RUO / GP

MALDI Biotyper®

Changing Microbiology

Not for use in clinical diagnostic procedures.

Innovation with Integrity

MALDI-TOF

In Microbiology, Speed and Accuracy Matter

The MALDI Biotyper® System

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 analyzer.

- 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 a unique proteomic fingerprint of an organism. Specifically, the MALDI Biotyper System measures highly abundant proteins that are found in all microorganisms.

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

But MALDI Biotyper can do much more. 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 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.

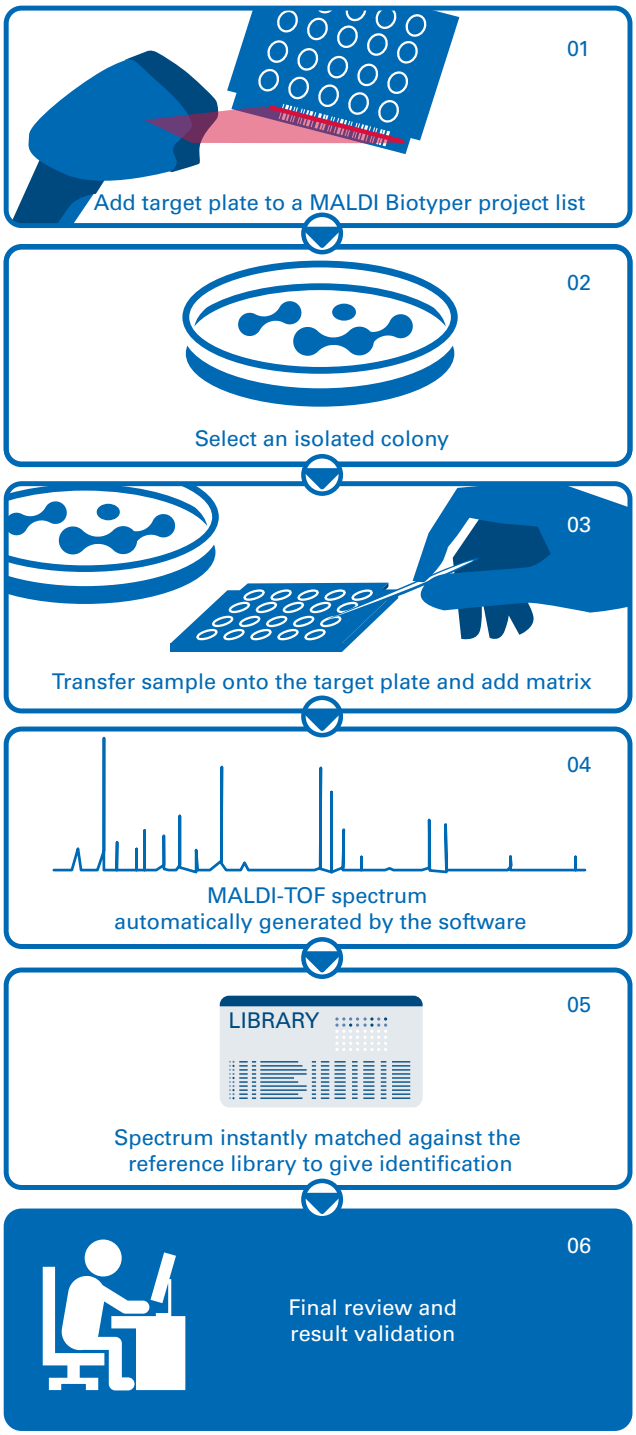
Typically, no more than an isolated single colony from a culture plate is required.

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

The hands-on time per isolate is only 20 seconds for 95% of the micro-organisms. The short time-to-result allows preparation and analysis of a full 96-spot target plate within 30 minutes. The MALDI Biotyper simplifies microbial identification, and facilitates and harmonizes the workflow with only one system.

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

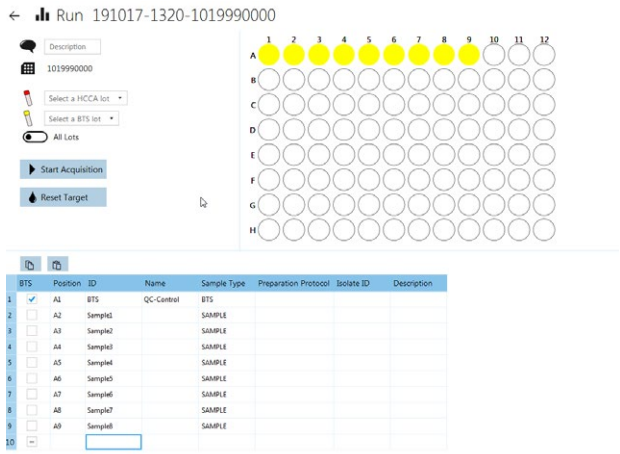
Time-to-Result including sample preparation:
- 95 isolates + 1 QC sample: ~30 min



Easy-to-Use Software

In just a few steps, the simple-to-use software guides users through the set-up of samples for analysis.

Automatic Calibration and Quality Control Check



The MALDI Biotyper System can automatically be checked by analysing Bruker Bacterial Test Standard (BTS) before each run. Using BTS for the quality control of the MALDI Biotyper assures the highest data reliability and measurement reproducibility.

Clear Identification Results Display at Species Level

Sample Name	Sample ID	Organism (best match)	Score Value
A1	BTS	Escherichia coli	2.68
A2	180610	Klebsiella pneumoniae	2.25
A3	180611	Proteus mirabilis	2.62
A4	180612	Candida albicans	2.19
A5	180613	Pseudomonas aeruginosa	2.23
A6	180614	Enterococcus faecium	2.53
A7	180615	Trueperella bernardiae	2.20

After the acquisition of the spectral data has been completed, a report is generated. The result for each sample is clearly listed under 'Organism (best match)' accompanied by the resulting score and an appropriate 'traffic light' color scheme.

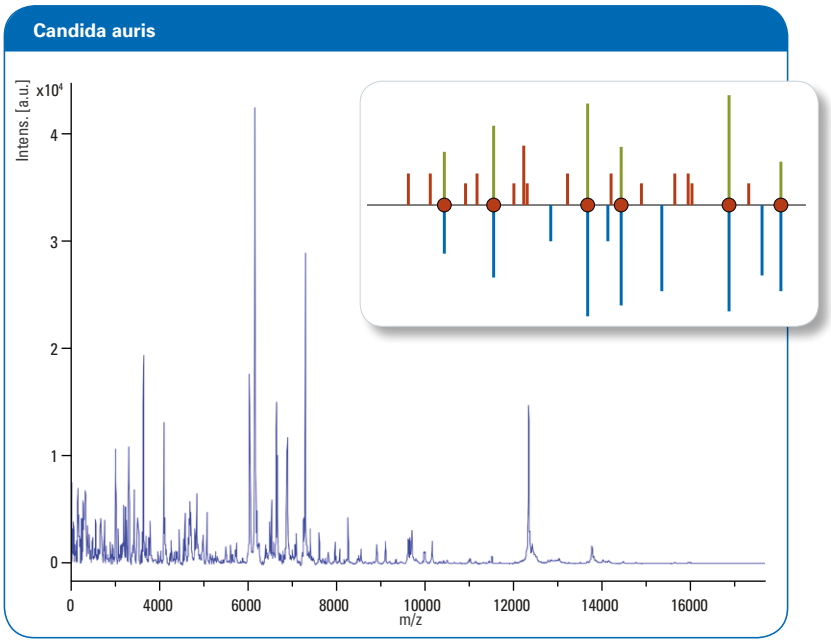
Easy reviewing and result validation

The informative MALDI Biotyper identification result report facilitates easy validation by the microbiologist. Subsequently, MALDI Biotyper results can be exported by a simple click in the software, in a format that a LIMS or an AST system can easily understand.

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

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 has been captured.

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

Bruker is fully committed to the continuous 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 molds identification. A dedicated MBT Filamentous Fungi Suite, embracing a software module and a specific reference spectrum library, is available to facilitate the identification of this group of microorganisms.

High confidence mycobacteria identification

The optional MBT Mycobacteria Suite 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 most 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 microorganism entries and to share and export libraries. 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 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 Bruker's 200 Hz smartbeam™ laser and latest developments in electronics allowing for positive and negative ion detection. The additional capability of analysis in negative ion mode allows the MALDI Biotyper sirius to broaden the research applications, such as the analysis of lipids.

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.

Accelerated data acquisition

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.

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 under push-button operator control, without breaking vacuum.

Compact Benchtop Systems – No Performance Compromise

True benchtop solutions

Low-noise operating systems with low weight and requiring less than 1 m / 4 feet of counter space offer flexibility in meeting laboratory needs for compact system solutions. Both systems need only a 220 V / 110 V electrical supply which results in very minimal heat output.

	MALDI Biotyper sirius one RUO System MALDI Biotyper sirius one GP System	MALDI Biotyper sirius RUO System MALDI Biotyper sirius GP System
Laser	Bruker's proprietary lifetime* smartbeam laser • 200 Hz repetition rate • ~600 samples/hr • 500 million laser shots	
Polarity	Positive ion mode only	Positive and negative ion mode
Mass range	0-500.000 Da; with MALDI Biotyper applications focused to: • 0-1000 Da (resistance detection) • 2.000-20.000 Da (microorganism identification)	
Vacuum system	High capacity turbomolecular pump • high pumping capacity • very fast target exchange • minimal down-time after maintenance	
L x W x H	500 x 710 x 1070 mm / 19.7 x 28.0 x 42.2"	
Weight	75 kg / 165.4 lb	
Common features	LED strip to remotely observe system status Perpetual Ion Source™ with IR-laser based self-cleaning functionality Whispermode™ Oil-free membrane pre-vacuum pump and turbo pump <60 dB under normal operating conditions Patented PAN™ technology for high mass resolution over a wide mass range Voltage: 220 V / 110 V	

** 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

All MALDI Biotyper Systems are running under Microsoft WIN® 10 Operating System.

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)

- MBT Mycobacteria Suite

Filamentous fungi identification (optional)

- MBT Filamentous Fungi Suite

Identification directly from positive blood cultures (optional)

Software
- MBT Compass HT Sepsityper Module

Consumables
- MALDI Sepsityper® Kit 50

Resistance detection (optional)

Software
- MBT Subtyping Module
- MBT STAR®-BL Module (with MBT Compass)

Consumables
- MBT STAR®-Carba Kit
- MBT STAR®-Cepha Kit

Accessories for workflow optimization & automation (optional)

- MBT Shuttle ergonomic target holder
- 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.

Dimensions & Operating Parameters

MALDI Biotyper® sirius one RUO System
MALDI Biotyper® sirius one GP System
MALDI Biotyper® sirius RUO System
MALDI Biotyper® sirius GP System

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

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

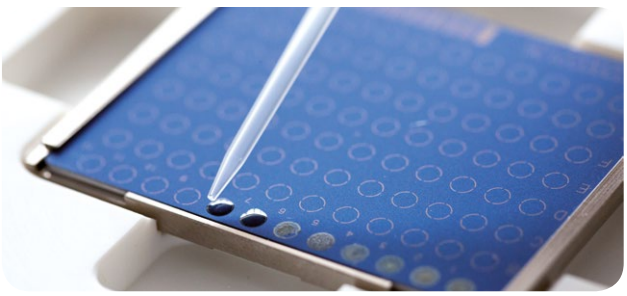
HCCA Matrix, portioned

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. Disposable MBT Biotargets render the same level of performance as reusable MALDI target plates without the need for time-consuming cleaning.



MBT Biotarget 96

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

MSP adapter for MBT Biotarget 96

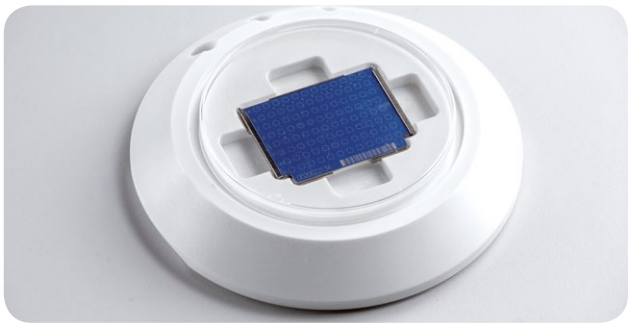
Adapter required to use MBT Biotargets with benchtop MALDI Biotyper systems / Part No 8267615

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 form make sample preparation easier.

One target holder / Part No 1847032



MBT Pilot®

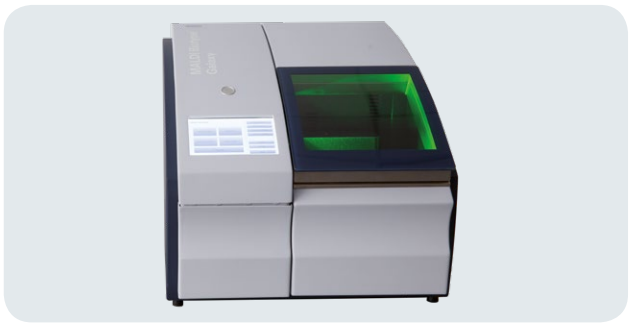
The MBT Pilot facilitates correct sample positioning through patented microprojection technology by indicating the next free MALDI target plate position.

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



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