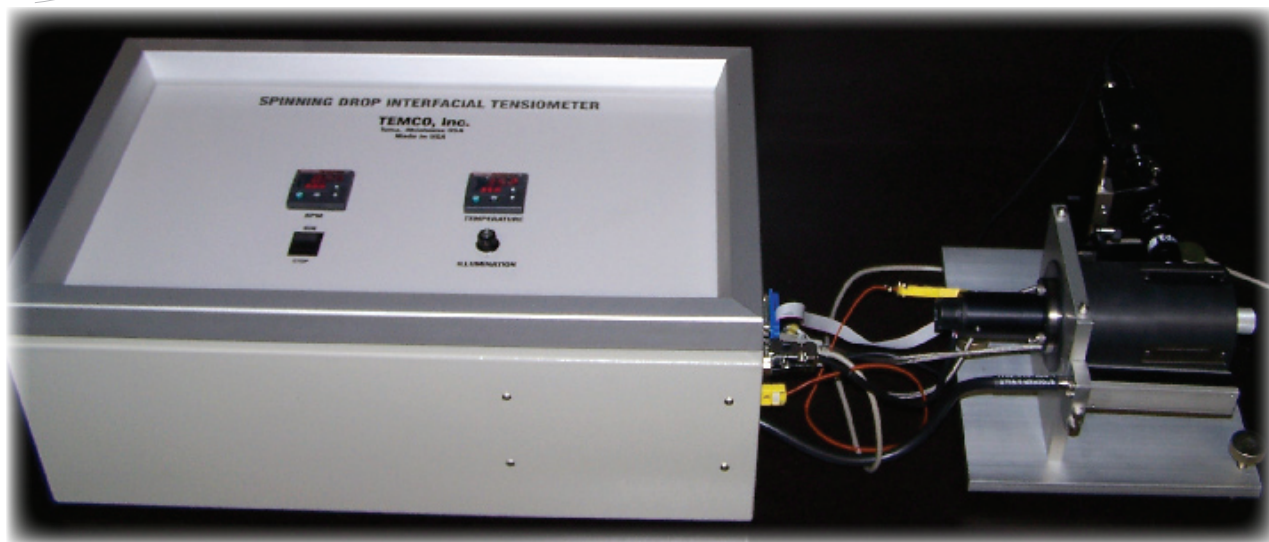


# Temco, Inc.

Design Excellence in Core Analysis Instrumentation

## Spinning Drop Interfacial Tensiometer Model 510



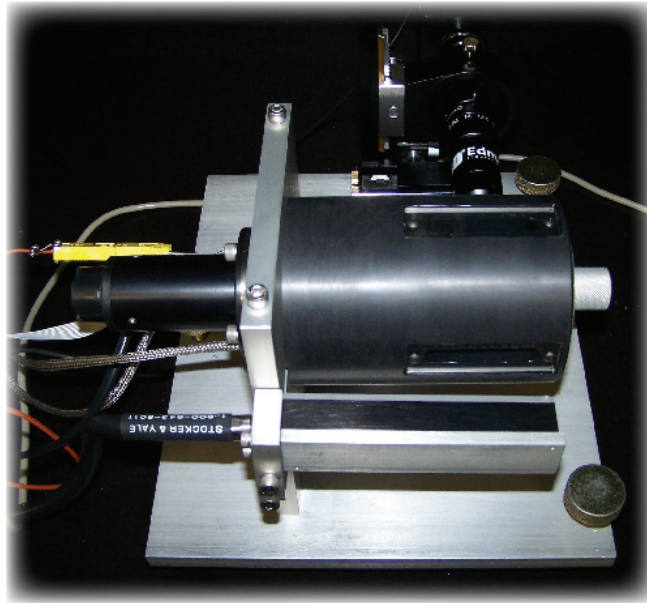
The Spinning Drop Interfacial Tensiometer can be used to measure the interfacial and surface tensions between two liquid phases of different densities. This technique has been successfully employed since the middle of the 1970's. The less dense phase is injected into a glass tube filled with the denser phase. For petroleum applications, generally, the oil phase is injected into the brine or surfactant phase. The horizontal glass tube is then rotated at high rates of speed. As the less dense phase bubble elongates within the denser phase, the interfacial tension measurement is performed.

### Industry Standard Features

- Measurement range: 70 to  $10^{-5}$  dynes/cm
- Rotation speed or velocity: 1,000 to 10,000 rpm
- Digital display of rotational speed
- Temperature range: 30 -100°C (86-212°F)
- Two sample tube inner diameters available
- Measurement microscope for drop dimensions

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## Unique Instrument Features

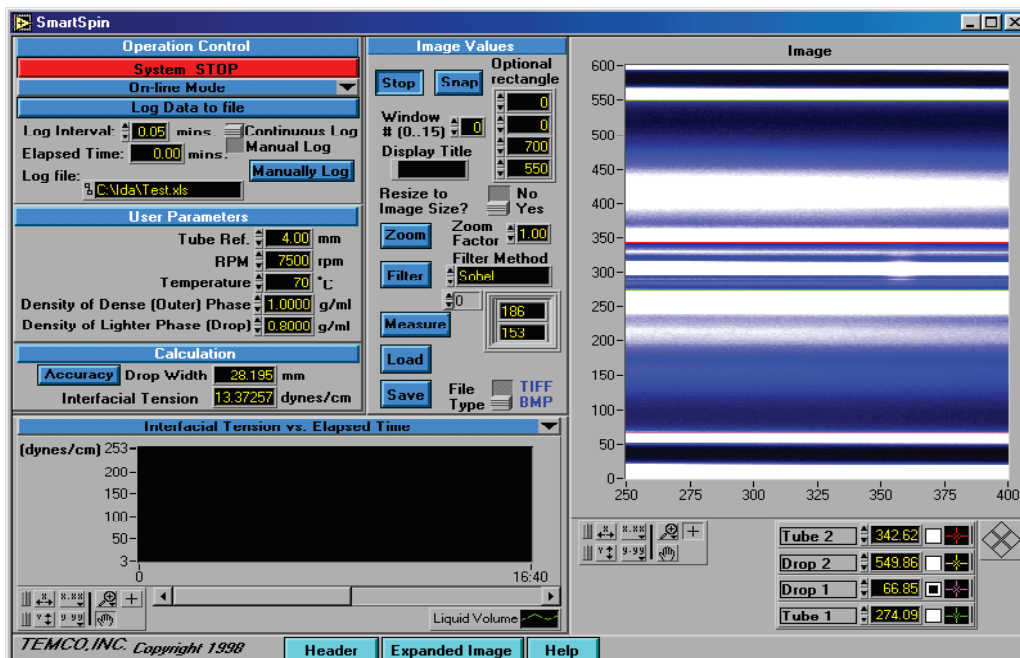
Optional camera with computer for data collection, storage, and interfacial tension calculation, see Model 510. Investigations of surface and interfacial tension using a spinning drop technique require a viewable environmental chamber or glass tube, temperature control, syringe for drop formation, rotational speed control, and observation equipment. The spinning drop visual cell is a capillary tube. The temperature in the tube is controlled using a heater element for the heating of the fluid. The heater temperature is controlled using an electronic temperature controller from the front panel. The cell is also insulated to maintain a constant, uniform temperature throughout the test period. A syringe needle is installed through septa at one end of the glass tube for the injection of the less dense phase into the tube. A drop will form on the tip of the needle, and then the needle is removed, leaving the drop within the glass tube. External leveling feet are provided for proper leveling of the bubble during and prior to any testing.

To observe and record the drop dimensions, a measuring microscope is used with the Model 500 and a measuring camera system is used with the Model 510. Both instruments have an external light source. The image of the drop is captured within the computer and software for data analysis and collection in the Model 510. The software is discussed and shown on the following page. The elongation of the drop is controlled with the rotational speed of the precision stepper motor. An electronic controller on the front panel is provided to easily set, maintain, and reproduce the rotation speed of the glass tube.

## SmartSpin Software

The SmartSpin software is a window based software package for observation and measurement of the spinning drop dimensions and the calculation of the interfacial tension. To solve for the interfacial tension the various dimensions are automatically measured. The calculated interfacial tension is displayed and recorded in the software. Since the drop dimensions can change over time, the software measures and calculates the drop dimensions and interfacial tension over time. This approach provides the end user with valuable data regarding how the two immiscible fluids interact over time.

The system is provided with the PC computer, monitor, camera, data acquisition, interface electronics, and software



## Ordering Information

To order a spinning drop interfacial tension system from Temco, you can either contact Temco directly or request the items as per the listing below:

Description	Model 500	Model 510
Measurement range	70 to 10 <sup>-5</sup> dynes/cm	70 to 10 <sup>-5</sup> dynes/cm
Rotational speed	1,000 to 10,000 rpm	1,000 to 10,000 rpm
Speed accuracy	0.1% F.S.	0.1% F.S.
Temperature range	30-100°C (86-212°F)	30-100°C (86-212°F)
Sample tube inner diameters	2 and 4 mm	2 and 4 mm
Measuring microscope	Standard	Not available
Measurement camera	Not available	Standard
Measurement accuracy	to 0.01 mm	to 0.01 mm
Electrical	110-230 VAC 50/60 Hz, 10 Amps	110-230 VAC 50/60 Hz, 10 Amps
Dimensions	Width: 79 cm (31") Depth: 41 cm (16") Height: 28 cm (11")	Width: 79 cm (31") Depth: 41 cm (16") Height: 28 cm (11")
Weight	31 kg (75 lbs.)	31 kg (75 lbs.) without the computer