



# Cutting Oil Refractometer Pocket **PAL-102S**

Cat. No.4502

For checking the concentration and measuring diluting ratio of cutting oil and washing solutions.  
Also, for checking the moisture of hydraulic oil !

## Feature

- Calibration with water only
- Extremely water resistant (IP 65)
- Light & Compact, 100g
- Revolutionary new feature E.L.I.
- Automatic Temperature Compensation (ATC)
- Measurement in 3 seconds
- Ergonomically designed for one-handed operation
- Convenient storage case
- Battery power indicator
- Designed with a strap holder option



Can be washed  
under running water!



## Specifications

Measurement Range	: 0.0 to 70.0
Resolution	: 0.1
Measurement Accuracy	: $\pm 0.2$
Measurement Temperature	: 10 to 75°C
Ambient Temperature	: 10 to 40°C (ATC)
Power Supply	: AAA alkaline battery×2
Battery Life	: Apporox. 11,000 measurements
International Protection Class	: IP65 Water Resistant
Dimensions and Weight	: 5.5×3.1×10.9cm, 100g

## Application

- Metalworking fluid (water based solution)  
(Cutting Oil, Grinding Oil, Quenching Oil,  
Rolling Solution, Wire Stretching Oil etc.)
- Metalworking fluid
- Lubricant oil
- Moisture of hydraulic oil
- Washing solutions

## How to use (in the case of cutting oil)

### Measurement of Diluting Ratio before use

### Periodic Inspections of Concentration

In order to prevent putrefaction, the cutting oil solution concentration should be kept at an optimum level. Periodic (at least once a week) inspections with PAL-102S is highly recommended.

### Appropriate filling up

Due to evaporation and contamination of the cutting oil solution, undiluted cutting oil and water need to be added periodically. You can use PAL-102S when adjusting the concentration as original level.

### Tips for Measurement with PAL-102S

The concentrations of the cutting oil solution vary from a place to a place in a circulating system.

The concentration near the injection nozzle is most stable (Please ensure your safety when taking the solution from the injection nozzle).

In addition, you can check the function of filter layer if you measure all solutions in the tank, the injection nozzle, and the septic tank.

\*PAL-102S can measure 3 type of cutting oils, emulsion, soluble, and chemical.

\*If measurement values are unstable, there are 2 methods that you can try.

① Diluting solutions with water. Then, measuring and multiplying a displayed value by your diluted ratio.

② Leaving the sample on the prism for a little while and measure.

## Measuring Method



①Place the sample onto the prism surface.



②Press the START key.



③The measurement value will be displayed in 3 seconds.

### Conversion method (in the case of water cased solutions)

E.g.) For an oil solution, with a concentration of 5% (dilution ratio at 20 times), mix 95ml of water to 5ml of undiluted solution. For this example, assume the displayed value, on the PAL-102S, is 4.0. Next, convert the displayed value using the following relationship to determine the conversion factor; Actual concentration÷Displayed value, Ex:  $(5.0 \div 4.0 = 1.25)$ . Once the conversion factor is known (1.25 in this example), measuring a sample with an unknown concentration is simple. Taking an unknown sample, assume that the measured value is 3.0. Using the simple formula, displayed value × conversion factor ( $3.0 \times 1.25$ ) the actual concentration of the sampled measured is 3.75.

All ATAGO refractometers are designed and manufactured in Japan.

**HACCP|GMP|GLP**

ATAGO products comply with HACCP, GMP, and GLP system standards.

**ATAGO CO., LTD.**

Headquarters: The Front Tower Shiba Koen, 23rd Floor  
2-6-3 Shiba-koen, Minato-ku, Tokyo 105-0011, Japan  
TEL : 81-3-3431-1943 FAX : 81-3-3431-1945  
overseas@atago.net http://www.atago.net/



\* Specifications and appearance are subject to change without notice.

**ATAGO U.S.A., Inc.**

TEL : 1-425-637-2107 customerservice@atago-usa.com

**ATAGO INDIA Instruments Pvt. Ltd.**

TEL : 91-22-2833-8038 / 8076 customerservice@atago-india.com

**ATAGO (THAILAND) Co., Ltd.**

TEL : 662-982-8718-9 customerservice@atago-thailand.com

**ATAGO BRASIL Ltda.**

TEL : 55 16 3916-6000 customerservice@atago-brasil.com

**ATAGO ITALIA s.r.l.**

TEL : 39 2 36557267 customerservice@atago-italia.com

**ATAGO CHINA Guangzhou Co., Ltd.**

TEL : 86 20-38106065 info@atago-china.com