



MTL

Non-contact 3D inspection solutions



BLAZER™ RoboMate™

MTL Brochure

2024



BLAZER™

The BLAZER series represents the high-speed and high-performance non-contact, automatic measuring equipment, engineered for the precise measurement of geometric parameters in jet engine and power turbine blades. It stands as the optimal solution for enhancing productivity on the production floor.

RoboMate™

RoboMate, MTL 3D Ltd.'s adaptive robotic system engineered for precision grinding and polishing of turbine blades. Seamlessly integrated with Blazer inspection technology, it ensures meticulous geometric analysis and top-tier accuracy. The intuitive MARS software simplifies programming, enhancing efficiency and operational control. Advanced algorithms and full module compatibility translate to a significant reduction in processing times and increased customization.



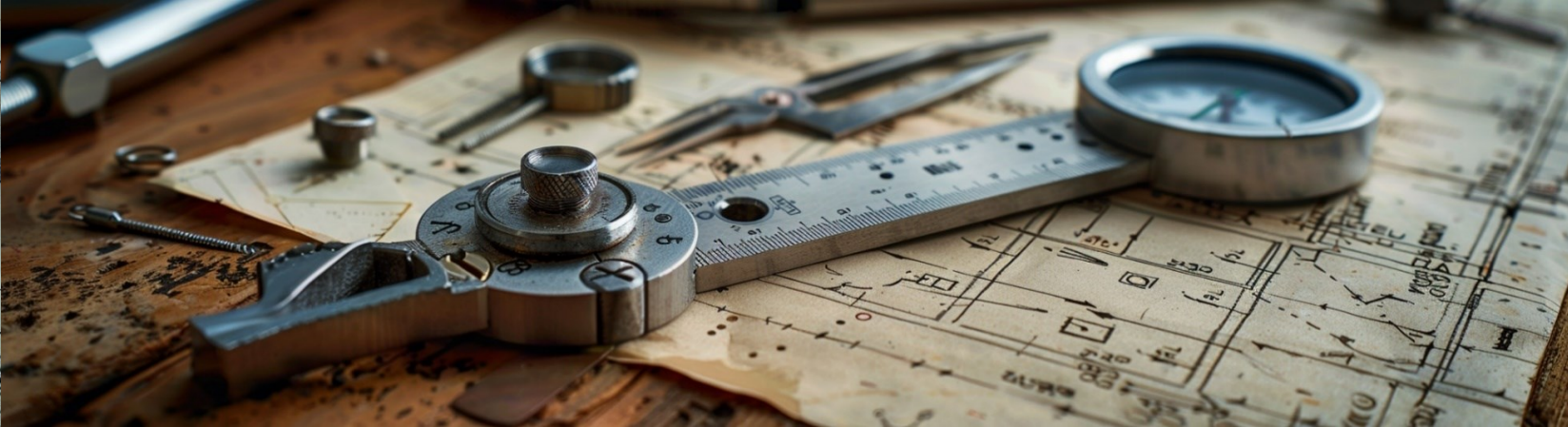
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Company Evolution and Expertise

Since its inception in 1998, MTL 3D Ltd. has been at the cutting edge of the high-tech industry. Born as Metroptic within the prestigious Iscar IMC group, our company has expanded by creating and advancing novel solutions and technologies. Our forte lies in the high-precision inspection of complex geometries, notably the sophisticated contours of gas turbine blades, where our technological solutions set the benchmark for accuracy and performance. Our relentless pursuit of innovation drives us to engineer systems that not only meet but exceed the exacting demands of high-performance inspection. Our suite of offerings has expanded to encompass a diverse range of automated solutions, each designed with the precision required for the meticulous examination of turbine blades. This dedication to our craft has earned us recognition as a trusted partner for clients seeking the highest standards of quality and reliability.



Advanced Inspection Systems

Our advanced inspection systems offer a comprehensive examination of root, shroud, and airfoil parameters, allowing for a full range of quality control checks. The BLAZER systems are capable of selecting various types of alignment and best-fit options, employing different calculation methods, and providing diverse report views to suit client needs.

Our Technology Expertise

Our BLAZER systems and MARS software stand as pillars of our technological prowess. The BLAZER non-contact 3D inspection system is designed for optimal performance in both in-process and post-process quality control, providing an inspection cycle time that is 4-5 times faster than traditional CMM solutions. This efficiency is a game-changer in industries that rely on precision and speed.



A Partner for the Future

As MTL 3D Ltd. continues to grow and expand its international presence, our dedication to innovation and client satisfaction remains the driving force behind our success. Our commitment to cutting-edge measurement and inspection technologies is unwavering as we eagerly anticipate crafting new partnerships and embracing technological challenges. We are excited to venture into new territories of high-tech engineering, ensuring our partners have a steadfast ally in the ever-evolving landscape of industry 4.0. We are eager to collaborate and contribute to pioneering the future of high-tech engineering alongside visionary partners and clients.



Key Advantages of the BLAZER Series

Enhanced Inspection Throughput:

It exceeds other technologies in blade inspection speed.

High accuracy:

Precision is a hallmark of the BLAZER series

Optimal Cost Efficiency:

It offers a balance of cost and performance

Reduced Operational Expenses:

Operating the BLAZER series is cost-effective

Consistent Quality Control:

Facilitates quality checks throughout all production stages.

Simplified Operation:

Setup and programming are straightforward and user-friendly.

Intuitive User Interface:

Designed for ease of use and accessibility

High Versatility:

Adaptable to a wide range of inspection needs

Informative Graphical Reports:

Offers detailed and clear graphical data for analysis

High protection from external factors:

Well-protected against factors that could affect performance



ROBOMATE

Robotic Adaptive Grinding and Polishing systems

RoboMate is an automated, versatile adaptive grinding system that offers a smart, online-controlled solution for grinding blade shapes.

It smartly controls profile geometry and surface smoothness of blade parts. The system is adept at performing grinding tasks on the edge profiles and airfoil, as well as polishing the fillet radius and platform areas, using distinctive adaptive control methods.

An industrial robot arm, coordinated by the main system controller, accurately adjusts the position of the blade part during the grinding process.

Basic Parameters of the part

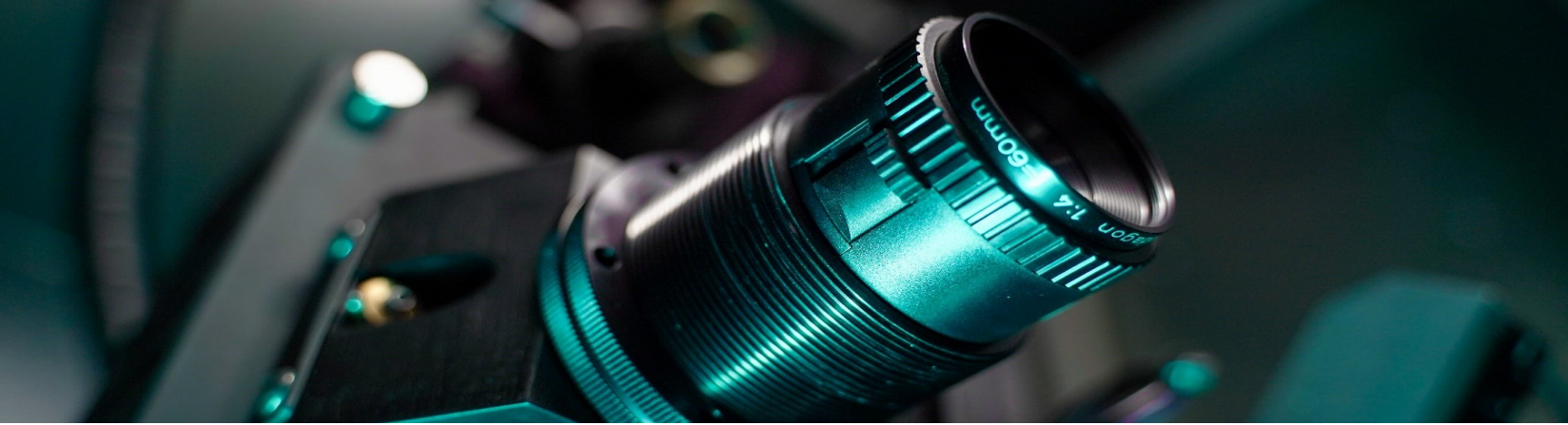
Maximum height	350 mm
Maximum Chord length	150 mm
Maximum weight (including fixture)	30 kg





Key Technical Characteristics

Parameter		Value
Blade Height, mm	in range	20 - 300
Blade Width (diameter), mm	in range	20-100
LE/TL Radius, mm	not less than	0,075
Fillet Radius, mm	not less than	0,5
Twist Angle, deg	not more than	55
Blade Weight	not more than	3
Max.Scanning resolution, pnts/mm	not less than	50
Measurement accuracy @ 2σ (deviation of actual data points from the inspected surface), mm	not more than	0,004
Blade inspection accuracy:		
Thickness, mm	not more than	0.015
Edge profile/airfoil profile, mm		0.010
Edges profile grinding time, min	not more than	5
Airfoil profile and platform polishing time (including fillet radius), min	not more than	20
Setup time (Typical blade type changeover time), min	not more than	7
Typical full process cycle time (from retrieving the blade from the pallet to placing it back after the processing), min	not more than	20
Dimensions:		
Length, mm		3000
Width, mm	not more than	3000
Height, mm		3000
Weight, kg		7000
Power Consumption:		
Voltage, V		$380 \pm 2\%$
Power, kW		35



BLAZER 2S

Small to Medium Blade Inspection

The BLAZER 2S is an optical measuring machine engineered for the inspection of small to medium-sized parts. It is proficient in measuring all key blade parameters, including the airfoil (incl. edge shape), root and platforms.

With exceptional resolution (approximately 80 pts/mm of section profile) the BLAZER 2S is perfectly suitable for measuring blades with extremely sharp edge (as small as 0.035 mm radius).



Basic Parameters of Measured Object:

Maximum height	450 mm
Maximum Chord length	140 mm
Minimum Edge radius	35 μ m





BLAZER 2S

Key Technical Characteristics

Parameter	BLAZER 2S
Dedication - Final or intermediate inspection of whole scope of blade parameters	
Maximum blade height (incl. fixture/goniometer)	450mm
Maximum blade chord length	140mm
Maximum load on rotary surface	15kg
Lateral resolution	80pts/mm
Minimum edge radius (for edge shape inspection)	0.035mm
Measuring accuracy (of single point@ 2σ)	0.002mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.015mm
Edge profile shape	0.010mm
Chord length	0.015mm
Airfoil profile	0.010mm
Platform	0.015mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	60sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	120sec
Medium blade, 250 mm height, 80 mm chord, 10 sections (after forging - no edges)	80sec
BLAZER 2S dimensions:	
Length	800mm
Width	1400mm
Height	1700mm
Weight	700kg
Power supply:	
Voltage	110V / 220 V
Power	600VA



BLAZER 2S Light

Small to Medium Blade Inspection

The Blazer 2S Light is an optical measuring device designed for examining both small and medium-sized parts. It is proficient in measuring all key blade parameters, including the airfoil (incl. edge shape), root and platforms.

While the Blazer 2S Light covers a wide array of blade part sizes and offers comprehensive dimensional analysis, its range is narrower than the Blazer 2S. However, the Blazer 2S Light compensates with a more compact overall system size.

It maintains a scanning resolution and accuracy comparable to the Blazer 2S, ensuring reliable and precise measurements across its scope of blade sizes.



Basic Parameters of Measured Object:

Maximum height	300 mm
Maximum Chord length	100 mm
Minimum Edge radius	35 μm
Maximum weight (including fixture)	15 kg





Key Technical Characteristics

Parameter	BLAZER 2S Light
Dedication - Final or intermediate inspection of whole scope of blade parameters	
Maximum blade height (incl. fixture/goniometer)	300 mm
Maximum blade chord length	100 mm
Maximum load on rotary surface	15 kg
Lateral resolution	80 pts/mm
Minimum edge radius (for edge shape inspection)	0.035 mm
Measuring accuracy (of single point@ 2σ)	0.002 mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.015 mm
Edge profile shape	0.010 mm
Chord length	0.015 mm
Airfoil profile	0.010 mm
Platform	0.015 mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	60 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	120 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections (after forging - no edges)	80 sec

BLAZER 2S Light dimensions:	
Length	800 mm
Width	650 mm
Height	2050 mm
Weight	300 kg
Power supply:	
Voltage	110 V / 220 V
Power	600 VA



BLAZER Flex

Small to Medium Blade Inspection

The Blazer Flex is a cutting-edge non-contact measurement system designed for geometric inspection of compressor and turbine blade roots and airfoils, suitable for medium and small sizes parts. With its high-precision optical sensor, it offers detailed 3D scanning of parts, including blade roots and platforms. Integrated with advanced sensors, linear and rotary axes, a motion controller, and custom MARS software, the Blazer Flex delivers reliable, precise, and repeatable measurements.



Basic Parameters of Measured Object:

Maximum height	300 mm
Maximum Chord length	120 mm
Minimum Edge radius	35 μm
Maximum weight (including fixture)	20 kg





Key Technical Characteristics

Parameter	BLAZER Flex
Dedication -Final or intermediate inspection of whole scope of blade parameters	
Maximum blade height (incl. fixture/goniometer)	300mm
Maximum blade chord length	120mm
Maximum load on rotary surface	20kg
Lateral resolution	80pts/mm
Minimum edge radius (for edge shape inspection)	0.035mm
Measuring accuracy (of single point@2 σ)	0.002mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.015mm
Edge profile shape	0.010mm
Chord length	0.015mm
Airfoil profile	0.010mm
Platform	0.015mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	60sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	120sec
Medium blade, 250 mm height, 80 mm chord, 10 sections (after forging - no edges)	80sec

BLAZER Flex dimensions:	
Length	1100 mm
Width	1000 mm
Height	1900 mm
Weight	300 kg
Power supply:	
Voltage	110 V / 220 V
Power	600 VA

QUALITY ASSURANCE

quality

ISO 9001

service

standards

BLAZER 2M

Medium to Large Size Blades Inspection

The BLAZER 2M is a mid-size optical measuring machine designed to accommodate a broad array of blade sizes, from the smallest to the largest. It is proficient in measuring all blade parameters, comparable to the capabilities of the BLAZER 2S. Additionally, the BLAZER 2M is equipped with a goniometer, enabling it to effectively measure blade clusters, thus enhancing its versatility in various blade inspection applications.

Basic Parameters of Measured Object:

Maximum height	800 mm
Maximum Chord length	400 mm
Minimum Edge radius	65 μm
Maximum weight (including fixture)	200





Key Technical Characteristics

Parameter	BLAZER 2M
Dedication - Final or intermediate inspection of whole scope of blade parameters	
Maximum blade height (incl. fixture/goniometer)	800 mm
Maximum blade chord length	400 mm
Maximum load on rotary surface	50 kg
Lateral resolution	40 pts/mm
Minimum edge radius (for edge shape inspection)	0.065 mm
Measuring accuracy (of single point@ 2σ)	0.004 mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.025 mm
Edge profile shape	0.015 mm
Chord length	0.025 mm
Airfoil profile	0.015 mm
Platform	0.025 mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	60 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	120 sec
Medium blade, 600 mm height, 200 mm chord, 20 sections	300 sec
BLAZER 2M dimensions:	
Length	1800 mm
Width	1800 mm
Height	2100 mm
Weight	2000 kg
Power supply:	
Voltage	110 V / 220 V
Power	2500 VA







BLAZER 2M Blisk

Medium to Large Size Blades

and Integrally Bladed Rotors (IBR) Inspection

The BLAZER 2M is a mid-size optical measuring machine that efficiently handles a diverse size range of blades, from the smallest to the largest.

It has the capability to measure all blade parameters, similar to those offered by the BLAZER 2S.

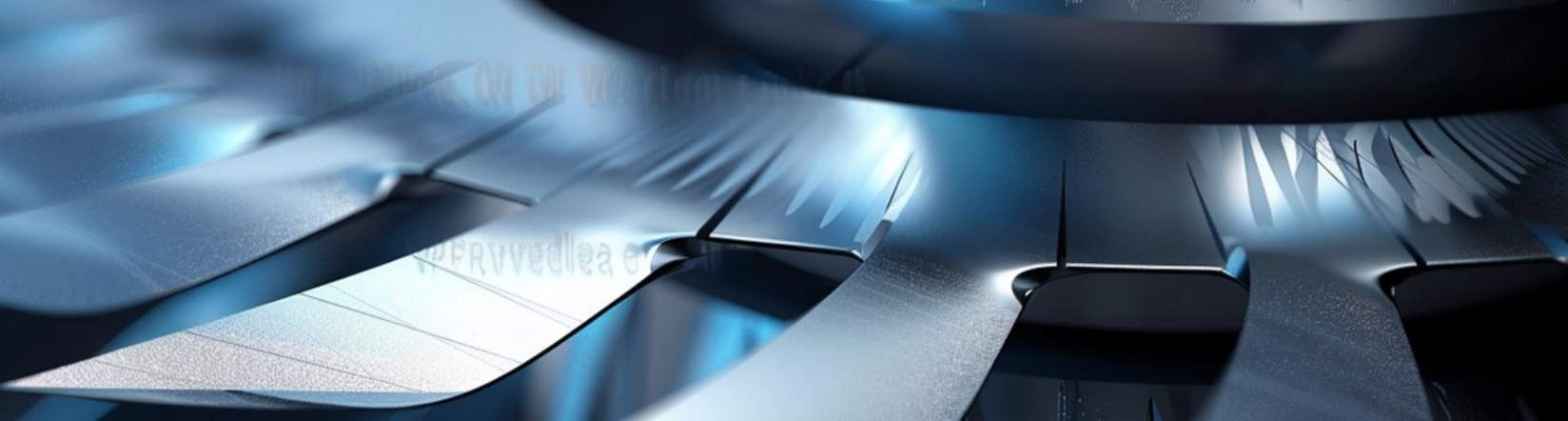
Additionally, this machine is specifically designed for inspecting small-size integrally bladed rotors (IBRs), also known as blisks. It proficiently measures all airfoil parameters of the blade, as well as open flow areas.

Basic Parameters of Measured Object:

Basic Parameters of Measured Object:

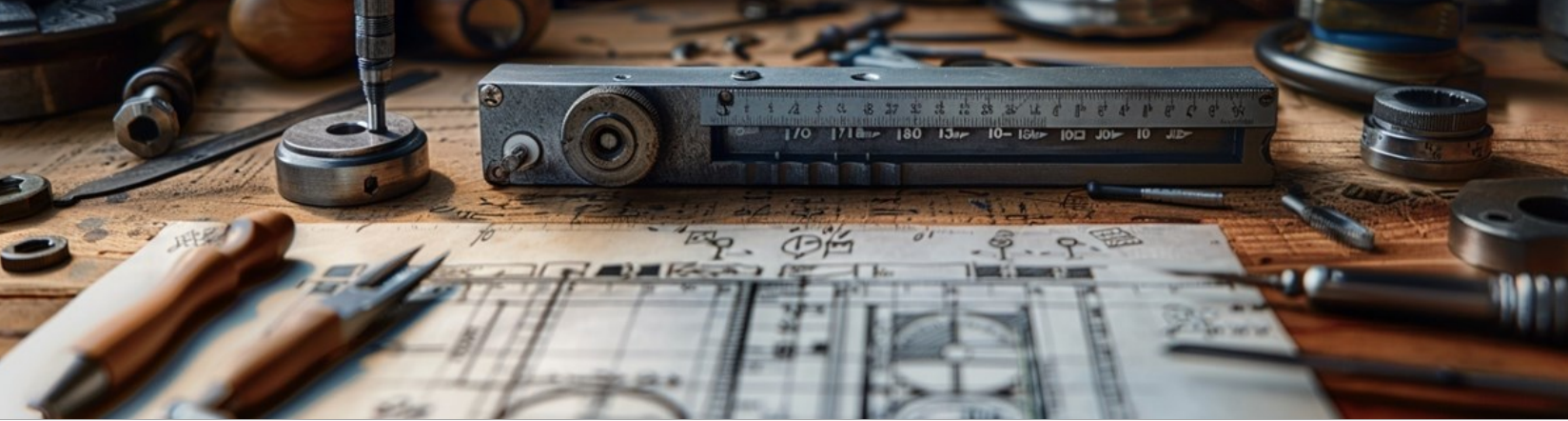
Maximal Outer diameter	700 mm
Maximum Chord length	150 mm
Minimum Edge radius	90 μm
Maximum weight	250 kg





Key Technical Characteristics

Parameter	BLAZER 2M BLISK
Dedication - Final or intermediate inspection of IBR or single blade parts	
Maximum outer diameter	700 mm
Maximum blade chord length	150 mm
Maximum load on horizontal rotary surface	250 kg
Maximum load on vertical rotary axis	150 kg
Lateral resolution	33 pts/mm
Minimum edge radius (for edge shape inspection)	0.090 mm
Measuring accuracy (of single point @2 σ)	0.004 mm
BLAZER 2M Blisk Blade measuring accuracy:	
Thicknesses	0.025 mm
Edge profile shape	0.015 mm
Chord length	0.025 mm
Airfoil profile	0.015 mm
Typical inspection time:	
IBR, 600 mm diameter, 100 mm blade chord length, 25 blades, 4 sections	25-30 min.
BLAZER 2M BLISK dimensions:	
Length	1800 mm
Width	2000 mm
Height	2100 mm
Weight	2500 kg
Power supply:	
Voltage	110 V / 220 V
Power	2500 VA



BLAZER 2L

Large Size Blades Inspection

The optical measuring machine is specifically engineered for inspecting large blades, offering the capability to measure a wide range of blade parameters. This includes details such as the airfoil, including edge shapes, roots, and platforms. Additionally, the machine is designed to accommodate an IBR (Integrally Bladed Rotor) inspection module, enhancing its versatility for a broader scope of blade inspections.

Basic Parameters of Measured Object:



Maximum height	1400 mm
Maximum Chord length	400 mm
Minimum Edge radius	65 μm
Maximum weight (including fixture)	50 kg





Key Technical Characteristics

Parameter	BLAZER 2L
Dedication - Final or intermediate inspection of whole scope of blade parameters	
Maximum blade height (incl. fixture/goniometer)	1400 mm
Maximum blade chord length	400 mm
Maximum load on rotary surface	50 kg
Lateral resolution	40 pts/mm
Minimum edge radius (for edge shape inspection)	0.065 mm
Measuring accuracy (of single point@ 2σ)	0.004 mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.025 mm
Edge profile shape	0.015 mm
Chord length	0.025 mm
Airfoil profile	0.015 mm
Platform	0.025 mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	60 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	120 sec
Medium blade, 600 mm height, 200 mm chord, 20 sections	300 sec
BLAZER 2L dimensions:	
Length	1800 mm
Width	2000 mm
Height	2600 mm
Weight	2500 kg
Power supply:	
Voltage	110 V / 220 V
Power	2500 VA



BLAZER Compact

Small and Medium Size Blades Inspection

The BLAZER Compact system is a table-mounted optical measuring device, particularly geared for in-process inspection of blade airfoils.

This system is a cost-effective and highly efficient solution for the control of blade profiles, thickness, and twist, making it ideal for post-forging checks. It stands out for its ability to provide quick and accurate assessments.

Basic Parameters of Measured Object:

Maximum height	400 mm
Maximum Chord length	100 mm
Maximum weight (including fixture)	15 kg





Key Technical Characteristics

Parameter	BLAZER Compact
Dedication - Intermediate inspection of airfoil blade parameters	
Maximum blade height (incl. fixture/goniometer)	400 mm
Maximum blade chord length	100 mm
Maximum load on rotary surface	15 kg
Lateral resolution	10 pts/mm
Measuring accuracy (of single point@2 σ)	0.004 mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.03 mm
Chord length	0.05 mm
Airfoil profile	0.025 mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	30 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	60 sec
BLAZER Compact dimensions:	
Length	450 mm
Width	570 mm
Height	900 mm
Weight	100 kg
Power supply:	
Voltage	110 V / 220 V
Power	500 VA



BLAZER Compact Light

Small and Medium Size Blades Inspection

The BLAZER Compact Light is a table-mounted optical measuring system, designed specifically for in-process inspection of blade airfoils.

As a streamlined and budget-friendly option, it delivers rapid and effective solutions for monitoring blade profile, thickness, and twist. Particularly suitable for post-forging quality control

Basic Parameters of Measured Object:



Maximum height	300 mm
Maximum Chord length	50 mm
Maximum weight (including fixture)	15 kg





Key Technical Characteristics

Parameter	BLAZER Compact Light
Dedication - Intermediate inspection of airfoil blade parameters	
Maximum blade height (incl. fixture/goniometer)	300 mm
Maximum blade chord length	50 mm
Maximum load on rotary surface	15 kg
Lateral resolution	20 pts/mm
Measuring accuracy (of single point@ 2σ)	0.003 mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.025 mm
Chord length	0.030 mm
Airfoil profile	0.020 mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	30 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	60 sec

BLAZER Compact Light dimensions:	
Length	350 mm
Width	400 mm
Height	800 mm
Weight	50 kg
Power supply:	
Voltage	110 V / 220 V
Power	500 VA



BLAZER Compact Marker

Small and Medium Size Blades Inspection

The BLAZER Compact Marker is a specialized table-mounted optical measuring system, primarily focused on in-process blade airfoil inspection.

This system provides a fast and cost-effective way to adjust and correct the profile, thickness, and twist of blades, particularly post-forging.

A standout feature of the BLAZER Compact Marker, differentiating it from the standard Compact system, is its capability to directly mark measured deviations on the airfoil surface. This addition enhances its functionality, allowing for more precise and immediate identification of areas needing adjustment or repair.

Basic Parameters of Measured Object:

Maximum height	400 mm
Maximum Chord length	100 mm
Maximum weight (including fixture)	15 kg





Key Technical Characteristics

Parameter	BLAZER Compact Marker
Dedication - Intermediate inspection of airfoil blade parameters	
Maximum blade height (incl. fixture/goniometer)	400 mm
Maximum blade chord length	100 mm
Maximum load on rotary surface	15 kg
Lateral resolution	10 pts/mm
Measuring accuracy (of single point@2 σ)	0.004 mm
BLAZER 2S Blade parameter measuring accuracy:	
Thicknesses	0.030 mm
Chord length	0.050 mm
Airfoil profile	0.025 mm
Typical airfoil inspection time:	
Small blade, 100 mm height, 25 mm chord, 6 sections	30 sec
Medium blade, 250 mm height, 80 mm chord, 10 sections	60 sec

BLAZER Compact Marker dimensions:	
Length	450 mm
Width	870 mm
Height	920 mm
Weight	150 kg
Power supply:	
Voltage	110 V / 220 V
Power	500 VA



Extended MTL capabilities

MTL 3D Ltd. is not just about products; we are about solutions. Our special projects include:

Robotic “Glass” Coating System:

An innovative solution for high-quality, uniform coating applications.

Process Automation Solutions:

Enhancing efficiency and reducing human error in complex manufacturing processes.

Turbine Blades Fixture Design and Manufacturing:

Custom fixtures designed to meet specific manufacturing demands.

IBR Inspection Systems:

Specialized systems for the inspection of integrally bladed rotors.

Seal Inspection System:

Ensuring the integrity of seals in various components.

Advanced Inspection Software:

At the core of our solutions is our sophisticated inspection software - MARS, engineered to integrate seamlessly with our hardware to provide comprehensive analytics, real-time feedback, and customizable features for a wide range of applications.



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