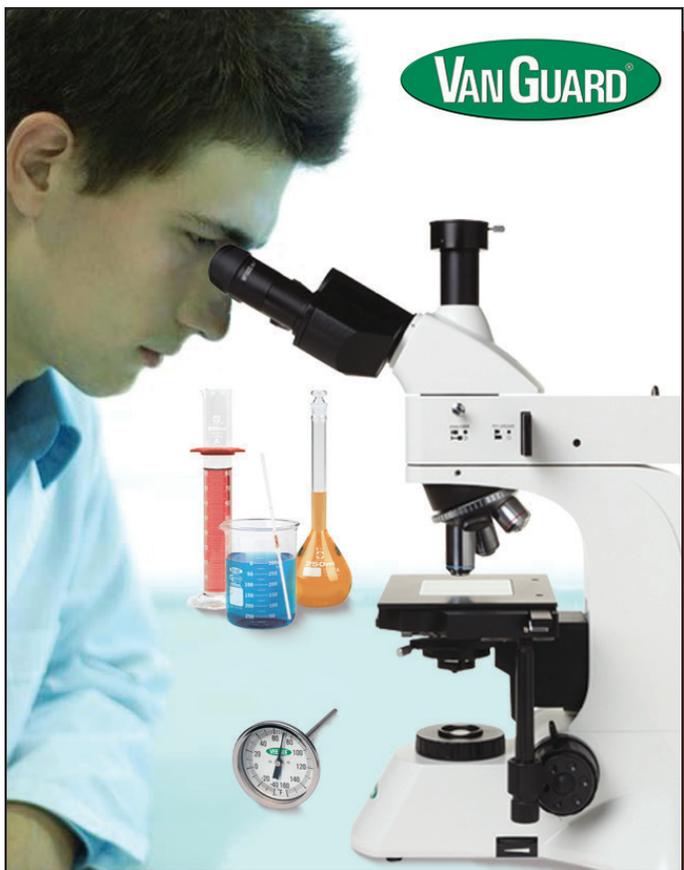


# VEE GEE

## LABORATORY EQUIPMENT & INDUSTRIAL TESTING

- Industrial Microscopes
- Glassware / Thermometers
- Hydrometers / Battery Acid Testing
- Refractometers / Testing Industrial Fluids





## Industrial Microscopes

### 1400 SERIES

#### Features

- VIOS Infinity-Corrected Optics
- 50W Variable Quartz Halogen Reflected Illumination
- 30W Variable Quartz Halogen Transmitted Illumination
- Brightfield & Polarizing Modes
- Integrated Köhler Illumination
- Advanced Ergonomics
- Large, Professional Stand
- High-Eyepoint Eyepieces (FD 22mm) w/ Rubber Eyecups
- 5-Year Limited Warranty



Featuring vivid, infinity-corrected optics, the 1400-Series Industrial Metallurgical Microscope is the flagship of the VanGuard line. Combining top performance with highly-advanced features, it stands up to the rigorous requirements of even the most demanding laboratory.

Built around an industry-leading, full-size frame, the 1442MMi model eliminates the fatigue and strain associated with working long hours over a microscope. Low-position focusing controls and long drop-down X-Y controls ensure simple, consistent, and comfortable use.

Various camera packages are available as options; including digital, video, and DSLR systems. The 1442MMi features: 10X High-Eyepoint Ultra-Widefield eyepieces, 30W variable quartz halogen transmitted illumination, 50W quartz halogen reflected illumination, field diaphragms for Köhler illumination and are backed by a 5-Year limited warranty.

### 1200MM Series

VanGuard 1200MM Series Industrial Microscopes featuring reflected illumination, as well as long working distance objectives, are perfect for the inspection off integrated circuits, wafers, electronic components, metals, polymers, paint, textiles, and essentially any other opaque sample.



VanGuard 1300-Series Stereo Microscopes are widely used in Industrial Settings to Include:

Fixed Stereo 1300SL-Series

Non Illuminated 1300ZP-Series

Mechanical Stage Option

Stereo Zoom 1300ZL-Series





**VEE GEE Hydrometers are manufactured to exacting standards. Each instrument is individually tested and inspected to insure the highest level of dependability, accuracy, and uniformity. Hydrometers for the Industrial Testing include:**

**API, ASTM**



**6722H**

**API, ASTM, w/ Thermometer (SafetyBLUE)**



**6756HTS**

**API, w/ Thermometer (SafetyBLUE)**



**6608-2TS**

**Baume (Heavy)**



**6609-1**

**Calcium Chloride (CaCl<sub>2</sub>), Specific Gravity, Freezing Points**



**6611-3**

**Liquid Petroleum Gas, Specific Gravity, w/ Thermometer (SafetyBLUE)**



**67101HTS**

**Sodium Chloride (NaCl), % By Weight**



**6611-2**

**Specific Gravity, Baume, Dual Scale**



**6604DS-04**

**Specific Gravity**



**6603-1**

**Specific Gravity Battery Syphon Set**



**6605-5**

**Specific Gravity/Baume, Universal**



**6605-1**

**VEE GEE API Scale**

The API Scale was selected in 1921 by the American Petroleum Institute (API), the U.S. Bureau of Mines, and the National Institute of Standards and Technology (NIST) as the standard hydrometer scale for petroleum products. The API Scale is based on the following formula:

$$^{\circ}\text{API @ } 60^{\circ}\text{F} = \left( \frac{141.5}{\text{Specific Gravity @ } \frac{60^{\circ}\text{F}}{60^{\circ}\text{F}}} \right) - 131.5$$

The thermometer scale for VEE GEE Hydrometers (w/ Thermometers) is located in the body. A correction scale for conversion of readings to 60°F is printed opposite the temperature scale.

General Specifications for VEE GEE ASTM Hydrometers: Manufactured in strict accordance to specifications of ASTM (American Society for Testing and Materials) for accuracy and design. All instruments are suitable for certification for use as a primary reference standard with NIST traceability.

**VEE GEE Specific Gravity Scale**

Specific Gravity, also known as relative density, is the ratio of the mass of a solid or liquid to the mass of an equal volume of distilled water. The standard temperature of calibration in the U.S. is 60°F/60°F. All VEE GEE Specific Gravity Hydrometers listed are calibrated at 60°F/60°F.

$$\text{Specific Gravity} = \frac{\text{Mass of X @ } 60^{\circ}\text{F}}{\text{Mass of Distilled Water @ } 60^{\circ}\text{F}}$$

The thermometer scale for VEE GEE Hydrometers (w/ Thermometers) is located in the body. A correction scale for conversion of readings to 60°F is printed opposite the temperature scale.

General Specifications for VEE GEE ASTM Hydrometers: Manufactured in strict accordance to specifications of ASTM (American Society for Testing and Materials) for accuracy and design. All instruments are suitable for certification for use as a primary reference standard with NIST traceability.



Analytical Instruments

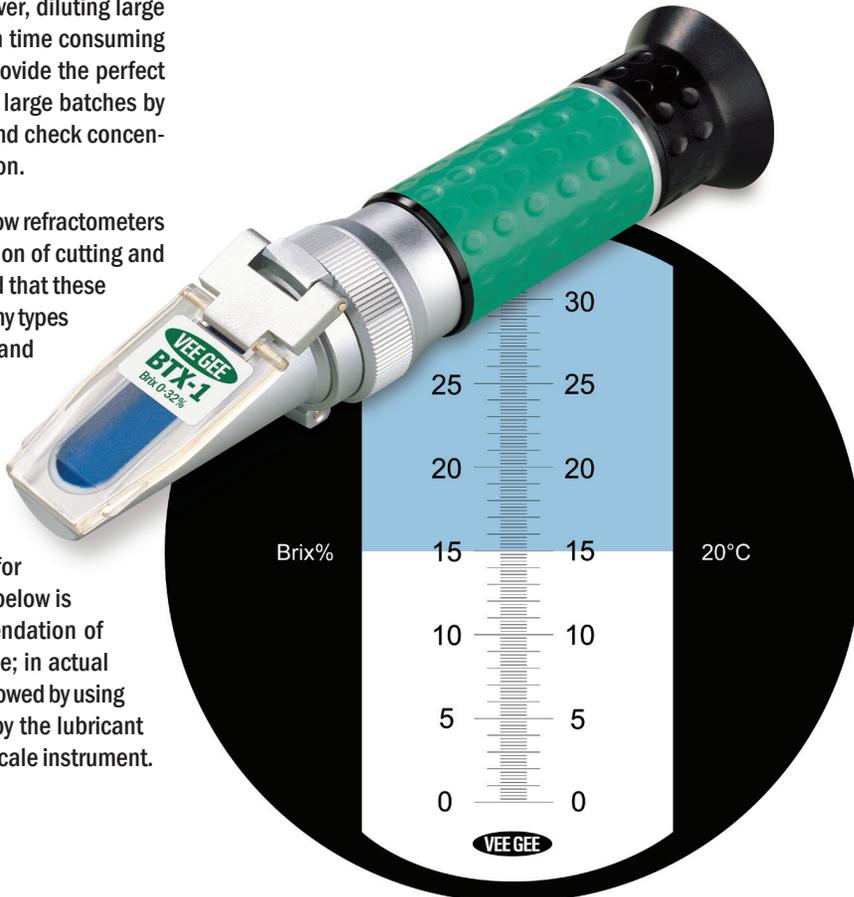
## Using Refractometers To Test Industrial Fluids

Manufacturers and machinists of all types rely on lubricants and coolants to reduce friction and heat during the cutting and grinding process. These lubricants are typically sold as concentrates to be diluted in water. This dilution process is critical and time consuming. An incorrect batch can result in thousands of dollars in damage to machinery and product. However, diluting large batches of this by volume can be both time consuming and cumbersome. Refractometers provide the perfect solution by allowing the user to make large batches by approximation and then come back and check concentration precisely to fine tune the dilution.

The following is a specific example of how refractometers can be used to control the concentration of cutting and grinding lubricants. It should be noted that these general concepts can be applied to many types of industrial fluids for both dilution and purity control.

### Cutting and Grinding Coolants:

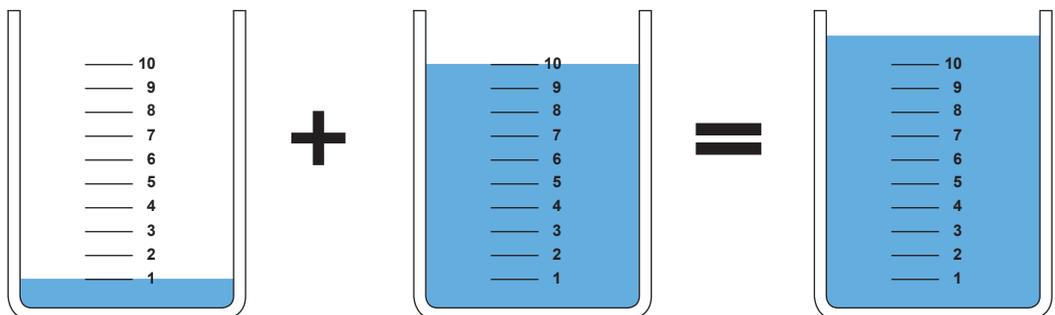
As stated above, many users buy concentrated cutting and grinding coolants with instructions to dilute with tap water to a particular ratio (for instance, a 10:1 ratio). The example below is based on a manufacturer's recommendation of a 10:1 ratio. Again, this is an example; in actual use, the procedure below should be followed by using the proper dilution ratio as provided by the lubricant manufacturer. This is based on a Brix scale instrument.



### Step 1:

#### Dilute to Specified Ratio

The first step is to develop a standard from which future measurements can be based. Using a measuring cup, carefully measure exactly 1 unit of concentrate and pour into a container. Next, carefully measure exactly 10 units of water and pour into the same container. Mix thoroughly.

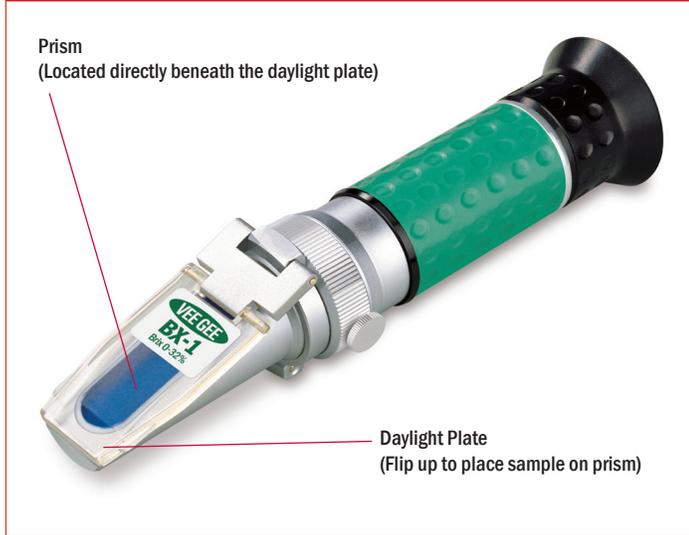


## Step 2:

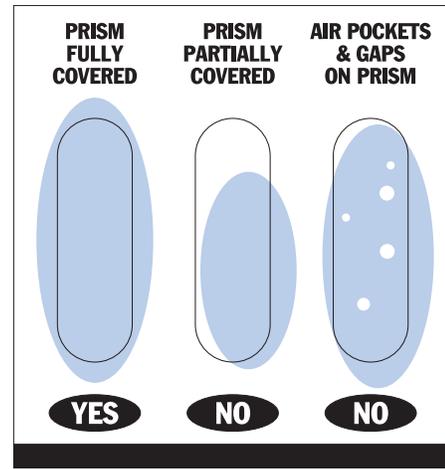
### Measure Sample With The Refractometer

Note: The following step applies to optical refractometers only. If using a digital model, simply record measurements from the LCD display for use in Step #3.

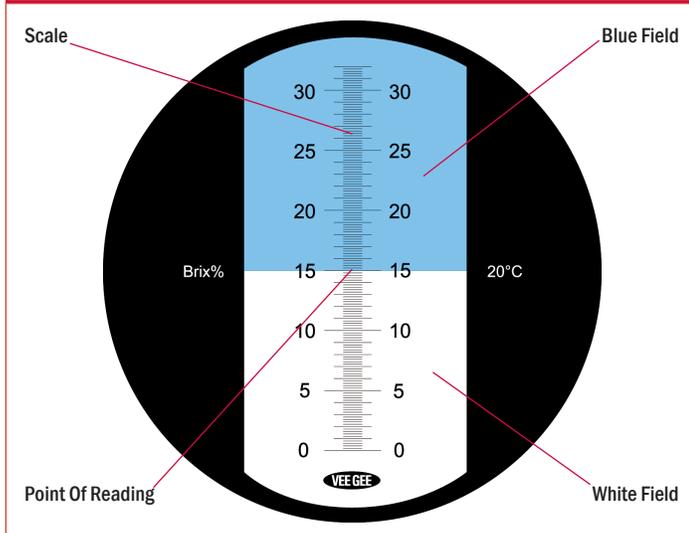
- A** Place 2-3 drops of the mixture on the prism and close the daylight plate.



- B** Make sure that the sample covers the entire surface of the prism without any air pockets.



- C** Look through the eyepiece; the reading is taken where the upper blue and lower white fields meet on the scale.



## Step 3:

### Make a Cross-Reference Table

Lastly, record the refractometer data onto a table which compares the ratio which was used to the reading which was taken from the refractometer. Repeat Steps One & Two to ensure accuracy. Another option is to repeat Steps One & Two but dilute the sample to values just above and below the reference point (i.e. 11:1 and 9:1). This step will indicate the level of accuracy needed during dilution by showing how much the refractometer reading will vary with slight changes in concentration.

Ratio	Reading
9:1	5.8
10:1	5.4
11:1	5.0
19:1	2.1
20:1	1.8
21:1	1.4

Note: This table is only a sample.

A more complete table can be developed by using the same procedure, but varying the dilutions more dramatically. This is useful for those who dilute to different concentrations depending upon application.

## Ordering Information

Above instructions based on Brix Scale instruments

Cat. No.	Model	Scale	Range	Resolution	Accuracy	ATC	Type	Dimensions	Weight
43001	BX-1	Brix	0.0-32.0%	0.2	±0.2	No	Optical	40 x 40 x 165mm	240g
43002	BTX-1	Brix	0.0-32.0%	0.2	±0.2	Yes	Optical	40 x 40 x 165mm	240g
43009	BX-10	Brix	0.0-10.0%	0.1	±0.1	No	Optical	40 x 40 x 185mm	285g
43011	BX-20	Brix	0.0-20.0%	0.1	±0.1	No	Optical	40 x 40 x 185mm	285g
43012	BTX-20	Brix	0.0-20.0%	0.1	±0.1	Yes	Optical	40 x 40 x 185mm	285g
48101	MDX-101	Brix	0.0-50.0%	0.1	±0.1	Yes	Digital	120x 32 x 60mm	139g

You may also want to check with the lubricant manufacturer for their dilution recommendations.

Many other Refractometer Scales and Models available in the VEE GEE Line.



For more information go to: [veegee.com](http://veegee.com) and see the VEE GEE Thermometer brochure for: Dial Thermometers, Min-Max Hygrometer, Thermometer Clock, Precision Serialized Thermometers and our High Accuracy Digital Stem Series.



For more information on VEE GEE Glassware, including: Beakers, Burets, Clamps, Flasks Cylinders and more... Go to: [veegee.com](http://veegee.com)



**⚠ WARNING:** This product can expose you to chemicals including lead, which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



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