.08	1.08	1.08	1.07	1.07	1.06	1.04	1.03	1.01	1.00	0.98
34	1.10	1.11	1.13	1.14	1.15	1.16	1.16	1.17	1.17	1.16	1.16	1.15	1.14	1.13	1.11	1.09	1.07	1.05
35	1.19	1.21	1.22	1.23	1.24	1.25	1.25	1.26	1.26	1.25	1.25	1.24	1.23	1.21	1.19	1.17	1.15	1.13
36	1.29	1.30	1.31	1.33	1.34	1.34	1.35	1.35	1.35	1.34	1.34	1.33	1.31	1.29	1.28	1.25	1.23	1.20
37	1.39	1.40	1.41	1.42	1.43	1.44	1.44	1.44	1.44	1.43	1.43	1.41	1.40	1.38	1.36	1.33	1.31	1.28
38	1.49	1.50	1.51	1.52	1.53	1.53	1.54	1.54	1.53	1.53	1.52	1.50	1.48	1.46	1.44	1.42	1.39	1.36
39	1.59	1.60	1.61	1.62	1.63	1.63	1.63	1.63	1.63	1.62	1.61	1.59	1.57	1.55	1.52	1.50	1.47	1.43
40	1.69	1.70	1.71	1.72	1.73	1.73	1.73	1.73	1.72	1.71	1.70	1.68	1.66	1.63	1.61	1.58	1.54	1.51

## Cleaning the prism:

Thoroughly clean the prism after use with water or other suitable solvent and dry with clean tissue.

The prism surface could be damaged by strong alkalis or acids if left in contact for long periods of time. Clean samples from the prism as soon as practicable.

Wiping the prism surface occasionally with alcohol will remove any build-up of oils left from the samples.



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