NG-EML Series A – Single-Column Universal Testing Machine (50 N – 5 kN)

Standards: ASTM D412, ASTM D638, ASTM D790, ASTM E4, ASTM E8, GB/T 16825.1, ISO 37, ISO 178, ISO 527, ISO 604, ISO 1184, ISO 6892, ISO 7500-1

- ULTIMATE USER-FRIENDLINESS
- LEADING DEPENDABILITY AND RELIABILITY
- STRICT COMPLIANCE WITH INDUSTRY STANDARDS
- STOCKED CONSUMABLES AND SPARES
- TRUSTED AFTER SALES TECHNICAL SUPPORT
- LIFETIME PRODUCT SUPPORT ADVANTAGE



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Description

The NG-EML Series A – **Single Column Bench Top Universal Testing Machine (50 N – 5 kN)** is a next-generation electromechanical system built for both advanced research and routine quality control applications. Combining precision, speed, and compact design, the system offers a powerful solution for testing rubber, plastics, metals, composites, adhesives, films, foams, wires, and consumer goods under tension, compression, and flexure.

Force Capacity Options: 10 N (2.25 lbf), 50 N (11.24 lbf), 100 N (22.48 lbf), 500 N (112.40 lbf), 1 kN (224.80 lbf), 2.5 kN (562.02 lbf), 5 kN (1124.04 lbf)

Frame Configuration: Single-column, table-top electromechanical frame

Test Space: Single-zone layout optimized for vertical displacement accuracy and consistent force application

Typical Applications: Material performance testing in R&D, production verification, education, and quality assurance. Especially suited for high-precision low-force applications and space-

limited environments.

Technical Specifications

The table below sets out the frame as published: force capacities from 0.01 kN to 5 kN, 37.8″ (960 mm) of vertical crosshead travel, 3.9″ (100 mm) of test width and a single-phase 220 V supply. Calibration is to Class 0.5 of ISO 7500 and ASTM E4.

Specification	Value
Model	NG-EML Series A – Single Column Bench Top Universal Testing Machine
Force Capacity	0.01 kN (2.2 lbf) / 0.05 kN (11.2 lbf) / 0.1 kN (22.5 lbf) / 0.5 kN (112 lbf) / 1 kN (225 lbf) / 2.5 kN (562 lbf) / 5 kN (1124 lbf)
Frame Type	Desktop
Test Space	Single-zone configuration
Maximum Crosshead Speed	94.5″ (2400 mm)/min
Minimum Crosshead Speed	0.00005 mm/min
Return Speed (Max)	118″ (3000 mm)/min
Position Resolution	0.0133 µm
Vertical Crosshead Travel (H)	37.8″ (960 mm)
Test Width (W)	3.9″ (100 mm)
Dimensions (W × D × H)	22.8 × 20.5 × 62.2 in (580 × 520 × 1580 mm)

Specification	Value
Frame Stiffness, kN/mm	10 kN/mm
Weight	238 lbs (108 kg)
Power Supply	600 W
Voltage	Single-phase AC 220 V ±10 %, 50 Hz / 60 Hz

Common Parameters

Specification	Value
Accuracy	Class 0.5
Force Range	500 N – 5 kN (0.2% – 100% FS) 10 N – 250 N (0.4% – 100% FS)
Calibration Standard	GB/T 16825.1, ISO 7500 (Class 0.5), ASTM E4
Speed Accuracy	±0.2% of set speed
Position Accuracy	±0.2% of set position
Force Resolution	1 / 600000 FS
Extension Resolution	1 / 600000 FS
Strain Accuracy	Better than GB/T 228, ISO 6892-1, ASTM E8, ASTM E21
Safety Protection	Overload protection (103% of rated force), position limit, over-voltage protection
Single-Channel Data Sampling Rate	1200 Hz

Specification	Value
Control Frequency	1200 Hz

Environmental and Operational Conditions

The limits the machine has to live inside, and the parts that set its motion accuracy:

Specification	Value
Working Temperature	+5 °C to +40 °C
Storage Temperature	-25 °C to +55 °C
Relative Humidity	At 20 °C, +10% to 90%, non-condensing
Maximum Operating Altitude	2000 meters
Motor Type	AC servo motor
Ball Screw	Pre-loaded
Position Measurement	Optical encoder

Watch Video



Watch the NG-EML Series A – Single-Column Universal Testing Machine (50 N – 5 kN) product video.

WATCH ON YOUTUBE

Typical Test Specimens

Below is a representative list of typical materials and components compatible with this testing system:

- Plastics, fine wire, fibers, threads, biomaterials, thin films, adhesives, foam, packaging materials, paper products, and general consumer goods
- Thermoplastics and thermosets (ASTM D638, ISO 527)

- Elastomers and rubber compounds (ASTM D412, ISO 37)
- High-strength composite materials and prepregs
- Metallic wires, solder, and small components (ASTM E8, ISO 6892)
- Biocompatible materials and medical samples such as films, sutures, and tissue substitutes
- Packaging films, laminated paperboard, and coated paper (ISO 1924, ASTM D882)
- Structural adhesives, sealants, and bonding tapes (ASTM D903, ISO 8510)
- Soft and rigid foams (ISO 2439, ASTM D3574)
- Textiles, including woven and non-woven fabrics, yarns, and geotextiles
- Consumer product components such as plastic parts, clips, springs, and flexible displays
- Optical films, membranes, and ultrathin multilayered structures
- Thin metal sheets, metal foil, and small-scale electronic components (low-force range)

Key Features

The NG-EML Series A combines a compact single-column frame, precision electromechanical drive, closed-loop control, and modular accessories for reliable low-force testing.

- **Compact rigid load frame:** Space-efficient single-column bench-top design for desktop use without compromising alignment or test stability.
- **FEA-optimized structure:** Reinforced column and crosshead geometry help minimize frame deflection and maintain alignment under full load.
- **High-speed electromechanical drive:** Direct-drive system with a high-rigidity synchronous belt supports crosshead speeds up to 94.5" (2400 mm)/min and return speeds up to 118" (3000 mm)/min with low vibration and noise.
- **Preloaded precision ball screws:** Axial preloading reduces backlash and supports consistent force transmission during tensile, compression, cyclic, and dynamic tests.
- **Linear motion guidance:** Dual guide rails with precision bearings maintain coaxial alignment and reduce lateral movement across the full stroke range.

- **GenTest™ software:** Pre-installed software includes ASTM, ISO, GB/T, EN, DIN, and BS method templates, guided setup, automatic calculations, real-time graphs, reporting tools, and user access control.
- **Digital closed-loop control:** 24-bit controller with 1200 Hz acquisition enables force, displacement, and strain control using optimized PID algorithms. The system supports ISO 7500-1 Class 0.5 and ASTM E4 requirements.
- **Automated safety monitoring:** Real-time checks cover crosshead travel, 103% overload protection, system voltage, and motor temperature. Emergency stop functions and programmable stroke limits are built into both hardware and software.
- **Modular accessories:** Compatible with manual, pneumatic, and hydraulic grips; clip-on, laser, and video extensometers; environmental chambers; and torsional fixtures through a modular plug-in interface.
- **Optional safety enclosure:** Transparent protective shields with interlock logic help contain specimen debris and stop system movement when opened.

Control System and Operator Interface

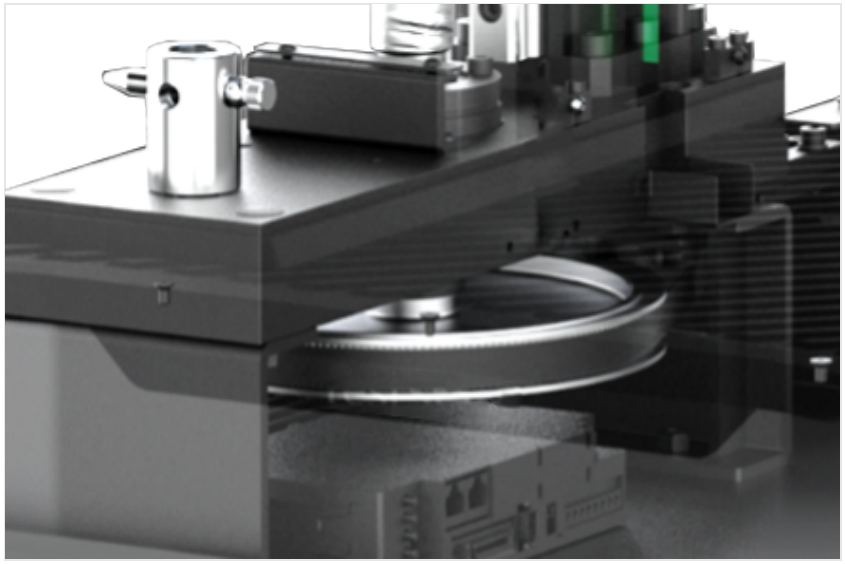


The NG-EML Series A uses a digital closed-loop control unit for synchronized force, displacement, and strain control. The controller supports USB 2.0 communication as standard,

with optional Ethernet connectivity for networked or remote operation.

- **USB 2.0 interface:** Provides stable communication between the machine and host computer at 12 Mb/s for test control, data transfer, and real-time signal exchange.
- **Ethernet connectivity:** Optional TCP/IP communication enables low-latency data transmission for networked workstations, remote operation, or multi-station lab setups.
- **Sampling and acquisition:** The system provides 1200 Hz closed-loop sampling with synchronized acquisition of force, displacement, and extensometer signals. A six-channel 24-bit analog input module supports accurate real-time measurement and control.
- **Integrated protection logic:** Embedded firmware continuously monitors voltage, current, overload conditions, motor temperature, and crosshead position. Hardware and software emergency stop functions are built into the system.
- **Handheld remote console:** A standard 3.5-inch full-color touchscreen controller with silicone keypad and rotary dial allows local operation, including test start/stop, grip actuation, crosshead movement, fine positioning, return-to-origin, and overload protection.
- **Optional standalone control:** An industrial touchscreen PC can be mounted directly on the machine frame, allowing full test operation without an external computer. This setup is useful for educational labs, mobile systems, and multi-station environments.

Structural Rigidity and Direct-Drive Servo Control



The NG-EML Series A uses a rigid single-column frame with FEA-optimized structural components, preloaded ball screws, and dual linear guide rails to maintain alignment and reduce mechanical play during low-force testing.

- **Rigid frame architecture:** Reinforced column supports and an optimized crosshead design help minimize frame deflection during tensile, compression, flexural, and cyclic tests.
- **Stable measurement geometry:** The load cell, ball screw, motor coupling, and crosshead interfaces are designed to reduce clearance under load, supporting consistent results for modulus, yield, peak load, and failure measurements.
- **Preloaded ball screws and linear guides:** Axial preloading reduces backlash, while dual guide rails help maintain coaxial movement across the full stroke range.
- **Direct-drive servo transmission:** The system uses a servo motor with a high-rigidity synchronous belt instead of a traditional gear reducer, improving mechanical efficiency and reducing transmission backlash.
- **High-speed crosshead movement:** The crosshead supports test speeds up to 94.5″ (2400 mm)/min and return speeds up to 118″ (3000 mm)/min, helping reduce cycle time in routine testing.

- **Controlled low-speed operation:** Optimized acceleration and servo control support slow, stable movement for sensitive procedures such as modulus testing, creep, stress relaxation, and multi-stage loading.

Integrated Safety and Protection



The NG-EML Series A includes hardware and software protection systems designed to help prevent operator injury, load cell overload, and mechanical damage during setup and testing.

- **Collision and overload protection:** The controller monitors force and motion feedback in real time. If an abnormal force spike, obstruction, or specimen failure is detected, crosshead movement is stopped to help protect the load cell and drive system.
- **103% overload limit:** A hardware-level stop is triggered at 103% of the rated force capacity to protect critical components.
- **Software and mechanical travel limits:** Programmable stroke limits and mechanical end-stop switches keep crosshead movement within defined safe zones.
- **Emergency stop circuit:** Integrated emergency stop buttons allow the operator to immediately interrupt machine motion.

- **Sensor range monitoring:** Force, displacement, and extensometer channels are monitored in real time to prevent overrange input and avoid distorted test data.
- **System diagnostics:** Built-in diagnostic routines support routine system checks and help identify setup or sensor issues before testing.
- **Handheld controller safeguards:** The remote console includes grip lockout, overload prevention, and return-to-origin safeguards to reduce the risk of accidental movement during setup.

Optional Protection Shield

An optional enclosed safety shield is available with an aluminum alloy frame and high-impact
polycarbonate panels. The shield helps contain specimen fragments during failure and improves
operator protection during routine or higher-risk tests.

The shield includes a door-locking mechanism and software-linked interlock. When the door is
open, machine movement is restricted to reduce the risk of operator injury.

Streamlined Operation and Maintenance

The NG-EML Series A is designed for straightforward operation, fast setup, and simplified maintenance in laboratory, education, and quality control environments.

- **GenTest™ software workflow:** The icon-driven interface includes ASTM, ISO, GB/T, and EN method templates, guided setup, real-time graphs, automatic calculations, and report export tools.
- **Guided test configuration:** Step-by-step setup helps operators build repeatable test sequences and reduce user-to-user variation.
- **Automatic reporting:** Built-in calculations for parameters such as modulus, yield strength, tensile strength, and peak load support routine documentation and quality reporting.

- **Modular accessory integration:** Grips, fixtures, extensometers, and environmental chambers connect through modular interfaces for faster setup and accessory changes.
- **Accessible maintenance design:** The slide-mounted controller module and removable protective panels allow easier inspection and servicing of belts, motors, sensors, and electronic components.
- **Flexible control options:** Operators can run the system through the standard handheld console, host PC, or optional frame-mounted industrial touchscreen PC.

Mechanical Architecture and Load Cell Integration

The NG-EML Series A combines a rigid mechanical structure, servo-based position feedback, and factory-calibrated load cell assemblies to support stable, repeatable low-force testing.

Linear Motion and Drive System

- **Linear guide system:** Dual linear guide rails with precision bearings help maintain straight, low-friction crosshead travel and reduce off-axis movement during displacement- and strain-sensitive tests.
- **Synchronous belt drive:** The direct-drive servo system uses a high-rigidity synchronous belt for smooth power transmission, low vibration, and reduced mechanical backlash.
- **Optical encoder feedback:** An integrated photoelectric encoder provides real-time crosshead position feedback with 0.0133 µm resolution.

Load Cell Assembly



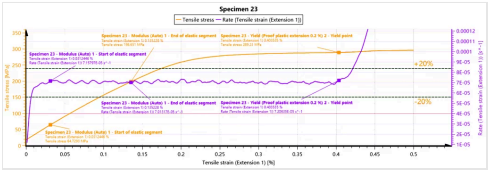
- **Factory-calibrated load cells:** Each system is supplied with calibrated load cells designed for high stiffness, low signal drift, and linear response across the rated force range.
- **Tension and compression testing:** Load cells support bidirectional measurement for tensile and compression tests without mechanical reconfiguration.
- **TEDS auto-recognition:** IEEE 1451.4-compliant TEDS chips allow automatic load cell recognition and reduce manual setup errors.
- **Load cell protection:** Overload logic and mechanical safeguards help protect the sensor from shock loading, side forces, and improper specimen failure.
- **Environmental compatibility:** Load cells are rated for operation from -55°C to +90°C, supporting use with compatible environmental chambers.

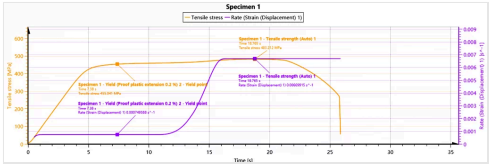


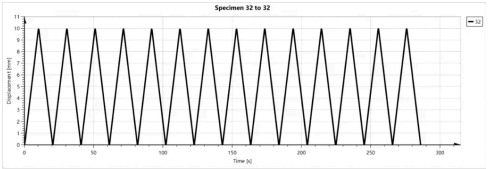
Closed-Loop Controller

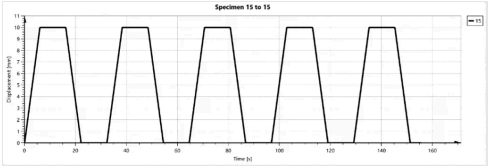
- **Closed-loop control:** The controller uses PID-based feedback control to manage force, displacement, and strain during changing material behavior and loading conditions.
- **Smooth motion profiles:** Controlled speed ramps help maintain stable crosshead movement during both low-speed procedures and faster test sequences.
- **Multi-channel acquisition:** Six synchronized analog channels and digital inputs allow integration of load, displacement, extensometer, temperature, and strain signals.
- **Real-time monitoring:** The system monitors voltage, temperature, and sensor status to support safe operation during longer or repetitive test protocols.

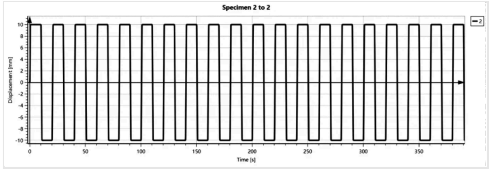
Live Data Visualization and Graphing

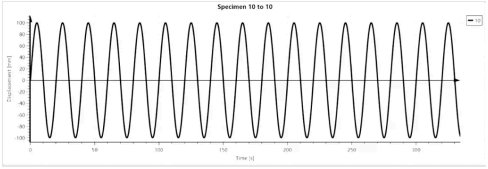












GenTest™ software displays synchronized force-displacement, stress-strain, and time-based curves during each test, with real-time updates from the 1200 Hz acquisition system.

- **Real-time graphing:** Test curves are updated during acquisition, allowing operators to monitor force, displacement, strain, stress, and time-based behavior as the test runs.
- **Custom chart views:** Operators can adjust chart layouts, axis scaling, zoom windows, and curve overlays for easier review and comparison.
- **Result markers:** Yield points, breakpoints, modulus regions, offsets, and extensometer triggers can be marked and labeled during or after testing.
- **Multiple curve overlays:** Batch results can be displayed on a single graph to compare sample consistency, detect outliers, and review repeatability.
- **Data and chart export:** Raw data and charts can be exported in CSV, Excel, PDF, PNG, and SVG formats.

Integrated Control Interfaces

The NG-EML Series A supports multiple control interfaces for machine setup, test execution, positioning, and accessory operation.



Handheld Remote Controller – Included as Standard

The standard magnetically mountable handheld controller includes a 3.5-inch full-color touchscreen, silicone-coated buttons, and a fine-resolution rotary dial for local machine operation.

- **Manual positioning:** Operators can jog the crosshead, fine-tune specimen alignment, and return the crosshead to its home position.
- **Live system feedback:** Force, displacement, and machine status are displayed directly on the handheld screen.
- **Core control functions:** The controller supports start/stop, crosshead movement, return-to-origin, grip open/close control when pneumatic grips are installed, and specimen protection during setup.
- **Flexible operation modes:** The remote can operate directly through the controller or as a PC-synchronized input device during software-guided workflows.



Optional Industrial Touchscreen PC

An optional frame-mounted industrial touchscreen PC allows the machine to operate without an external desktop or laptop.

- **GenTest™ software access:** The touchscreen PC can run the full GenTest™ software environment, including method libraries, custom test sequences, live graphing, data analysis, and report generation.
- **Touch-based operation:** Operators can review graphs, test results, settings, and sequence controls directly on the mounted screen.
- **Industrial build:** The unit can include a sealed surface, shock-resistant housing, and optional vibration isolation mounts for use in lab or production environments.
- **Peripheral connectivity:** USB ports support data export, printer connection, barcode scanning, and other peripheral devices.



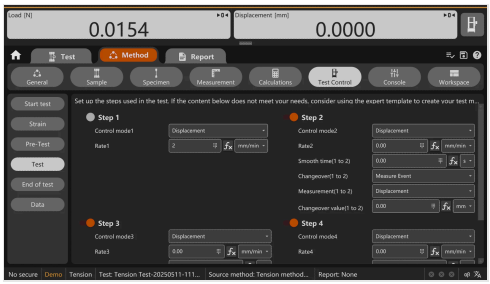
Optional Pneumatic Grip Control Module

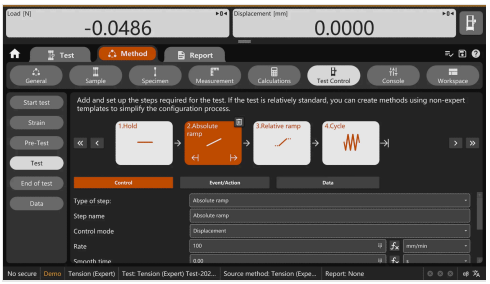
For systems equipped with pneumatic grips, an optional digital pressure control module allows operators to manage grip force and actuation from the machine interface.

- **Pressure adjustment:** Operators can set clamping pressure to match specimen requirements and reduce the risk of slippage or specimen deformation.
- **Dual grip control:** Upper and lower pneumatic grips can be controlled independently for loading, alignment, and release.
- **Safety logic:** Grip actuation is restricted unless the system is in a safe operating state. Pressure locking and relief functions help maintain controlled grip operation during setup and test start.
- **Compact installation:** The module can be mounted near the test frame or integrated on the machine, with quick-connect fittings for faster grip changes.
- **Status feedback:** Pressure and grip status indicators help operators confirm setup conditions before testing.

GenTest™ Software







GenTest™ software provides a unified environment for test setup, machine control, data acquisition, analysis, and reporting. The interface is designed for routine quality control, R&D, education, and multi-user laboratory environments.

Test Methods and Standards

The software includes preloaded method templates for commonly used GB/T, ASTM, ISO, and EN standards. Test methods are organized by application type, making it easier to select the correct setup for tensile, compression, flexural, cyclic, and custom test procedures.

Users can also create customized test sequences with step-based control, including ramp, hold, waveform, trigger-based actions, and defined acquisition strategies.

Real-Time Test Control and Data Display

GenTest™ displays live force, displacement, strain, stress, time, and accessory data during testing. Operators can configure up to 12 real-time data channels, adjust units and display formats, and monitor test progress, control modes, cycle status, and active test steps.

The software also supports real-time graphing with zoom, axis scaling, curve overlays, and interactive review tools for force-displacement, stress-strain, and time-based curves.

Accessory and Device Integration

The software integrates with compatible grips, extensometers, thermal chambers, pneumatic grip controllers, temperature controllers, strain sensors, and other external devices.

Accessory settings can be linked directly to the test workflow, allowing operators to control fixture pressure, chamber conditions, extensometer behavior, and peripheral actions as part of the test sequence.

Data Analysis, Reporting, and User Management

GenTest™ supports automatic calculations, post-test recalculation, inter-test and batch comparison, and one-click export of raw data and processed results.

Reports can be customized by content, format, layout, and export type. Built-in logging records test parameters, system states, user actions, and abnormal events for traceability.

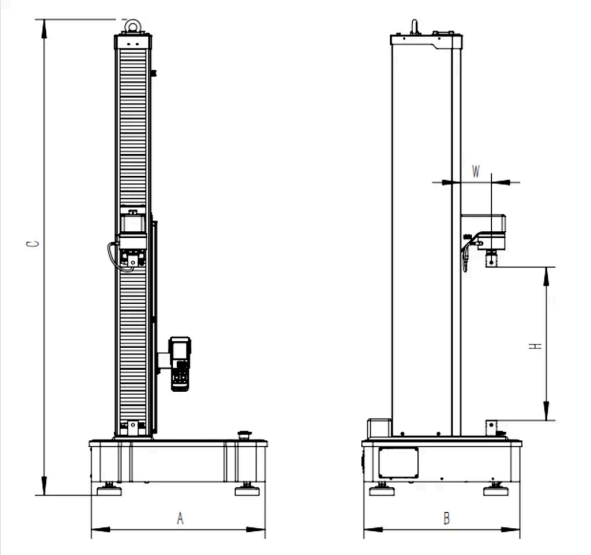
Multi-language switching, permission levels, and operator access controls support use across international labs, training environments, and production quality systems.

Overall Dimensions and Test Space

The diagram below shows the main frame dimensions and usable test space of the NG-EML Series A single-column bench-top machine. Dimensions may vary depending on model capacity, grip configuration, and installed accessories.

Label	Dimension	Value
A	Machine base width	22.8″ (580 mm)
B	Machine base depth	20.5″ (520 mm)
C	Overall machine height	62.2″ (1580 mm)
H	Usable vertical test space	37.8″ (960 mm)
W	Throat depth, horizontal clearance	3.94″ (100 mm)

Values are the frame dimensions from the specification table above. They vary with model capacity, grip configuration and installed accessories.



For Laboratories

Need Additional Quality Control Equipment to Build Your Laboratory?

Electromechanical universal testing is only one part of a complete quality control laboratory. NextGen can help you equip your entire lab with impact testers, notching and broaching systems, cooling chambers, tensile testers, hardness testers, specimen preparation equipment, and other supporting solutions, all coordinated as one complete project.

- One partner to equip your complete laboratory
- Installation, training, calibration
- Support for the life of the equipment

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