

## VEE GEE Temperature Correction

As an alternative to recalibration of the refractometer due to ambient temperature changes, the following temperature correction method can be used. Ensuring that both the distilled water and the ambient temperature are both at exactly 20°C, follow steps 2-7 under the CALIBRATION section on the preceding page. [NOTE: If the required reference temperature is higher or lower than 20°C, make note of this temperature, calibrate the refractometer accordingly, and use this temperature value for the correction described below]. Once this is accomplished, if ambient temperature changes, simply apply the temperature corrections as described below.

Temperature coefficients are used to correct measured values conducted at temperatures other than the reference (calibration) temperature. For each °C higher than the reference temperature, a temperature coefficient is subtracted from the value; for each °C lower than the reference temperature, a temperature coefficient is added to the value. Model NDX-2 can be used for measuring both water-based solutions and oils. The coefficients used for temperature correction on oil-based solutions are slightly higher than those used for water-based solutions (see upper right corner). If there is a specific temperature coefficient known for the sample being tested, use this value. Otherwise use an average of the values shown in the upper right corner. Confirm the type of sample being tested and perform the following calculations:

### Temperature Coefficients

Water-Based Solutions:  
(-0.0001 to -0.0002/+°C)  
Oil-Based Solutions:  
(-0.0003 to -0.0004/+°C)

#### Sample Values

1.492	27°C	20°C	0.0003
Measurement Value	Measurement Temperature	Reference Temperature	Temperature Coefficient

#### 1. Calculate Temperature Differential

20	27	-7
Reference Temperature	- Measurement Temperature	= Temperature Differential

#### 2. Calculate Temperature Compensation Factor

-7	0.0003	-0.002
Temperature Differential	x Temperature Coefficient	= Temperature Compensation Factor

#### 3. Calculate Temperature Corrected Value

1.492	-0.002	1.490
Measurement Value	+ Temperature Compensation Factor	= Temperature Corrected Value

## VEE GEE Common Oils

Sample	Temperature	nD Range
Almond Oil	20°C	1.470-1.472
Arachis Oil	20°C	1.460-1.472
Aromatic Oils	20°C	1.487-1.550
Beef Tallow	40°C	1.454-1.459
Beeswax	20°C	1.440-1.445
Butter	40°C	1.453-1.463
Cacao Oil	40°C	1.456-1.458
Camellia Oil	20°C	1.468-1.469
Castor Oil	20°C	1.477-1.479
Chrysalis Oil	40°C	1.471-1.476
Coconut Oil	40°C	1.448-1.450
Cod Liver Oil	40°C	1.477-1.483
Cod Oil	20°C	1.479-1.482
Corn Oil	20°C	1.474-1.476
Cottonseed Oil	20°C	1.472-1.477
Herring Oil	40°C	1.470-1.475
Hog Tallow	40°C	1.458-1.461
Kapok Oil	20°C	1.469-1.471
Lard	40°C	1.478-1.482
Linseed Oil	20°C	1.479-1.481
Mackerel Oil	20°C	1.478-1.481
Mutton Tallow	40°C	1.455-1.458
Naphthalene Oils	20°C	1.407-1.436
Neat's-Foot Oil	40°C	1.460-1.461
Olive Oil	20°C	1.467-1.471
Palm Oil	40°C	1.453-1.456
Paraffin Oils	20°C	1.332-1.412
Peanut Oil	20°C	1.460-1.472
Rapeseed Oil	20°C	1.472-1.476
Sardine Oil	40°C	1.479-1.481
Seal Oil	40°C	1.474-1.483
Sesame Oil	20°C	1.473-1.476
Shark Oil	20°C	1.492-1.493
Soy Sauce	20°C	1.463-1.465
Soybean Oil	20°C	1.470-1.478
Sugar Oil	20°C	1.471-1.474
Sunflower Oil	20°C	1.474-1.476
Tea Oil	20°C	1.468-1.471
Tuna Oil	20°C	1.478-1.484
Tung Oil	20°C	1.500-1.510
Unsaturated Oils	20°C	1.371-1.432

## VEE GEE Specifications

**Range:** 1.435-1.520 nD (Refractive Index)  
**Resolution:** 0.001  
**Accuracy:** ±0.001  
**Dimensions:** 40 x 40 x 140mm (1.6 x 1.6 x 5.5")  
**Weight:** 230g (8.1 oz.)  
**Supplied With:** Vinyl Carrying Case (1), Plastic Transfer Pipet (1)  
**Optional Oil Standards:** 1.442 nD @ 20.0°C, ¼ oz. Bottle (cat. no. 45000-OS025)

# VEE GEE® Refractometers

## Operation Manual Model NDX-2



**VEE GEE®**  
Refractometers

Warranty information and registration form can be found at:  
[www.veege.com/service\\_support](http://www.veege.com/service_support)

1.435-1.520 nD

Cat. No. 43055

## VEE GEE Introduction

Thank you for purchasing this VEE GEE Refractometer. With the user in mind, VEE GEE Refractometers are built from modern designs and, with proper care, this instrument should provide many years of reliable performance. It's recommended this manual is read entirely before using the refractometer for the first time.

## VEE GEE Refractometer Components

### Rubber Hood

Houses and protects the focusable lens. Prevents light from entering through the eyepiece during use.

### Calibration Ring

Mechanism used to zero or calibrate the refractometer, without the requirement of additional tools.

### Rubber Grip

Insulates the refractometer against hand heat for accurate results.

### Calibration Ring Set Screw

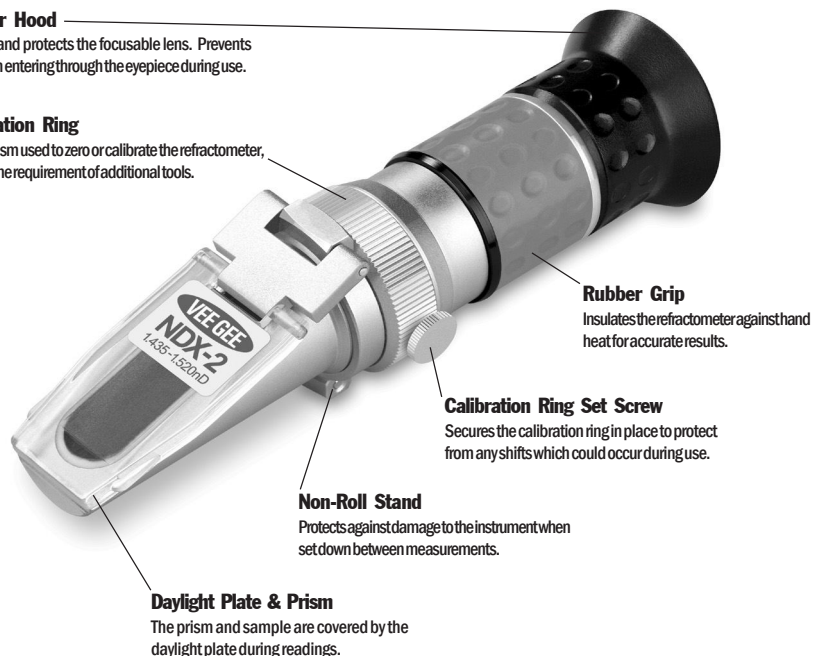
Secures the calibration ring in place to protect from any shifts which could occur during use.

### Non-Roll Stand

Protects against damage to the instrument when set down between measurements.

### Daylight Plate & Prism

The prism and sample are covered by the daylight plate during readings.



## VEE GEE Precautions

- ⚠ This refractometer is an optical instrument -- it can become damaged if dropped or handled in a rough manner.
- ⚠ The prism is made of optical glass and is susceptible to scratches -- do not apply any rough or abrasive material and take care when cleaning the prism.
- ⚠ After each use, clean the prism surface and daylight plate with a soft cloth or tissue soaked in water and wipe off with a dry cloth or tissue.
- ⚠ Do not hold the refractometer under a stream of water from a faucet. Do not splash it with or dip it in water.
- ⚠ If the surface of the prism becomes coated with an oily solution or similar, it will repel test samples and affect readings. If this occurs, the prism should be cleaned with a weakened detergent or similar solvent.

## VEE GEE Calibration

- 1 Calibration should be conducted at the start of each day or when any shifts in ambient temperature occur. If recalibration is impractical, refer to the directions for temperature correction on the following page. For standard calibration procedures, please follow the directions below.
- 2 Open the daylight plate and apply one or two drops of a liquid standard on to the surface of the prism [a **1.504 nD @ 20°C oil standard is used for this example. A prepared solution of a known concentration (minimum 1.435 nD) may also be used for calibration purposes**]. Hold the prism at an angle close to parallel with the floor so the liquid standard will not run off of the prism.
- 3 Gently close the daylight plate over the prism. The liquid standard should spread as a thin, even layer in between the daylight plate and the prism. By looking through the daylight plate, ensure that the liquid standard covers the ENTIRE surface of the prism. If there are bubbles and gaps or if the liquid standard is only on one portion of the prism, the liquid standard must be reapplied (Figure 1). Inaccurate calibrations will result if the prism is not covered correctly.
- 4 Looking through the eyepiece, hold the refractometer and direct the daylight plate upwards towards light. If the scale is not in focus, adjust it by gently turning the eyepiece (rubber hood) either clockwise or counterclockwise. Be careful not to overturn the focusing mechanism.
- 5 When the refractometer scale is viewed through the eyepiece, the upper field of view will be seen as blue and the lower field will be seen as white (Figure 2). Confirm that the boundary line crosses the scale at "1.504" (or the value of the liquid standard being used) (Figure 3).
- 6 If the boundary line falls above or below "1.504", gently loosen the set screw on the calibration ring. While looking through the eyepiece, gently turn the calibration ring clockwise or counterclockwise until the boundary line is at "1.504." Once this is achieved gently tighten down the set screw. (NOTE: Do not over-tighten. If the set screw is over-tightened, the boundary line may shift slightly).
- 7 When calibration is complete, gently wipe the prism using tissue paper.

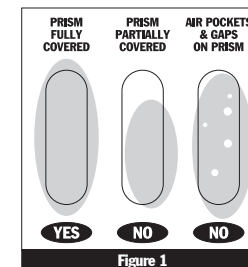


Figure 1

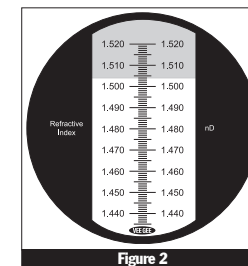


Figure 2

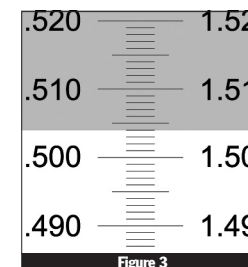


Figure 3

## VEE GEE General Use

- 1 Open the daylight plate and apply one or two drops of the sample solution to the surface of the prism. Hold the prism at an angle close to parallel with the floor so the sample will not run off of the prism.
- 2 Gently close the daylight plate over the prism. The sample solution should spread as a thin, even layer in between the daylight plate and the prism. By looking through the daylight plate, ensure that the sample solution covers the ENTIRE surface of the prism. If there are bubbles and gaps or if the sample is only on one portion of the prism, the sample solution must be reapplied (Figure 1). Inaccurate readings will result if the prism is not covered correctly.
- 3 Looking through the eyepiece, hold the refractometer and direct the daylight plate upwards towards light. If the scale is not in focus, adjust it by gently turning the eyepiece (rubber hood) either clockwise or counterclockwise. Be careful not to overturn the focusing mechanism.
- 4 When the refractometer scale is viewed through the eyepiece, the upper field of view will be seen as blue and the lower field will be seen as white (Figure 4). The reading is taken at the point where the boundary line of the blue and white fields crosses the scale (Figure 5). The value is the Refractive Index (nD) reading of the sample.
- 5 When each measurement is complete, the sample must be cleaned from the prism using tissue paper and water.

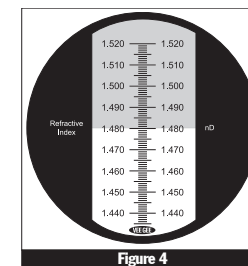


Figure 4

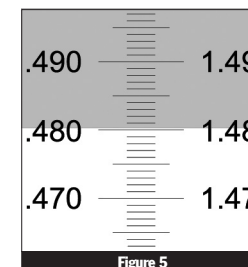


Figure 5