TORONTECH

LIBS ANALYZER TT-LIBS-C

The LIBS Analyzer TT-LIBS-C is a high-performance laser-induced breakdown spectroscopy (LIBS) system designed for fast and reliable elemental analysis of metal materials. It combines laser-induced breakdown technology with advanced spectral analysis methods to deliver accurate results in real time. The instrument is lightweight and portable, making it well suited for on-site testing where speed and flexibility are essential.

Designed for ease of use, the TT-LIBS-C performs analysis without sample preparation. Testing causes minimal surface impact and uses a very small detection area, allowing repeated measurements on the same sample. The system can analyze multiple elements simultaneously, helping users quickly identify material grades and verify composition directly in the field.

The TT-LIBS-C provides precise grade identification and strong performance in detecting light elements such as magnesium, aluminum, and silicon, which are often difficult to measure using conventional methods. Built for demanding industrial environments, it delivers stable and reliable results even under challenging conditions. This makes the TT-LIBS-C a practical and efficient solution for metal processing, smelting, recycling, and other applications that require fast elemental verification.

Key Highlights

- Portable LIBS analyzer for on-site elemental analysis
- Fast testing with no sample preparation required
- Simultaneous multi-element detection
- Accurate grade identification of metal materials
- Excellent detection performance for light elements
- Low-impact, micro-destructive testing
- Reliable real-time results in industrial environments

APPLICATIONS

Principle

Laser-induced breakdown spectroscopy (LIBS) is a type of laser ablation analysis. It works by focusing a laser beam on the surface of a sample. When the laser pulse exceeds the material's breakdown threshold, a localized plasma forms. As the plasma expands and cools, it emits light that reflects the sample’s elemental composition. This light is captured by a high-resolution spectrometer. LIBS is a fast and effective technique for both qualitative and quantitative analysis in industrial applications.

Schematic diagram

LIBS Analyzer TT-LIBS-C

Product Configuration

LIBS Analyzer TT-LIBS-C

Smart Two-Color Warning System
When powered on, the green indicator light activates.

LIBS Analyzer TT-LIBS-C

Enhanced Backlight Performance
Easily visible even in bright outdoor lighting.

LIBS Analyzer TT-LIBS-C

Red Light Flashes During Testing
Provides a quick visual check of instrument status.

LIBS Analyzer TT-LIBS-C

One-Touch Operation
“Start – Aim and Test – View Results”
The entire process takes just seconds. Designed for simplicity, it’s easy to use—even for non-technical users.

Application

LIBS Analyzer TT-LIBS-C

Automobile Manufacturing

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Aerospace

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Metal Processing

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Waste recycling

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Steel smelting

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Energy and Power

Application Case

Medium-low alloy steel is commonly used in bridges, construction, machinery manufacturing, and other industries due to its superior mechanical properties, corrosion resistance, and weldability. However, the types and concentrations of alloy elements significantly affect the performance of this steel. Accurate and rapid detection of elemental composition is therefore essential for ensuring product quality.

The LIBS Analyzer TT-LIBS-C Carbon was used for on-site testing of medium-low alloy steel samples provided by an enterprise. Multiple repeated tests were conducted to verify the instrument’s stability.

Display of testing results										
Test sample: Medium-low alloy steel Test time: 3 second/each point										
Element	**C**	**Si**	**Ti**	**V**	**Cr**	**Mn**	**Fe**	**Ni**	**Cu**	**Mo**
Standard content	0.325	3.860	1.180	0.355	3.160	1.320	86.607	0.350	0.470	1.000
Test1	0.318	3.594	1.037	0.383	3.099	1.175	87.752	0.361	0.463	0.846
Test2	0.380	3.342	1.383	0.391	2.963	1.109	87.677	0.351	0.535	0.817
Test3	0.362	3.494	1.374	0.385	2.983	1.109	87.533	0.379	0.538	0.798
Test4	0.336	3.782	1.393	0.410	3.011	1.127	87.190	0.380	0.552	0.820
Test5	0.292	4.089	1.162	0.392	3.227	1.236	87.920	0.391	0.513	0.843
Test6	0.340	3.633	1.329	0.398	3.087	1.153	87.289	0.394	0.538	0.840
Test7	0.323	3.782	1.260	0.407	3.099	1.186	87.207	0.372	0.524	0.841
Test8	0.312	3.841	1.231	0.388	3.090	1.189	87.258	0.386	0.518	0.821

Display of testing results										
Test sample: Medium-low alloy steel Test time: 3 second/each point										
Element	**C**	**Si**	**Ti**	**V**	**Cr**	**Mn**	**Fe**	**Ni**	**Cu**	**Mo**
Test9	0.318	3.548	1.303	0.403	3.085	1.123	87.492	0.383	0.531	0.814
Test10	0.352	3.931	1.213	0.390	3.156	1.142	87.183	0.411	0.527	0.822
Mean value	0.333	3.704	1.269	0.395	3.080	1.155	87.450	0.381	0.524	0.826
STD	0.026	0.223	0.113	0.009	0.079	0.041	0.265	0.017	0.024	0.016
RSD	7.84%	6.02%	8.88%	2.36%	2.56%	3.57%	0.30%	4.45%	4.60%	1.89%

The LIBS Analyzer TT-LIBS-C Carbon demonstrated exceptional performance in detecting medium-low alloy steel. Its portability, high efficiency, and precision made the testing process quicker, simpler, and more accurate.

FEATURES

Software Advantage

Intuitive Operation

User-friendly software interface designed for a smooth experience—easy to navigate with minimal training required.

Professional-Grade Alloy Library
The built-in library supports a wide range of alloy grades, helping to bridge gaps between international standards in specialized industries. Users can also customize and expand the library to meet specific requirements.

Advanced Data Processing
The software includes robust built-in capabilities for automatic spectral data correction, ensuring greater analytical accuracy. It also supports future upgrades and expansions to meet evolving analytical needs and technological advancements.

User Customization
Analysis reports can be exported in formats like Excel and PDF, with flexible options to include company details, spectral graphs, and comprehensive sample data—ideal for efficient research and informed decision-making.

User Management
The software allows for seamless management of instrument accounts and the addition of new users. Its intelligent user management system ensures precise recording, analysis, and organization of spectral data with ease.

Intelligent software brings excellent user experience to customers

LIBS Analyzer TT-LIBS-C
Column 1 content

User Management

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Column 2 content

Easy to customize

Column 3 content

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Select test method

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Data Editing

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Test Results

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Multiple Format Output

Performance Advantages

Fast Analysis
One-click operation with a typical readout in just 3 seconds.

Portable and Lightweight
Weighing just 2 kg, this compact device meets ergonomic standards and offers long battery life, making it ideal for field

applications.

Safety Laser
Equipped with high-energy pulse safety (Class 3B) laser technology, the device is completely safe for normal use. Additionally, a sensor-based laser safety interlock is built in to minimize the risk of accidental laser exposure.

Minimal Ablation Damage
The ablation impact on the sample surface is micro-destructive, with minimal damage that is virtually invisible to the naked eye.

Low Detection Limit
With high-resolution hardware and an independent fitting algorithm, the instrument delivers enhanced accuracy and a lower detection limit. LIBS technology provides a wide detection range, from ppm to percentage levels, making it ideal for various analytical needs.

TECHNICAL SPECIFICATIONS

Dimensions	255mm × 302mm × 81mm
Core Technology	Integrated laser-induced breakdown technology and spectral analysis methods
Weight	2kg (with battery)
Display system	4.3-inch industrial-grade resistive touch screen Automatically adjust display brightness according to external environment brightness
Storage function	32GB
Laser	Class 3B 1535nm, passive solid-state laser
Spectral parameters	<0.1nm resolution
Single test time	3-second typical readout

High precision test modes	Quick inspection model, general inspection model, precise inspection mode (the average value of multiple single test values can be analyzed through the algorithm)
Test elements	C, Al, Cu, Mg, Ni, Fe, Si, Sn, Zn, Mn, Ti, Zr, Cr, Bi, Pb, Ag, etc. (different models can test different elements)
Alloy base	Stainless steel, chrome-molybdenum steel, medium-low carbon steel, cast iron, and other iron-based alloys
Sample type	Cylinders, thin plates, wires above 1mm in diameter, foils (~0.02mm), large fragments (no powder)
Detection limit	Varies according to different base and elements
Work temperature	Standard 0~40℃, recommended 5~35℃
Protective gas	Argon gas
Software	Application update, data download and grade library custom editing, test report generation, calibration file editing, etc.
Safety	Sensing light safety interlock device
Battery	Equipped with MSBUS bus smart battery, two single batteries can work continu -ously for about 8 hours, and the remaining battery capacity can be directly che -cked. It complies with aviation dangerous goods transportation regulations.
Waterproof performance	IP54 waterproof and dustproof rating

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