

Kino

► **A60**

Full Automatic Surface / Interfacial Tensiometer & Contact Angle Meter

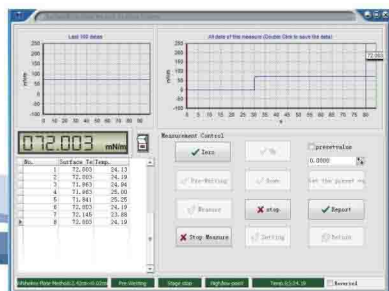
– Professional Weight-based Interface Chemical Analytical System



A60

Full Automatic Surface / Interfacial Tensiometer & Contact Angle Meter

– Professional Weight-based Interface Chemical Analytical System



Measurement of surface tension (ST) / interface tension (IFT), analysis of equilibrium and dynamic contact angle (CA / DCA) of solid material, contact angle of powder and fiber, as well as measurement of critical micelle concentration (CMC) of surfactant and more are all characterizations of interface chemistry.

Series A60 – full-auto weight-based dynamic & static interface chemistry analytical system, equipped with world leading micro-analytical balance, high-precision positioning mechanism controlled by stepper motor, and digital semiconductor temperature sensor, are developed to meet the demand in interface chemistry measurement for high-precision control over the process of R&D and products' quality. The instrument advantages in such merits as simple operation, high accuracy, complete function and excellent quality. It has powerful data management and covers three different measurement methods, which enable it to be applied extensively in measurement of dynamic / static surface tension (ST), interface tension (IFT), contact angle measurement of solid material, single fiber by Wilhelmy plate based method and Washburn-based method. International design, global sourcing and professional service provide you comprehensive and professional solution in interface chemistry measurement. Our instruments, with their obvious advantages, represent the leading level of weight-based interface chemistry equipment.

The latest upgraded model A601S (as shown in the picture) embeds professional customized portable control terminal, with which you can control your interface chemistry analytical process more conveniently. All data can be copied into your U-disk and printed out. Unexpected functions are all designed for you.

$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

Series A60 from USA KINO cover the following variants and each part is stand-alone. The mainframe A601 is required to purchase no matter which variants of A60 series you need. Contact angle measurement modules of single fiber, weight-based method, Washburn method for powder are all available in series A60, but they are not included in the standard configuration.

A601S Upgraded surface / interfacial tensiometer NEW		A601 Surface / interfacial tensiometer	
A602	Auto-CMC module	A603	Contact angle analysis based on weighing method
A604	Contact angle analysis for powder	A605	Single fiber / fiber bundle analysis
A606	Customized surface chemistry analytical system		

Applications

Product Name	Applications
1 Ink, Paint	Analyzing wettability in printing/coating process, R&D and product's quality control
2 Printing	Development of printing plate detergent and its wettability analysis, wettability analysis of film, paper, etc.
3 Film	Wettability analysis and quality control
4 Detergent Industry	Analysis of surfactant's absorption rate, property and its proper concentration (CMC)
5 Chemical Cocatalyst Fluid	Analysis abilities of aggregation and diffusion
6 Cosmetic	Analysis of dispersity, stability and wettability of emulsion and suspending agent
7 Electroplating	Wettability analysis, quality control
8 Pesticide	Development, formula preparation as well as wettability analysis of additive
9 Nano-fiber and Powder	Analyzing hydrophilic or super-hydrophobic contact angle and dynamic contact angle
10 Petroleum	Indicating interface tension in secondary and tertiary oil recovery, quality control of displacement agent, degradable ingredients analysis
11 Textile	Analysis of contact angle, wettability, surface tension and adhesive force
12 Pharmaceutical & Food	Analysis of surface tension, wettability, surface tension of can coating as well as cleanness analysis
13 Power	Surface tension analysis of transformer oil and insulating oil, as well as contact angle analysis of fiber bundle
14 Surfactant	Measurement of surface tension and critical micelle concentration (CMC)

$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

Performance Features

Leading design of weighing sensor

- Electromagnetic force balance sensor technology, expertise in micro-weighing analysis
- Better temperature drifting correction, zero tracking technology
- High data updating speed (23 data/s) and processing with more reliable values.
- World's first rear sensor (A101, A606), useful for volatile & corrosive sample liquid analysis, e.g. liquid ammonia and acid substances, etc.
- Double-microchip processing technology, with better data-handling capacity and higher speed of processing.
- Upgradeable software, customized to meet your special measurement requirements.

High-precision sample positioning stage and temperature control system

- Stepper motor controlled high-precision vertical travel positioning stage, with resolution up to 0.1μm and repetitive-positioning accuracy up to 2μm.
- Digital temperature sensor made of semiconductor with temperature resolution of 0.01°C and absolute temperature accuracy of down to 0.0625°C
- Sample chamber controlled by water circulator offers best temperature control.



Comfortable operation process

- Universal USB2.0 communication interface provides stronger compatibility, higher speed, and convenient access to laptops and new-model desktops without RS232 interface.
- One-key zeroing and full-auto measurement with simple and convenient operation, to minimize errors caused by human operation.
- Humanizing pre-wetting function, designed for oily sample measurement.



Some samples can't well wetting Wilhelmy plate or DuNoüy ring for the first time, especially for some oily sample. Our uniquely designed pre-wetting function can provide a more humanized solution for you in these cases.

- Multiple self-calibration functions to enhance measurement reliability

Series A60 are equipped with both weighing sensor calibration and self-calibration function of sensing interface (Wilhelmy plate and DuNoüy ring), which is much better than other manufacturers'. It can enable you to control the reliability of measured value more effectively.

Anti-static design to improve measurement accuracy of surface/interface tension (for optional)

- USA KINO adopts ionic wind technology to avoid detection error of liquid-gas interface caused by electrostatic.
- What is more, ion beam kit module is provided for better anti-static experience. The anti-static device will be always on during measurement. It's most effective in powder/ fiber measurement to avoid powder electrostatic adsorption and deformation of single fiber.
- Usage of glass door with anti-static coating can effectively isolate conduction of electrostatic.

$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

CAST®1.0—powerful functions and user-friendly interface

- More methods available for you to make a comprehensive solution. USA KINO exclusively provides 3 methods, including classical Wilhelmy plate method (slide Wilhelmy plate method), modified Wilhelmy plate method and DuNoüy ring method.
- USA KINO provides you a series of weight-based wettability analytical methods for solid material, e.g. contact angle analysis by Wilhelmy plate method, fiber contact angle analysis, and powder contact angle analysis based on Washburn method, in prerequisite that corresponding modules are purchased. (SM02 should be purchased)
- USA KINO's innovative 3rd generation Wilhelmy plate method used Young-Laplace equation correction, in which method plate needn't be immersed and withdrawn in measuring process (such method is called zero buoyancy method).

It can be used for measurement of dynamic & static surface / interface tension, especially for viscous sample, which enriches measurement technologies of interface chemistry.

(1) Professional liquid-gas / liquid-liquid interface detection technology;

(2) Professional FK buoyancy correction technology;

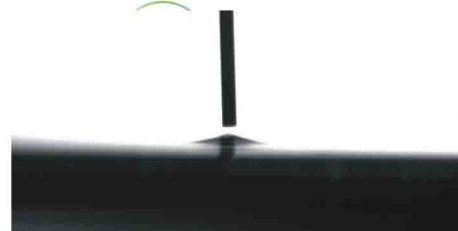
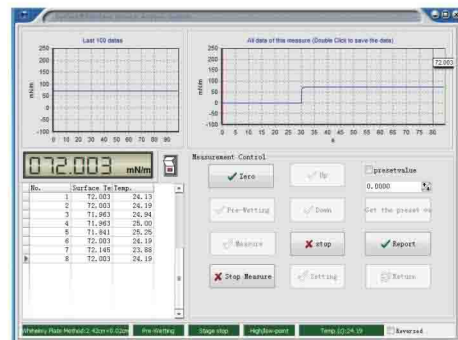
(3) Professional zero point correction and preset value technology.

- Managing all dynamic live data

(1) Software manages all live data that balance acquired. All data can be query and modified as well as exported to Excel.

(2) Real-time display of data graph, with observation of interface tension changes.

The function provides unparalleled convenience in measuring dynamic surface tension of time-dependent, medium-high viscosity samples, and volatile liquid or mixture.



$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

- Database with abundant liquid data

300 kinds of liquid with 800 data values can be directly used for analyzing surface free energy and its distributions of solid (such as Lewis acid and base components, hydrogen bond forces, polar force and dispersive force) (SM02 should be purchased)

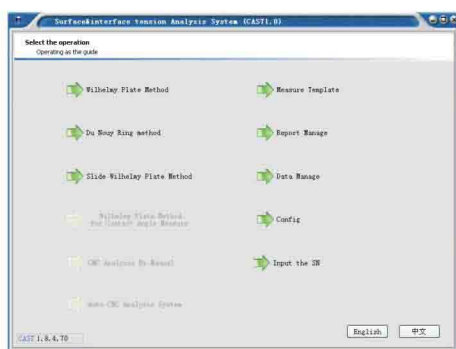
- Powerful database management with data storage, query and modification.

(1) Real-time data storage and display, historical data searching, and eigenvalue modification are all available with CAST® 1.0.

(2) CAST® 1.0 saves all the measured data of dynamic value automatically and exports them into Excel.

- User-friendly language interface of CAST® 1.0

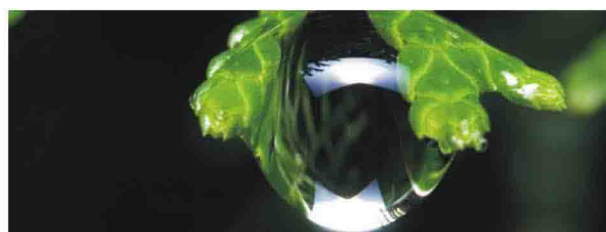
The language interface of CAST® 1.0 adopts leading-edge unicode technology, providing you with a user-friendly operation interface. With it, different languages can be switched easily.



Standardized measurement templates

Various standardized measurement templates are available from USA KINO:

- Measurement of surface tension and equilibrium surface tension as well as estimation of equilibrium time for surfactant.
- Measurement of surface tension and equilibrium surface tension as well as estimation of equilibrium time for medium-high viscosity sample.
- High-precision surface & interface tension measurement of pure liquid with fixed surface tension
- Interface tension measurement, especially for plate-upward state in interface tension measurement.
- Measurement of interface tension between monomolecular film and water, etc.



$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \theta}{X} + \frac{1}{R_1} \right\}$$

Technical Specifications

A601/A601S–Surface / interfacial tensiometer

Hardware Specifications

1	Weighing Sensor	(1) Measuring Range	0–999.999mN/m
		(2) Resolution	0.001mN/m
		(3) Weighing Accuracy	0.04mN/m
		(4) Absolute Error	±0.2mN/m (Reference secondary distilled water)
		(5) Weighing Capacity	220g
		(6) Weighing Readability	0.1mg
		(7) Data Update Speed	23 data/s
		(8) Data Sampling Speed	100Hz
		(9) Data Processing	Double–chip processor
		(10) Zeroing Method	One–key zeroing with presetting functions
2	Sample Stage Control	(1) Lifting Range	0–50mm
		(2) Lifting Accuracy	Travel resolution:0.007μm; Repetitive positioning: 0.5μm
		(3) Control of Lifting Speed	Variable speed
		(4) Control Mode	Software–controlled via USB interface for better compatibility
		(5) Positioning Readout Mode	Read by software encoder
3	Communication Interface	USB2.0 interface can be directly connected to laptops, without compatibility of RS232	
4	Temperature Readout (Relevant accessories should be optional purchased)	Temp. Sensor	Digital semiconductor temperature sensor made in U.S.A.
		Temp. Calibration	Self–calibration
		Accuracy	0.01℃
		Readout Mode	Automatically read by software

Reference Specifications of CAST® 1.0

1	Measuring Method	3 methods, includes: ✓ Modified Wilhelmy plate method ✓ Classical Wilhelmy plate method ✓ DuNoüy ring method
2	Measuring Mode	Both automatic and manual mode in measurement of surface / interface tension
3	Standardized Measurement Templates (Optional purchased or customized)	Various standardized measurement templates are available from USA KINO: ✓ Measurement of surface tension and equilibrium surface tension as well as estimation of equilibrium time for surfactant. ✓ Measurement of surface tension and equilibrium surface tension as well as estimation of equilibrium time for medium–high viscosity sample. ✓ High–precision surface & interface tension measurement of pure liquid with fixed surface tension ✓ Interface tension measurement, especially for plate–upward state in interface tension measurement. ✓ Measurement of interface tension between monomolecular film and water, etc.

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

4	Calibration	Self-calibration of platinum plate & platinum ring and weighing sensor calibration
5	Pre-wetting Function	Providing human-oriented pre-wetting function
6	Interface Detection	Detection of interface of liquid-gas / liquid-liquid automatically by software
7	Buoyancy Correction	3 kinds of buoyancy correction modes, professional FK correction factor
8	Database Management	Real-time graph and storage, query of measured data and data Excel exportable

General Specifications

1	Dimension	390L × 500W × 470Hmm
2	Weight	32Kg
3	Power Supply	100-240AC 50/60Hz
4	Power	40W



A602–Auto–CMC Analytical Module

1. Software–controlled single–channel syringe pump
 - Software–controlled double–channel syringe pump;
 - Software–controlled multiple–channel syringe pump;
 - Dosing volume controlled module with anti–overflow mode
 All above can be customized.

2. Sample chamber with magnetic stirrer

3. Specific software module (SM03)

Note: It is recommended to confirm your technical schemes with our sales engineer before your purchase to ensure the system can meet all your demands.

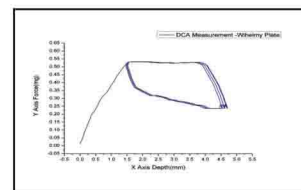
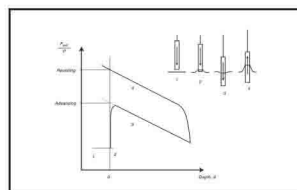
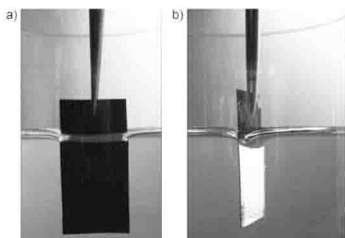


A603–Weight–based Contact Angle Meter (Software Module: SM02)

A603 has the same configuration with A601 except its extended function of weight–based contact angle

Hardware Specifications	
1 Contact Angle	(1) Measuring range: 0–180° (2) Resolution: 0.01°
2 Measuring Method	Weight–based method, Wilhelmy plate method
3 Types of Contact Angle	Dynamic contact angle, advancing/ receding contact angle, wettability analysis with balance
4 Estimating Surface Free Energy of Solid	12 kinds of calculation models, e.g. equation of state, Van Oss, Owens, Fowkes
5 Liquid Database	300 kinds of liquid with 800 data values

Accessories: special holders for film or plate



A604–Powder Contact Angle Meter (Software Module: SM02)

A604 has the same configuration with A601 except its extended function of powder contact angle measurement.

Hardware Specifications	
1 Contact Angle	(1) Measuring range: 0–90° (2) Resolution: 0.01°
2 Measuring Method	Weight–based method Washburn–based method

Accessories:

Glass capillary, special holder for powder.

Note: Please contact our engineers for confirmation before your purchase. It is not recommended for clients to purchase by yourselves.



$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

A605–Fiber Contact Angle Meter (Software Module: SM02)

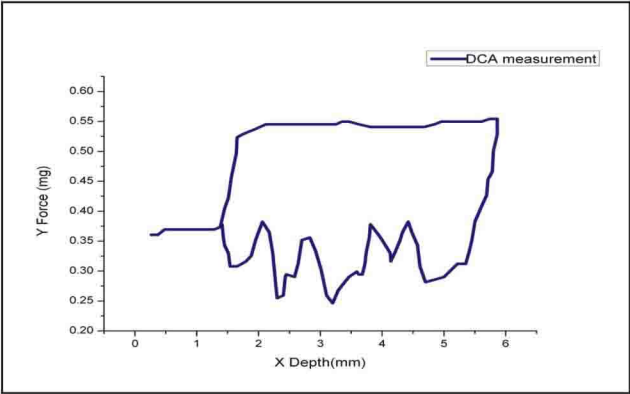
A605 has the same configuration with A601 except its extended function of fiber contact angle measurement.

Hardware Specifications	
1 Contact Angle	(1) Measuring range: 0–180°
	(2) Resolution: 0.01°
2 Measuring Method	Weight–based method Washburn–based method

Accessories:

Special sample holder for fiber, antistatic module (optional purchased)

Note: Please contact our engineers for confirmation before your purchase. It is not recommended for clients to purchase by yourselves.



Single fiber contact angle analysis is as reference in the graph

A606–Interface Chemistry Analytical Module

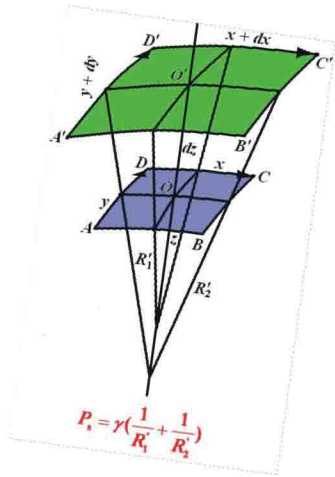
The system is a stand–alone analytical module based on high–precision weighing sensors with three different sensor resolutions: 0.01mN/m, 0.001mN/m, and 0.0001mN/m.

It is especially applicable for: surface tension customization system of on–site assembly line, e.g. quality control of electroplating line, single fiber contact angle measurement, etc.

The module enables you to fully take advantage of analytical balance, which can achieve functions of high–precision weighing analysis and density measurement.

Special Statements

- 1, The above production pictures and technical specifications are subject to change without notice; and the latest confirmed product information shall prevail.
- 2, All rights reserved by USA KINO Industry Co.,Ltd.



$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

Standard Components

Model	A601	A601S
Appearance		
Standard Accessories	1, one mainframe 2, one piece of platinum plate 3, two sets of sample vessels 4, one alcohol lamp 5, one tweezer 6, one data cable 7, one CAST® 1.0 CD and relevant driver disk 8, one set of standard weights 9, one weight of 100 mg 10, one user manual	1, one mainframe 2, one piece of platinum plate 3, two sets of sample vessels 4, one alcohol lamp 5, one tweezer 6, one data cable 7, one CAST® 1.0 CD and relevant driver disk 8, one set of standard weights 9, one weight of 100 mg 10, one user manual 11, one piece of platinum ring 12, one set of temperature sensors 13, one set of portable control terminal
Accessories for Option	1, platinum ring 2, temperature sensors 3, thermo-stating sample chamber 4, computer	1, thermo-stating sample chamber

Note: computer should be prepared by clients yourselves

Optional Accessories

Optional Accessories :

- DuNoüy ring:
Conforming to the international standards, for measuring surface/interface tension with established measuring method
As shown in the right picture:
- Temperature sensor:
High-precision digital semiconductor temperature sensor with self-calibration function
Resolution: 0.01°C
Measuring range: -50~150°C
- Thermo-stating sample chamber:
Water circulator connected to control temperature of samples.
Range: 0~100°C or -50~200°C for option
- Water circulator:
Temperature range: -5~100°C
Accuracy: 0.1°C
- Other specific accessories can be customized



$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_1} \right\}$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos \theta$$

Standards

USA KINO's instruments confirming to the following standards

ASTM D 0971-91: Standard test method for interface tension of oil against water by the ring method

ASTM D 1331-56: Standard test method for surface and interfacial tension of solutions of surface active agents

ASTM D 1417-83: Standard method of testing rubber lattices-synthetic

ASTM D 1590-60: Standard test method for surface tension of water

BS EN 14370-2004: Surface active agents - Determination of surface tension

ISO 1409-1995: Plastics/rubber-Polymer dispersions and rubber lattices (natural and synthetic)-Determination of surface tension by the ring method

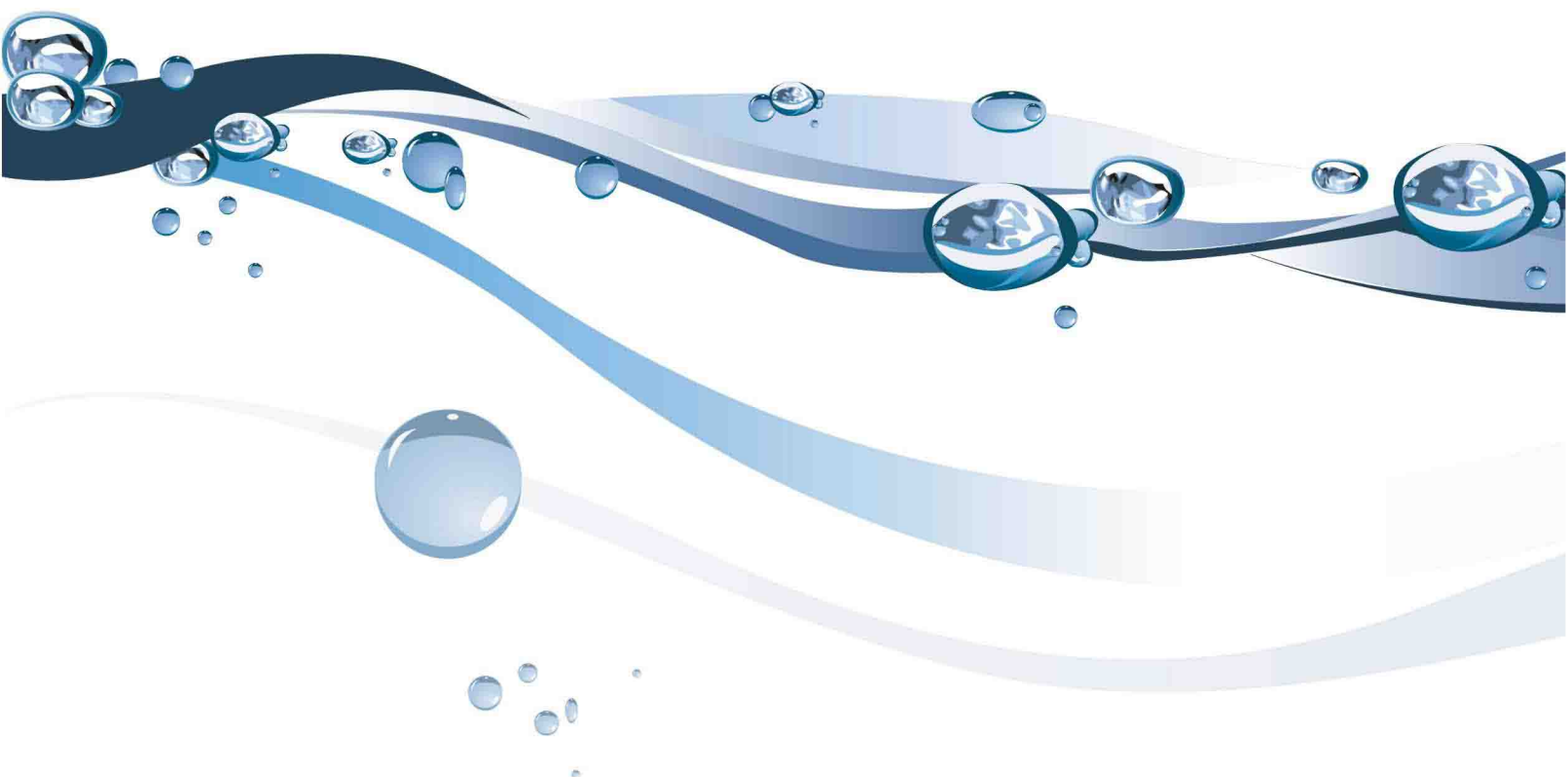
ISO 6295: Determination of interfacial tension of oil against water

ISO 304 & ISO 6889: Surface active agents-Determination of interfacial tension by drawing up liquid films

ISO 4311: Anionic and non-ionic surface active agents-Determination of the critical micellization concentration-Method by measuring surface tension with a plate, stirrup or ring



$$\sigma \cdot \left\{ \frac{1}{R_i} + \frac{1}{R_j} \right\} = \sigma \cdot \left\{ \frac{\sin \phi}{X} + \frac{1}{R_j} \right\}$$



State of the art interface chemical analytical instruments from USA KINO provide you professional solutions. For more information, please visit
[http:// www.uskino.com](http://www.uskino.com) www.kinochina.com

The logo graphic for Kino, featuring a stylized, flowing blue shape that resembles a water droplet or a splash, with several smaller bubbles and droplets trailing behind it, creating a sense of motion.

Kino

USA KINO Industry Co.,Ltd

Strategic Investment Company: Shanghai Solon Information Technology Co.,Ltd

E-mail: sales@uskino.com
sales@kinochina.com