

# GLYCOL/BATTERY REFRACTOMETER

## 300014

### INSTRUCTION MANUAL

SPER  
SCIENTIFIC LTD.

#### INTRODUCTION

Your portable refractometer is a precision optical instrument which is designed to measure the freezing point of either Ethylene Glycol or Propylene Glycol based coolants and the strength of the electrolyte solution of battery systems. It uses three scales which are accurate, and easy to read. Its light weight and ergonomic design make it convenient for both laboratory and field conditions. It is excellent for scientific research and quality assurance requirements.

The refractometer operates on the principle, that as the concentration of a solution increases, its refractive index changes proportionately. The refractive angle measured by your refractometer registers on the field scales accordingly. The larger the concentration of ethylene glycol or of propylene glycol the lower the freezing point of the solution. Specific gravity is registered on the center scale which indicates the status of the battery acid. The scale sections are labeled, RECHARGE, FAIR AND GOOD.

#### PANEL DESCRIPTION

1. Prism
2. Cover plate
3. Calibration screw
4. Barrel with textured grip
5. Eyepiece with ribbed focus ring



Fig. 1

#### OPERATING PROCEDURES

1. With cover plate open, carefully clean the prism (1) with soft cotton cloth. Avoid scratching the surface.
2. Aim the front end of the refractometer toward a light source and rotate the eyepiece (5) to obtain the clear focus.
3. Adjustment of the null (0F 32°F freezing point of water).
  - A - Open the cover plate (2).
  - B - Apply a few drops of pure distilled water on to the prism platform (1).
  - C - Close cover plate (2).
  - D - Rotate calibration screw (3) so that the dark and light boundary line coincides exactly with the 32°F water line at the bottom of the temperature scales.
4. Carefully dry the prism platform and cover.
5. Place a few drops of the solution to be tested on the prism and close the cover plate lightly so the solution spreads evenly on the prism.
6. Aim the front end of the refractometer toward the light source and focus the eyepiece on the boundary line between the light and dark hemispheres.

7. The boundary line of light and dark will indicate the freezing point of Propylene glycol on the left scale or the freezing point of Ethylene glycol on the right scale of the particular concentrations measured. If the solution is battery fluid it will indicate the specific gravity of this concentration on the middle scale. See Fig. 2.
8. The temperature of the null reference liquid should be at the same temperature as the sample solution. For variations in temperature the null point should be adjusted once every 30 minutes. The standard test point is at 20° C.

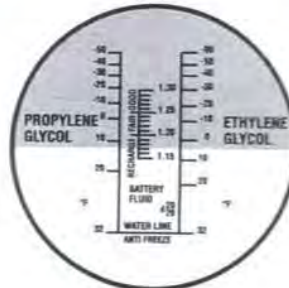


Fig 2

### PRECAUTIONS

1. After use *do not* dip or run unit under water. Avoid letting water seep into the internal section of the refractometer.
2. Clean carefully after each use with a soft cotton cloth. Do not scratch surface of the prism.
3. Store unit in a dry, clean and non-corrosive environment.
4. Avoid strong shocks.
5. If reasonable care is applied to your refractometer the reliability, precision and optical performance will not change.

### SPECIFICATIONS

MAGNIFICATION	2.2X
MEASURING RANGE (From freezing point of water)	
Ethylene glycol	32°F to -60°F
Propylene glycol	32°F to -50°F
Resolution	10°F
Accuracy full scale	± 2°F
MEASURING RANGE FOR BATTERY FLUID	
Specific gravity	1.15 to 1.30
Resolution	0.01
SIZE	6 1/2 x 1 1/2 inches
WEIGHT	6 1/2 oz.

### STANDARD ACCESSORIES

Carrying Case, Transfer pipette, Distilled water, Adjustment screwdriver, Instruction manual, Registration card.

**Warranty:** Sper Scientific warrants this product against defects in materials and workmanship for a period of 5 yearS from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover damage resulting from accident, misuse, or abuse of the product. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD  
7720 E Redfield Rd, Suite 7, Scottsdale, AZ 85260  
WWW.SPERSCIENTIFIC.COM INFO@SPERSCIENTIFIC.COM

The defective unit must be accompanied by a description of the problem and your return address. Register your product online or return your warranty card within 10 days of purchase.