VEE GEE®

Analytical Instruments

Using Refractometers To Test Industrial Fluids

Model BX-1

Model PDX-1

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.

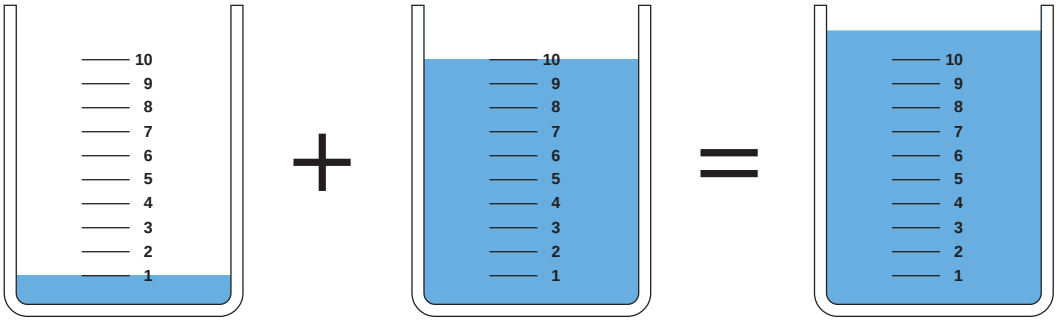
The following is a specific example of how refractometers can be used to control the concentration of cutting and grinding lubricants. It should be noted that these general concepts can be applied to many types of industrial fluids for both dilution and purity control.

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, 10:1). 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.

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.

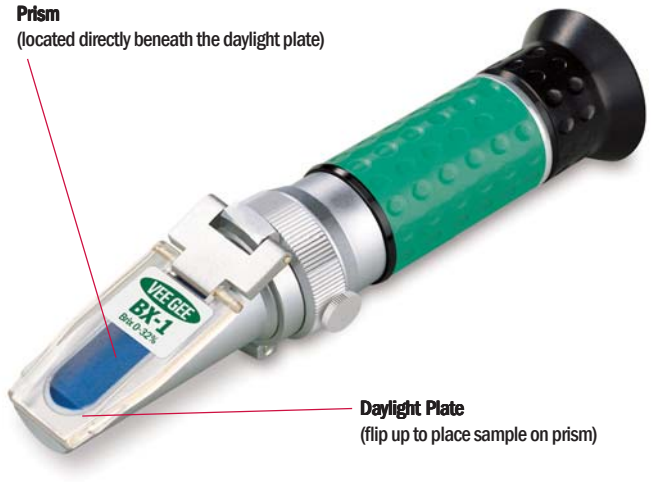


Step 2:

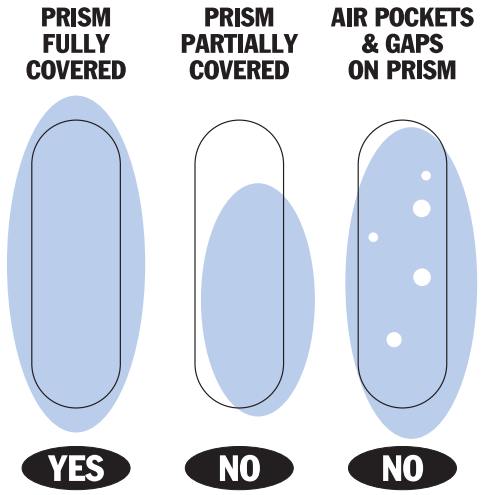
Measure Sample With The Refractometer

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.

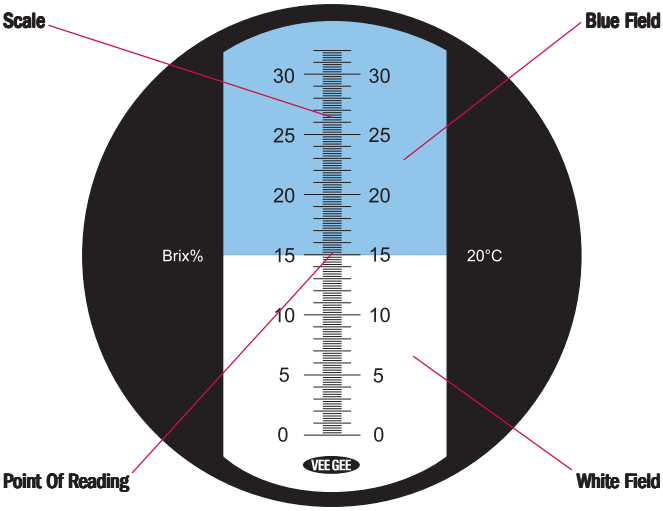
A **Place 2-3 drops of the mixture on the prism and close the daylight plate.**



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 1 & 2 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

Cat. No.	Model	Scale	Range	Resolution	Accuracy	Type	Temperature Compensation	Dimensions	Weight
43001	BX-1	Brix	0.0-32.0%	0.2	±0.2	Optical	Manual	40 x 40 x 165mm	240g
43002	BTX-1	Brix	0.0-32.0%	0.2	±0.2	Optical	Automatic	40 x 40 x 165mm	240g
43009	BX-10	Brix	0.0-10.0%	0.1	±0.1	Optical	Manual	40 x 40 x 185mm	285g
43011	BX-20	Brix	0.0-20.0%	0.1	±0.1	Optical	Manual	40 x 40 x 185mm	285g
43012	BTX-20	Brix	0.0-20.0%	0.1	±0.1	Optical	Automatic	40 x 40 x 185mm	285g
44001	PDX-1	Brix	0.0-65.0%	0.1	±0.1	Digital	Automatic	170 x 95 x 45mm	425g

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