Changing Microbiology

The MALDI Biotyper® System

Microbial identification with unequaled speed and accuracy

Innovation with Integrity

RUO/GP

In microbiology, speed and accuracy matter

A powerful technology for better results

To help answer key challenges in microbiology, Bruker has utilized its many years of experience to create the truly groundbreaking MALDI Biotyper System (MBT). In the past decade, this revolutionary technology has been adopted in many microbiology laboratories worldwide, for reliable, fast and efficient identification of a wide range of gram-negative and gram-positive bacteria, yeasts and molds, by an easy to operate, yet powerful benchtop system.

- Accuracy comparable to Nucleic Acid Sequencing
- Much faster than traditional methods
- Cost-effective
- Robust and easy to use
- A true benchtop system
- Easy to implement
- Optional workflow improvement tools

Identifying microorganisms by their molecular fingerprint

The MALDI Biotyper System identifies microorganisms using MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization Time-of-Flight) mass spectrometry to determine the unique proteomic fingerprint of an organism. Specifically, the MALDI Biotyper System measures highly abundant proteins that are found in all microorganisms, and takes advantage of their specific differences.

The characteristic patterns of these proteins give the unique fingerprint of an organism and are used to reliably and accurately identify a particular microorganism by matching the respective pattern with an extensive reference library.

The outstanding capabilities of the system go well beyond microbial identification and Bruker is continuously working on further innovations.

A simple procedure for a sophisticated and fast platform

Bacteria, yeast or mold: one workflow for all

The MALDI Biotyper System workflow has been designed to be efficient and easy. No previous experience with mass spectrometry is required. As shown, the fully traceable workflow has been streamlined and requires only a few simple steps to generate high quality microorganism identifications. Typically, no more than an isolated single colony from a culture plate is required. The hands-on time per isolate is only 20 seconds for 95% of the microorganisms.

Our dedicated microbiology software automates the process of acquiring the mass spectrum and performing the match against the extensive reference library. The identification results, presented using a 'traffic light' color scheme, are effortless to interpret.

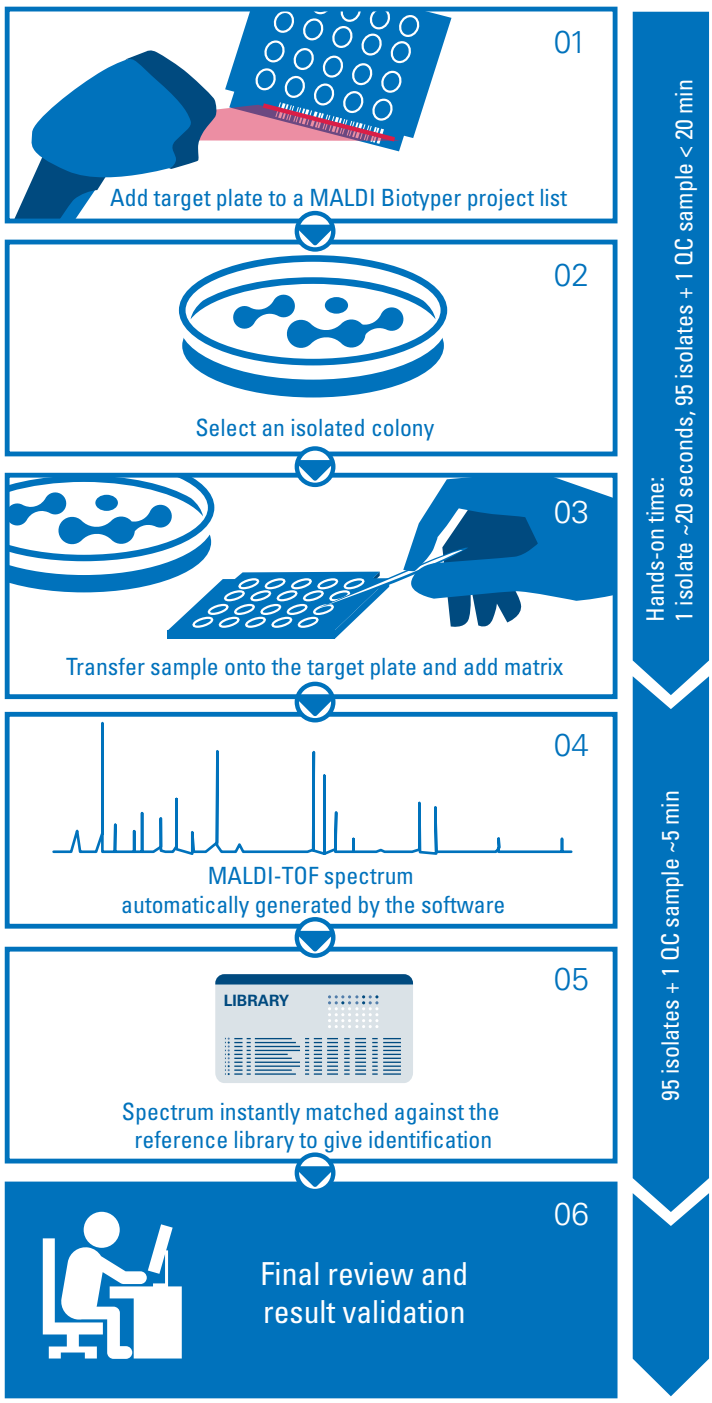
The MALDI Biotyper simplifies microbial identification, and facilitates and harmonizes the workflow with only one system.

Faster than ever

The new MBT Compass HT software dramatically shortens the time-to-result; analysis of 95 isolates and 1 QC sample results in a complete identification report within ~5 minutes.

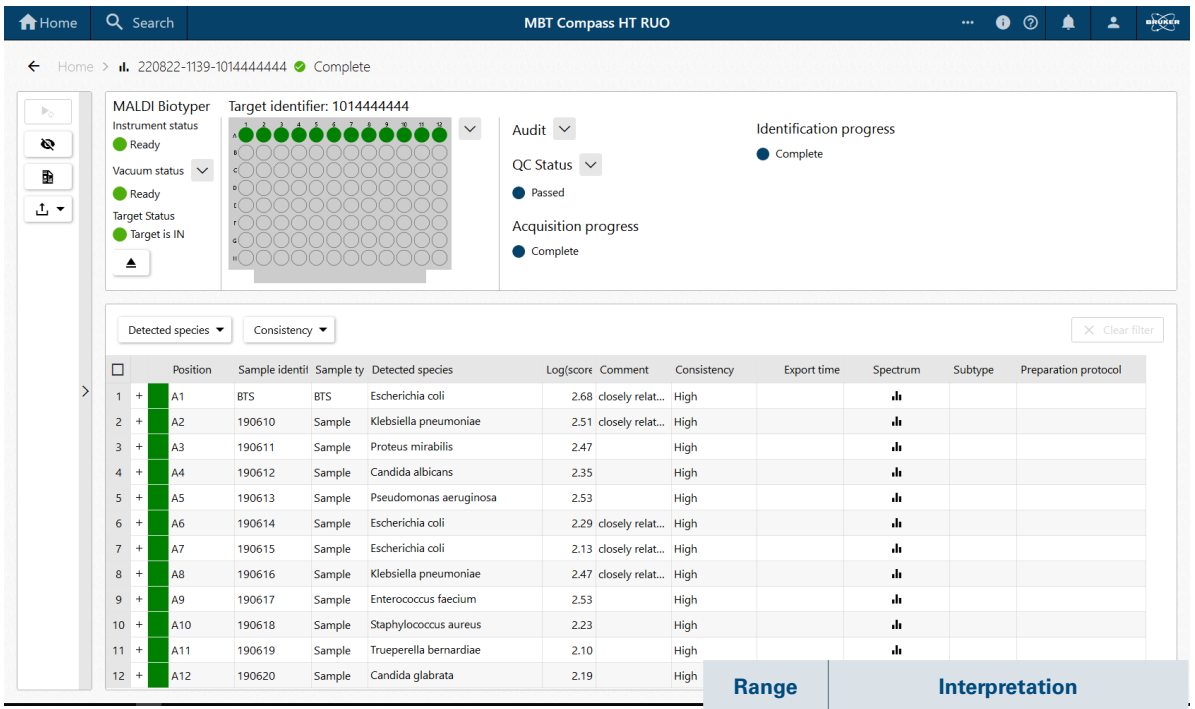
Sample preparation hands-on time:
- 1 isolate ~20 seconds
- 95 isolates < 20 min

System analysis time to ID result:
- 95 isolates + 1 QC sample ~5 min



Easy-to-use software dedicated to microbiology

In just a few steps, the simple-to-use software guides users through the set-up of samples for analysis. The MALDI Biotyper System is automatically checked using Bacterial Test Standard (BTS) before each use. When the check is successful, the system automatically begins the measurement process of the samples.



Range	Interpretation
2.00 - 3.00	High Confidence Identification
1.70 - 1.99	Low Confidence Identification
0.00 - 1.69	No Organism Identification Possible

Instantly after the acquisition of the spectral data of the first sample, the identification results pop up consecutively. The results are clearly listed under 'Detected Species' accompanied by the resulting Log(score) and appropriate 'traffic light' color. When the entire sample run has been completed, a report is generated.

Easy reviewing and result validation

The informative MALDI Biotyper report facilitates easy validation by the microbiologist. Subsequently, a simple click in the software enables the export of the MALDI Biotyper results in a LIS or AST system compatible form.

Open microbiology concept - easy implementation in your laboratory

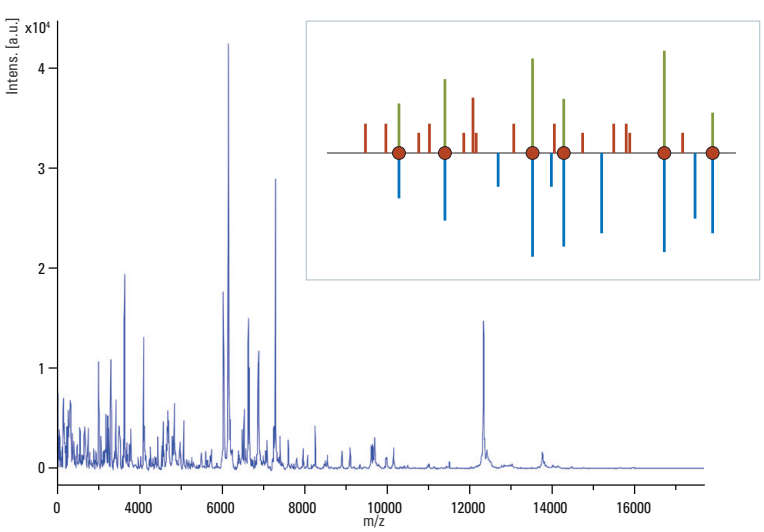
The MALDI Biotyper allows for smooth integration with existing AST systems, laboratory automation systems and laboratory informatics.

More than a comprehensive library

The main spectra concept capturing true biological variability

Reference library entries in the MALDI Biotyper system are stored as Main Spectra (MSP). These MSPs are based on multiple measurements of a single defined strain to ensure that the true biological variability of an organism is reflected in the library.

Unknowns are then compared to the MSP library using a superior pattern-matching approach. This includes peak positions and intensities, ensuring the highest possible levels of accuracy and reproducibility across the complete range of microorganisms.



A continuously updated reference library covering over 4,000 species

Bruker is fully committed to the steady development of the reference library. An active program of reference spectra generation culminates in regular library updates for MALDI Biotyper users.
These updates are focused on recommendations from our collaboration partners from the industrial, veterinary and clinical field, including certified strain collections.

Taxonomy becomes easy

The metadata of the MALDI Biotyper Reference Library facilitate the access to taxonomical information, such as synonyms and taxonomical modifications.

Reduce the need for mycology expertise

The MALDI Biotyper is perceived as the most promising alternative for the identification of molds. A dedicated MBT HT Filamentous Fungi Module, including a software module and a specific reference spectrum library, is available to facilitate the identification of this challenging group of microorganisms.

High confidence mycobacteria identification

The optional MBT HT Mycobacteria Module for the MALDI Biotyper is the comprehensive solution for highly reliable and fast mycobacteria identification. It is composed of a software module and a specific reference spectrum library covering the majority of the currently known mycobacteria species.

Create your own libraries and run your data comparison

Laboratories that need to create their own libraries can make use of software tools to easily compile customized reference library entries which can be exported and shared. For further investigations, software tools – such as dendrogram analysis – are available.

The best technology from the experts in mass spectrometry

A platform suited to your needs

Being the leader in MALDI-TOF technology, it is of great importance to Bruker to design robust, compact, high performance platforms intended for extensive and routine usage in the microbiology laboratory. Continuous hardware development has led to the 4th generation of Bruker's benchtop MALDI Biotyper systems.

Bruker offers laboratories the opportunity to choose the MALDI-TOF mass spectrometer that best fits their needs:

- The new **MALDI Biotyper sirius one RUO** or **GP System** with Bruker's proprietary lifetime* smartbeam™ solid state laser technology at 200 Hz repetition rate, and positive ion mode. System improvements, including the newest electronics and a high performance vacuum system, generate fast target exchange times for accelerated time-to-result - even faster than before.
- The **MALDI Biotyper sirius RUO** or **GP System**, with the same innovative improvements, smartbeam™ 200 Hz laser and positive as well as negative ion detection. The additional capability of analysis in negative ion mode broadens the research applications, such as the analysis of lipids for e.g. resistance detection.

Even shorter Time-to-Result

With Smart Spectra Acquisition™, data generation is accelerated by minimizing the number of laser shots per sample needed to acquire a meaningful spectrum. An additional benefit of this function is the optimal exploitation of the laser lifetime.
The Time-to-Result is further shortened dramatically by the power of the new MBT Compass HT software, resulting in identification results popping up instantly after spectra acquisition, one by one, without delay.
An entirely filled MBT Biotarget 96, holding 95 isolates and 1 QC sample, results in a complete identification report in ~5 minutes.

Resolution meets sensitivity

Resolution and sensitivity are tailored to the needs of microbiologists. Due to Bruker's patented PAN™ resolution the MALDI Biotyper achieves optimal results from a compact benchtop instrument.

Highly reproducible results

The quick and simple Bacterial Test Standard quality check, performed before each run, ensures the highest standard of run-to-run reproducibility.

Continuous operation

The integrated ion source cleaning permits continuous high performance with minimized maintenance requirements. Cleaning the source using the separate IR-laser is performed easily by a few clicks in the software, without breaking vacuum.

Compact benchtop systems – no performance compromise

Optimal performance secured by zero-button IDealTune

Machine Learning (ML) based approaches are opening the door for mining deeper information from MALDI-TOF spectra, which is also of great interest for antimicrobial resistance prediction. For this kind of promising applications, it is of utmost importance that the MALDI-TOF system always operates in optimal conditions, to deliver standardized mass spectra of the highest quality. As Bruker endeavours providing high-level future-proof solutions, the automated zero-button IDealTune procedure has been developed, fine-tuning the detector, baseline settings and laser power, without any user intervention.
IDealTune is performed systematically in the background; forget about tedious preparation of dedicated tuning samples, forget about time-consuming manual tuning.

	MALDI Biotyper sirius one RUO System MALDI Biotyper sirius one GP System	**MALDI Biotyper sirius RUO System MALDI Biotyper sirius GP System**
Speed of analysis	▪ 95 isolates + 1 QC sample ~5 min to identification ▪ Identification of 600 samples/hr ▪ Identification results popping up instantly after spectra acquisition, one by one, without delay	
Laser	Bruker's proprietary lifetime* smartbeam laser ▪ 200 Hz repetition rate ▪ At least 500 million laser shots are guaranteed	
Polarity	Positive ion mode only	Positive and negative ion mode
Mass range	0-500.000 Da; with MALDI Biotyper applications focused to: ▪ 0-1.000 Da (resistance detection) ▪ 2.000-20.000 Da (microorganism identification)	
Vacuum system	Oil-free membrane pre-vacuum pump and high capacity turbomolecular pump ▪ high pumping capacity, which in combination with a clever source design results in very fast target exchange ▪ minimal downtime after maintenance	
Other features	LED strip to remotely observe system status Perpetual Ion Source™ with IR-laser self-cleaning functionality Whispermode™ <60 dB under normal operating conditions Patented PAN™ technology for high mass resolution over a wide mass range Voltage: 220 V	
Dimensions & Operating Parameters	L x W x H: 500 x 710 x 1070 mm / 19.7 x 28.0 x 42.2" Net weight: 75 kg / 165.4 lb Noise: < 60 dB Temp Range: 16 - 30°C / 61 - 86°F Operating Humidity: 20 - 75%, non-condensing	

* Lifetime means: 500 million laser shots or seven years (whichever occurs first)

MALDI Biotyper System overview

Benchtop MALDI-TOF system

- **MALDI Biotyper sirius one RUO System / MALDI Biotyper sirius one GP System**, with 200 Hz smartbeam™ laser and positive ion mode

  or

- **MALDI Biotyper sirius RUO System / MALDI Biotyper sirius GP System**, with 200 Hz smartbeam™ laser and positive and negative ion detection

Routine identification of gram +/- bacteria, yeasts

Software
- MBT Compass HT software
- MBT Compass Library
- Security Related Library for identification of highly pathogenic microorganisms (optional)

Consumables
- Matrix HCCA-portioned
- Bacterial Test Standard
- MBT Biotarget 96

Mycobacteria identification (optional)

Software
- MBT HT Mycobacteria Module

Consumables
- MBT Mycobacteria Kit

Filamentous fungi identification (optional)

- MBT HT Filamentous Fungi Module

Identification directly from positive blood cultures (optional)

Software
- MBT HT Sepsityper Module

Consumables
- MALDI Sepsityper® Kit 50

Resistance detection (optional)

Software
- MBT HT Subtyping Module
- MBT HT LipidART Module
- MBT HT STAR®-BL Module

Consumables
- MBT Lipid Xtract™ Kit
- MBT STAR®-Carba Kit
- MBT STAR®-Cepha Kit

Accessories for workflow optimization & automation (optional)

- MBT Shuttle ergonomic target holder
- MBT FAST™ Shuttle for standardized and accelerated drying of matrix and other liquids
- MBT Pilot® for guided sample transfer
- MBT Galaxy® for automated application of matrix and formic acid

Please contact your local Bruker sales representative for availability of the optional MBT system components in your country.

THE ORIGINAL

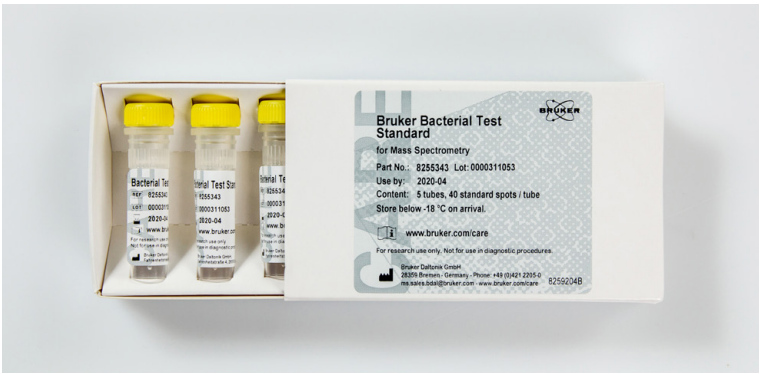
Often imitated, never duplicated

MBT consumables for basic identification

Bacterial Test Standard (BTS)

The BTS is an *E. coli* extract spiked with two high molecular weight proteins and has been developed for the quality control process of the MALDI Biotyper System. Its specific composition covers the entire mass range of proteins used for precise identification of microorganisms.

Content: One box consisting of 5 tubes providing 50 µL per tube / Part No. 8255343



HCCA Matrix, portioned

The instant HCCA matrix enables easy and convenient preparation of HCCA matrix solutions. The matrix is soluble in standard organic solvent, easy to handle, and enables highly sensitive measurements.

Content: One box consisting of 10 tubes providing 250 µL per tube / Part No. 8255344

Disposable MBT Biotargets

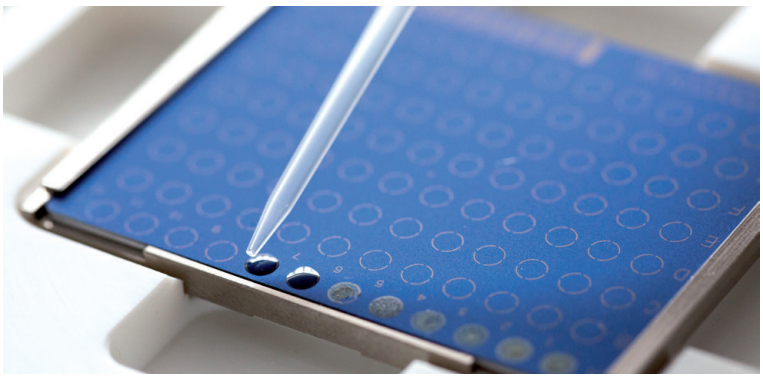
The ready-to-use disposable MBT Biotargets offer 96 positions and a unique barcode for full traceability in paperless workflows.

MBT Biotarget 96

Set of 20 individually barcoded MALDI Biotyper target plates, 96 positions each / Part No. 1840375

MSP adapter for MBT Biotarget 96

Adapter required to use MBT Biotargets with MALDI Biotyper Systems / Part No. 8267615

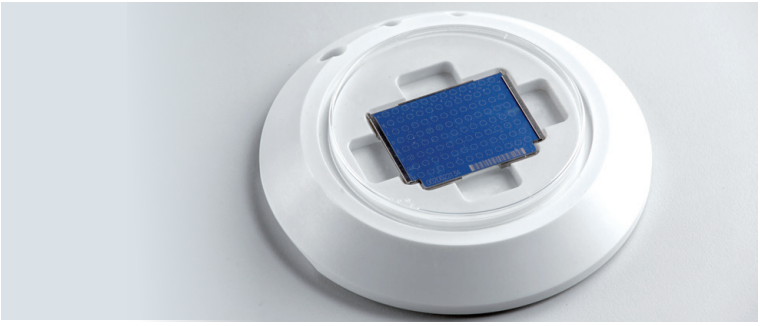


MBT workflow accessories

MBT Shuttle Target Holder

The MBT Shuttle target holder is used to securely hold MBT Biotargets during the sample preparation process. The secure grip, non-slip rubber feet and ergonomic shape make sample preparation easier.

One target holder / Part No. 1847032



MBT FAST™ Shuttle

Standardized and accelerated drying of MALDI Biotyper matrix and other liquid reagents

Part No. 1872847

MBT Pilot®

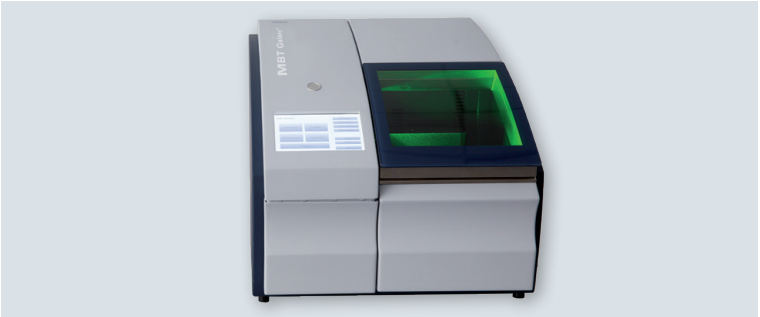
The MBT Pilot facilitates correct sample positioning through patented microprojection technology by indicating the next free MALDI target plate position.

Part No. 1822041

MBT Galaxy®

The MBT Galaxy, for automated application of HCCA matrix and formic acid, frees laboratory personnel from cumbersome pipetting while ensuring the highest preparation quality under controlled conditions and complete traceability in a paperless workflow.

Part No. 1821269



Not for use in clinical diagnostic procedures.
Please contact your local representative for availability in your country.

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