# Automotive Refractometer

300014

Instruction Manual

SPER SCIENTIFIC

Environmental Measurement Instruments

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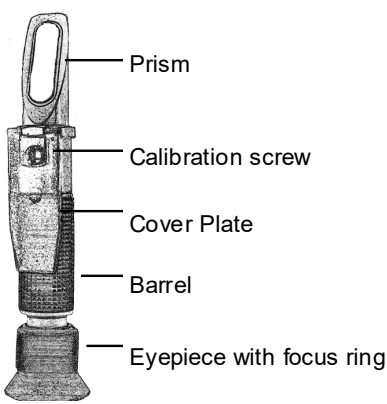
## INTRODUCTION

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

The refractometer operates on the principle that, as the concentration or density of a solution increases, its refractive index changes proportionately. The refractive angle measured by your refractometer registers on the scale. 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.

## DESCRIPTION



## OPERATING PROCEDURE

1. With the **COVER PLATE** open, clean the **PRISM** with a soft cloth to avoid scratching the surface.
2. Aim the refractometer toward a light source and rotate the **EYEPIECE** to obtain the clearest focus.
3. Zero Point Calibration (32°F freezing point of water):
   A. Open the **COVER PLATE**.
   B. Apply a few drops of pure distilled water onto the **PRISM** platform.
   C. Close the **COVER PLATE**.
   D. Turn the **CALIBRATION SCREW** until 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 PLATE**.
5. Place a few drops of the test solution on the prism and close the **COVER PLATE** so the solution spreads evenly on the prism.
6. Aim the front of the refractometer towards the light source and focus the eyepiece on the boundary line.
7. The boundary line indicates 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 scale solution is battery acid it will indicate the specific gravity of this concentration on the middle scale. See Fig 2.

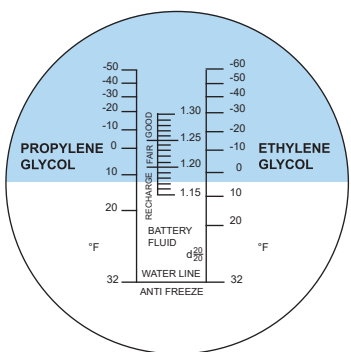



Fig 2.

8. After use, clean the prism with a cloth and remove any residue.
9. The temperature during the zero point calibration should be the same temperature as the test solution. For variations in temperature, the zero point should be adjusted once every 30 minutes. Standard test point is at 20°C.

## PRECAUTIONS

Never submerge the unit, and do not let liquid seep into the unit's body. Clean the refractometer after each use with a soft cotton cloth. Do not scratch surface of the prism. Store in a dry, clean, and non-corrosive environment. Avoid strong or sudden impact.

## SPECIFICATIONS

| | |
|---|---|
| Magnification | 2.2X |
| Measuring Range (From freezing point of water) | |
| Ethylene glycol | 32°F to -60°F (0°C to -51°C) |
| Propylene glycol | 32°F to -50°F (0°C to -46°C) |
| Resolution | 10°F |
| Accuracy | 2°F |
| Measuring Range for Battery Acid | |
| Specific Gravity | 1.15 to 1.30 |
| Resolution | 0.01 |
| Size | 6 1/2" x 1 1/2" (165 x 38 mm) |
| Weight | 6.5 oz. (184 gr.) |
| Accessories | Screwdriver, Carrying Case, Transfer Pipette, Distilled Water, Instruction Manual. |

## WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of **five (5) year** 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 probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will break the waterproof seal and void the warranty. To obtain warranty service, ship the unit postage prepaid to:

**SPER SCIENTIFIC LTD.**
8281 E. Evans Rd., Suite #103
Scottsdale, AZ 85260
(480) 948-4448

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperwarranty.com within 10 days of purchase.