xylem

INSTRUCTIONS
B+S CODE: 45-091 / VERSION 1F

Eclipse Wine (%ABV) Refractometer

INSTRUCTIONS FOR USE

Bellingham + Stanley

a xylem brand

Eclipse Wine (%ABV) Refractometer

Items Required to Calculate ABV

Order Code	Description	Range
45-22	Eclipse Wine (%ABV) refractometer	10 – 135 °Zeiss
44-839	Hydrometer	0.98 to 1.050 S.G
44-838	Hydrometer Jar	

Application

The alcohol content of a beer, wine and cider can be calculated from the readings of two instruments; an Eclipse Wine (%ABV) refractometer and a standard hydrometer measuring specific gravity (S.G.).

Only a few drops of the product are required to obtain a refractometer reading, while the S.G. is measured in the usual way with the hydrometer and hydrometer jar. The process only takes a few minutes to carry out, and an accuracy of about ±0.5% alcohol can be obtained using reasonable care in ensuring that both readings are made at the same temperature.

If the instrument is used with care, and cleaned and maintained as recommended after use, it should give many years of accurate and trouble free service.

Measurement Method

Siphon off enough of the finished product to fill the hydrometer jar to the required level, and leave all the equipment with it in a place free from draughts and direct sunlight for at least an hour to attain room temperature.

Measure the S.G. value (D reading) as accurately as possible and record.

Applying the sample

Lift the illuminator flap, drip the sample on to the prism then close the illuminator flap. Alternatively use the dribble feature; drip sample into the top of the closed flap.

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.

Taking a reading

Hold the instrument up to a suitable light source and look through the eyepiece. Rotate the eyepiece to focus the scale.

Take a reading from the scale at the border of the light and dark areas. If the scale is completely light then the sample concentration may be too high for the instrument range.

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.

ABV Calculation

The alcohol content can be calculated either by visiting the technical centre on our website and using the %ABV calculator or alternatively, calculated from the R-D value as shown below to obtain %ABV from *Table 1 - Extended %ABV* - on the next page.

R-D = R (Refractometer reading) – D (S.G. value)

Where D (S.G. value) = (S.G. – 1) x 1000

Examples

Light dry table wine

S.G. = 0.993 & Refractometer reading = 37

D (S.G. value) = (0.993 – 1) x 1000 = -7

R-D = 37- (-7) = 44

Alcohol content = 10.7%v/v

Sweet dessert wine

S.G. = 1.015 & Refractometer reading = 72.5

D (S.G. value) = (1.015 – 1) x 1000 = +15

R-D = 72.5 – (+15) = 57.5

Alcohol content = 15.7%v/v

Precautions to improve accuracy

It is important that both the R and D readings are taken at the same temperature.

Make sure that the prism is cleaned and dried between each reading, using a little clean water at room temperature, and a soft tissue or cloth to dry.

Make sure the scale of the instrument is in sharp focus before taking readings, adjust the eyepiece if necessary.

Look at the quality of borderline obtained. Poor sharpness may indicate insufficient sample on prism, or temperature gradients across the prism, or that the prism was not properly cleaned and dried after the last reading.

If in doubt, clean and dry the prism, leave for a while, and repeat measurements from the start. Measuring the same sample twice in quick succession is a useful indication of the reliance that should be placed on the results obtained. Always clean the plastic illuminator plate when cleaning the prism.

Calibration

The zero of the refractometer can be checked at any time by using distilled water at 20°C. The R reading should be 15 within ½ a scale division.

Table 1 – Extended %ABV table (2 decimal resolution)

R-D	%v/v Alc	R-D	%v/v Alc	R-D	%v/v Alc	R-D	%v/v Alc	R-D	%v/v Alc
15.0	0.08	30.0	5.59	45.0	11.10	60.0	16.60	75.0	22.11
15.5	0.27	30.5	5.77	45.5	11.28	60.5	16.79	75.5	22.29
16.0	0.45	31.0	5.96	46.0	11.46	61.0	16.97	76.0	22.48
16.5	0.63	31.5	6.14	46.5	11.65	61.5	17.15	76.5	22.66
17.0	0.82	32.0	6.32	47.0	11.83	62.0	17.34	77.0	22.84
17.5	1.00	32.5	6.51	47.5	12.01	62.5	17.52	77.5	23.03
18.0	1.18	33.0	6.69	48.0	12.20	63.0	17.70	78.0	23.21
18.5	1.37	33.5	6.87	48.5	12.38	63.5	17.89	78.5	23.40
19.0	1.55	34.0	7.06	49.0	12.56	64.0	18.07	79.0	23.58
19.5	1.73	34.5	7.24	49.5	12.75	64.5	18.26	79.5	23.76
20.0	1.92	35.0	7.43	50.0	12.93	65.0	18.44	80.0	23.95
20.5	2.10	35.5	7.61	50.5	13.12	65.5	18.62	80.5	24.13
21.0	2.29	36.0	7.79	51.0	13.30	66.0	18.81	81.0	24.31
21.5	2.47	36.5	7.98	51.5	13.48	66.5	18.99	81.5	24.50
22.0	2.65	37.0	8.16	52.0	13.67	67.0	19.17	82.0	24.68
22.5	2.84	37.5	8.34	52.5	13.85	67.5	19.36	82.5	24.86
23.0	3.02	38.0	8.53	53.0	14.03	68.0	19.54	83.0	25.05
23.5	3.20	38.5	8.71	53.5	14.22	68.5	19.72	83.5	25.23
24.0	3.39	39.0	8.89	54.0	14.40	69.0	19.91	84.0	25.41
24.5	3.57	39.5	9.08	54.5	14.58	69.5	20.09	84.5	25.60
25.0	3.75	40.0	9.26	55.0	14.77	70.0	20.27		
25.5	3.94	40.5	9.44	55.5	14.95	70.5	20.46		
26.0	4.12	41.0	9.63	56.0	15.13	71.0	20.64		
26.5	4.30	41.5	9.81	56.5	15.32	71.5	20.83		
27.0	4.49	42.0	10.00	57.0	15.50	72.0	21.01		
27.5	4.67	42.5	10.18	57.5	15.69	72.5	21.19		
28.0	4.86	43.0	10.36	58.0	15.87	73.0	21.38		
28.5	5.04	43.5	10.55	58.5	16.05	73.5	21.56		
29.0	5.22	44.0	10.73	59.0	16.24	74.0	21.74		
29.5	5.41	44.5	10.91	59.5	16.42	74.5	21.93		

The purpose of providing a 2 decimal place table is to allow users to benefit from better resolution of the table data and is not intended to offer a higher accuracy reading.

The calculation of ABV by way of a handheld refractometer and hydrometer is still limited by instrument performance, especially with respect to the temperature and achievable accuracy of the handheld refractometer. As such, the typical accuracy of % ABV remains as published at ±0.5%.

Refractometer readings (Zeiss values) must fall between 15 and 130 and specific gravity must be between 0.9 and 1.1. The results (values) will only be displayed if the input parameters are within these limits and the calculated ABV is in the range 0 to 25.6. Typically, this is limited to beers, wine and ciders although some dry fortified wines and low sugar liqueurs may also be suitable.

Certificate of Conformity

This Eclipse refractometer was calibrated and tested by Bellingham + Stanley and has been found to meet the published specifications for this instrument.

For the refractometer to continue to operate within our specifications, it should be kept in clean condition and well maintained in accordance with the user guide.

This certificate implies no responsibility by Bellingham + Stanley with regard to the accuracy of the instrument after the date of examination at Bellingham + Stanley.

⚠ Attention

These refractometers are precision optical instruments and should be handled with care.

Do not drop or subject them to sharp knocks.

Always check the Safety Data and specifications for the samples before applying them 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 (PPE).

The material of the hinged lid is made of polycarbonate, which can react with a series of concentrated acids and bases and is soluble in various organic solvents. Avoid contact with acetone and certain aromatic hydrocarbons. Review the specifications of the samples before application.

If the flap should become damaged, a replacement can be clipped on easily – part number 45-006 (pack of 3).

Intended use

Bellingham + Stanley assumes no liability for any loss or damage of any kind caused by the use of this instrument.

This product is for general laboratory, manufacturing and research use only and is not intended for any animal or human therapeutic or diagnostic use.

Precautions to improve accuracy

Make sure that the prism is cleaned and dried between each reading, using a little clean water at room temperature, and a soft tissue or cloth to dry.

Make sure the scale of the instrument is in sharp focus before taking readings, adjust eyepiece if necessary.

Look at the quality of borderline obtained. Poor sharpness may indicate insufficient sample on prism, or temperature gradients across the prism, or that the prism was not properly cleaned and dried after the last reading.

If in doubt, clean and dry the prism, leave for a while, and repeat measurements from the start. Measuring the same sample twice in quick succession is a useful indication of the reliance that should be placed on the results obtained. Always clean the plastic illuminator plate when cleaning the prism.

More information

Eclipse refractometers are Made in Germany.

IP Rating: IP65 water resistant

Further information on CRM's and a full Eclipse User Guide in various other languages can be found on our website www.bellinghamandstanley.com

Manufactured in Europe

Made in Germany by Xylem.

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Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

Bellingham + Stanley is part of Xylem Lab Solutions and is a leading provider of refractometers, polarimeters and density meters.

Xylem Lab Solutions' global brands have been leaders in the laboratory instrumentation market for decades, and are relied upon every day across more than 150 countries. Working in true partnership with our clients, we listen, learn and adapt to individual needs, offering deep application expertise built upon our long history of innovation in instruments and services. Our solutions for analysis, measurement and monitoring help enable many of today's modern laboratories and industrial processes, and provide our customers the trusted and high performing solutions they need to succeed.

Xylem Lab Solutions is part of Xylem Inc., a global company focused on solving the world's most challenging and fundamental water issues. As accurate analysis is crucial to the water industry, Xylem Lab Solutions taps its diverse product brands for leadership in that field and beyond, providing the best laboratory and field monitoring instrumentation across a wide variety of industries.

For more information on how Xylem can help you, go to www.xylem.com

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