User's Guide

EXTECH INSTRUMENTS

Brix Refractometers

Models RF10 and RF15 (with ATC)



Introduction

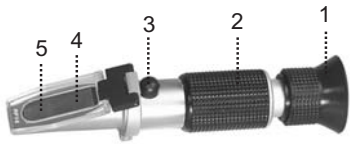
Congratulations on your purchase of the Extech RF10 or RF15 Brix Refractometer. Precision optical instruments should be handled gently; avoid touching the optical surface. Careful use of these instruments will provide years of reliable service.

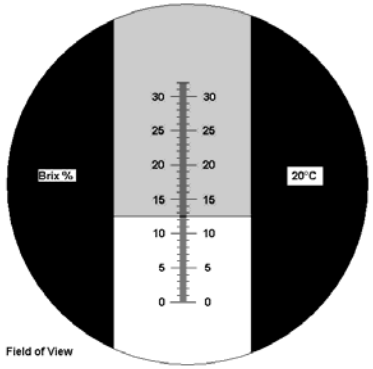
Specifications

Range	0 to 32% Brix
Resolution	0.2%
Dimensions	RF10: 6.6 x 1.3 x 1.3" (168 x 32 x 32mm); RF15: 6.3 x 1.4 x 1.4" (159 x 35 x 35mm)
Weight	RF10: 3.2 oz. (91g); RF15: 7 oz. (200g)

Description

1. Eyepiece
2. Mirror Tube
3. Adjustment screw
4. Cover Plate
5. Prism





Operation

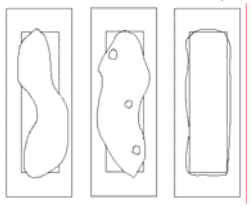
This instrument measures the refractive index of a sample. The measurement is displayed in % Brix.

1. Zero Adjustment

Cover the prism with distilled water (several drops will suffice). Close the cover plate and rotate the adjustment screw until the light/dark boundary (shadowline) lines up with the zero line. After the zero adjustment, clean the prism with a soft cloth.

2. Sample Preparation and Reading

To take a sample reading, simply place a few drops of a sample liquid on the measurement prism at the end of the instrument. Close the prism cover plate so that the liquid spreads across the entire surface of the prism without air bubbles or dry spots (see diagram). Allow the sample to remain on the prism for approximately 30 seconds.



While holding the instrument under a light source, look through the eyepiece. The sucrose concentration is determined by the intersection of the boundary of the light and dark fields (known as the shadowline) on the printed scale. If the scale appears out of focus, the eyepiece may be adjusted by rotating the knurled portion of the eyepiece. The instrument also features an eye-guard to prevent stray light from entering the eyepiece and causing reflections.

It may be necessary to adjust the position of the light source to maximize the contrast of the shadowline. Under normal conditions, optimal contrast is obtained by holding the instrument underneath and perpendicular to a light source.

Once a reading has been taken, wipe dry with a clean cloth (do not wash or rinse) and place the instrument in the supplied plastic case. Store the instrument in a safe, dry environment.

Note: The Distilled water temperature, used for zero adjustment, and the sample liquid temperature should be the same. If the temperature of the samples fluctuates, zero the refractometer every 30 minutes (RF10 only).

3. Temperature Compensation (RF15 has Auto Temp. Comp.)

Temperature is one of the single most important factors influencing accurate refractometer readings and is one of the largest sources of measurement error. Temperature compensation relieves the user of the responsibility to measure temperature and apply a correction factor when taking readings. *The RF15 makes this correction automatically.* When ambient temperature strays from 68°F (20°C), readings are automatically adjusted to compensate for temperature variance between 50°F to 86°F (10°C to 30°C).

The RF10 Refractometer has been designed for use with a 20°C standard temperature. Therefore, if the temperature of the measurement deviates from 20°C, the reading must be manually compensated in accordance with the Temperature Compensation Table below.

Example: A reading of 20% at 28°C is compensated thusly: 20% + 0.62%=20.62%.

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Temperature Compensation Table (Referenced To 20°C)

%	5	10	15	20	25	30	35	40	45	50	55	60	65	70
°C	Subtract the following from the measurement													
10	0.58	0.59	0.61	0.64	0.67	0.69	0.71	0.72	0.74	0.74	0.74	0.75	0.76	0.77
11	0.51	0.54	0.55	0.58	0.61	0.63	0.65	0.65	0.67	0.67	0.67	0.68	0.68	0.69
12	0.47	0.49	0.50	0.52	0.55	0.57	0.58	0.58	0.60	0.60	0.60	0.60	0.61	0.61
13	0.42	0.44	0.44	0.45	0.49	0.50	0.51	0.51	0.53	0.53	0.53	0.53	0.53	0.53
14	0.37	0.38	0.39	0.40	0.42	0.43	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.46
15	0.31	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
16	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
17	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
18	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
19	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
	Add the following to the measurement													
21	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
22	0.14	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15
23	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	0.22
24	0.28	0.29	0.29	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.31	0.31
25	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
26	0.43	0.44	0.44	0.46	0.46	0.47	0.47	0.48	0.48	0.48	0.48	0.48	0.47	0.47
27	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
28	0.59	0.60	0.61	0.62	0.63	0.64	0.64	0.65	0.65	0.64	0.64	0.64	0.64	0.63
29	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.73	0.73	0.73	0.73	0.72	0.72	0.71
30	0.75	0.77	0.78	0.79	'0.80	'0.81	0.81	0.81	0.82	0.81	0.81	0.81	0.80	0.79

Source: International Commission for Uniform Methods of Sugar Analysis (1966)

International Brix% Scale

Brix to Refractive Index (nD) Conversion Table

%	nD	%	nD	%	nD	%	nD	%	nD	%	nD
0	1.333	15	1.3557	30	1.3811	45	1.4097	60	1.4419	75	1.4778
1	1.3344	16	1.3573	31	1.3829	46	1.4118	61	1.4442	76	1.4804
2	1.3359	17	1.3589	32	1.3847	47	1.4138	62	1.4464	77	1.4829
3	1.3373	18	1.3605	33	1.3866	48	1.4159	63	1.4488	78	1.4855
4	1.3388	19	1.3622	34	1.3884	49	1.418	64	1.4511	79	1.4881
5	1.3403	20	1.3638	35	1.3903	50	1.42	65	1.4534	80	1.4907
6	1.3418	21	1.3655	36	1.3922	51	1.4222	66	1.4558	81	1.4933
7	1.3433	22	1.3672	37	1.3941	52	1.4243	67	1.4582	82	1.496
8	1.3448	23	1.3689	38	1.396	53	1.4264	68	1.4606	83	1.4987
9	1.3463	24	1.3706	39	1.3979	54	1.4286	69	1.463	84	1.5014
10	1.3478	25	1.3723	40	1.3998	55	1.4308	70	1.4654	85	1.5041
11	1.3494	26	1.374	41	1.4018	56	1.4329	71	1.4678	86	1.5068
12	1.3509	27	1.3758	42	1.4037	57	1.4352	72	1.4703	87	1.5096
13	1.3525	28	1.3776	43	1.4057	58	1.4374	73	1.4728	88	1.5123
14	1.3541	29	1.3793	44	1.4077	59	1.4396	74	1.4753	89	1.5151

Source: International Sugar Analysis Committee

Warranty

EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for one year from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website at www.extech.com (click on 'Contact Extech' and go to 'Service Department' to request an RA number). A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

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