SUGAR/BRIX REFRACTOMETER

300003

INSTRUCTION MANUAL

SPER
SCIENTIFIC

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INTRODUCTION

Your portable refractometer is a precision optical instrument designed to measure the concentration of sugar in aqueous solutions. It utilizes the standardized Brix scale which is accurate and easy to read. Its light weight, ergonomic design makes it convenient for both laboratory and field applications. It is excellent for quality assurance, process control requirements, and scientific research.

The refractometer operates on the principle that as the concentration or density of a solution increases, its refractive index changes proportionately. The refractive angle measured by your refractometer registers on the scale. The larger the concentration of sugar in solution the higher the reading on the scale.

PANEL DESCRIPTION

1. Cover plate
2. Refracting prism
3. Telescopic barrel
4. Rotary scale selector
5. Eyepiece with ribbed focus ring
6. Calibration screw
7. Light reflecting window

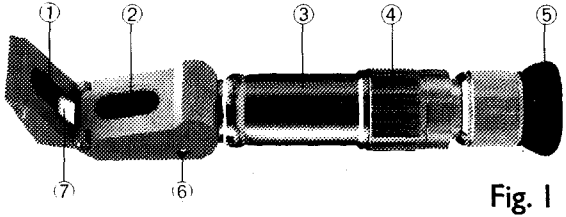

Fig. 1

OPERATING PROCEDURES

1. With the cover plate open, carefully clean the prism (2) and reflecting surface (7) with soft cotton cloth. Avoid scratching the surfaces.

2. Aim the refractometer toward a light source and select the 0 - 50% scale by rotating the range selector (4).

3. Rotate the eyepiece (5) to obtain clearest focus.

4. Adjustment of the null (reference point).
   A - Open the cover plate (1).
   B - Apply a few drops of pure distilled water on to prism platform (2).
   C - Close cover plate (1).
   D - Rotate calibration screw (6) so that the dark and light boundary line coincides exactly with the 0% line reading on the scale in the 0-50% range.

5. Carefully dry the prism platform and the light reflecting window (7) with soft cotton cloth.

6. To test your sugar sample first select 0-50% or 50-80% by rotating the range selector.

7. Place a few drops of the test solution on the prism and close the cover plate so the solution spreads evenly on the prism.

8. Aim the light reflecting window toward the light source and focus the eyepiece on the boundary line of the light and dark hemispheres.

9. The boundary line indicates the concentration of sugar in the test sample.

10. If the boundary line is too low or too high to read on the scale you selected, rotate range selector (4) to the other scale. See Fig. 2, and 3 below.

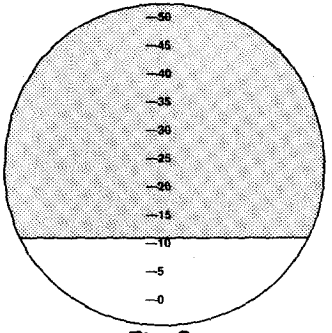

Fig. 2

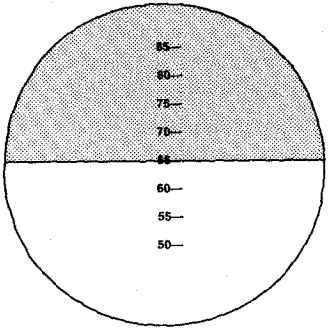

Fig. 3

50 to 80% scale

11. After use clean the refracting and illuminating prisms with a soft cloth to remove any surface residue.

12. The temperature of the null reference liquid should be at the same temperature as the sample solution. For variations in temperature during use the null point should be re-calibrated once every 30 minutes.

TEMPERATURE CORRECTION

Your refractometer #300003 is designed and constructed to operate with distilled water and sample solutions at a standard temperature of 20°C.

1. To compensate for temperature conditions other than 20°C use the Temperature Correction Table, fig. 4.

2. Example 1: Actual temperature is 30°C. The boundary line reads a concentration of 15%.
Refer to the temperature correction table and locate the 15% concentration column.
Follow this column down to the row that corresponds to the temperature of 30°C.
We are at the 0.78 correction point, so our actual % concentration is (15% + 0.78) or 15.78%.

Example 2: Actual temperature is 16°C. The boundary line reads a concentration of 40%.
Refer to the temperature correction table and locate the 40% concentration column.
Follow this column down to the row that corresponds with the temperature of 16°C.
We are at the 0.30 correction point, so our actual % concentration is (40% - 0.30%) or 39.70%.

Temperature Correction Table for Sper Model 300003

Temperature °C		Concentration (%)														
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
10	subtract from reading	0.50	0.54	0.58	0.61	0.64	0.66	0.68	0.70	0.72	0.73	0.74	0.75	0.76	0.78	0.79
11		0.46	0.46	0.53	0.55	0.58	0.60	0.62	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71
12		0.42	0.45	0.48	0.50	0.52	0.54	0.56	0.57	0.58	0.59	0.60	0.61	0.61	0.63	0.63
13		0.37	0.40	0.42	0.44	0.46	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.54	0.55	0.55
14		0.33	0.35	0.37	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.45	0.46	0.46	0.47	0.48
15		0.27	0.29	0.31	0.33	0.34	0.34	0.35	0.36	0.37	0.37	0.38	0.39	0.39	0.40	0.40
16		0.22	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.30	0.30	0.31	0.31	0.32	0.32
17		0.17	0.18	0.19	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24
18		0.12	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16
19		0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
20		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	add to reading	0.06	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
22		0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16
23		0.19	0.20	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.24
24		0.26	0.27	0.28	0.29	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.32
25		0.33	0.35	0.36	0.37	0.38	0.38	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
26		0.40	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
27		0.48	0.50	0.52	0.53	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
28		0.56	0.57	0.60	0.61	0.62	0.63	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
29		0.64	0.66	0.68	0.69	0.71	0.72	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
30		0.72	0.74	0.77	0.78	0.79	0.80	0.80	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81

Fig. 4

NOTE: Below 20°C you subtract from the reading, and above 20°C you add to the reading. Further, if the null liquid (distilled water) is at same temperature as test sample then making sure that the null line of distilled water is exactly on the 0% will make it unnecessary to refer to the correction table.

PRECAUTIONS

1. Do not dip or run the unit under water. Do not let water seep into internal section of refractometer.

2. Clean the refractometer after each use with soft cloth. Do not scratch surface of the prisms.

3. Store in a dry, clean, and non-corrosive environment.

4. Avoid strong shocks.

5. If reasonable care is applied to your refractometer the reliability, precision and optical performance will not change.

SPECIFICATIONS

MEASURING RANGE	0 - 80%
RESOLUTION	1%
ACCURACY	±1%
SIZE	7 X 1½ inches
WEIGHT	19 oz.

STANDARD ACCESSORIES

Screwdriver, Carrying case, Transfer pipette, Instruction manual, Registration card, Distilled water

WARRANTY

Sper Scientific warrants this product against defects in materials or workmanship for a period of **five (5) years** from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover damage resulting from accident, misuse, or abuse of the product or batteries. In order to obtain warranty service, simply ship the unit postage prepaid to: Sper Scientific, Ltd., 7720 E. Redfield, Suite 7, Scottsdale, Arizona 85260.

Please note: The defective unit must be accompanied by a description of the problem and your return address.

Please be sure to return your warranty registration card within ten (10) days of purchase.