



Electronic Multishot System (EMS)

MICON DRILLING
Drilling Equipment Made in Germany

MICON-Drilling GmbH
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Company Profile

The MICON-Drilling GmbH is a worldwide operating service company, specialized in sales and rental of drilling equipment. Decades of experience, high quality standards and focused customer orientation are our unique selling points.

We are a member of the MICON Group, established in Nienhagen/Germany, in 1994. The privately owned company specializes in design, production, inspection and repair of drill string components, drill bits, sophisticated directional drilling systems and additional equipment. Our main focus lies on the technical service for drilling applications in the mining, oil & gas, tunneling and geothermal industries.

An innovative engineering department ensures continuous optimization of all MICON products. Additionally, we are in close contact with a network of several German universities to foster research and development activities.

The MICON Group manufactures drilling equipment in two independent facilities on state-of-the-art CNC milling, turning and welding machines. Latest technology and implementation of German engineering guarantee the highest degree of efficiency and quality.



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MICON Buildings "Im Nordfeld", Nienhagen/Germany



MICON Buildings "Breite Horst", Nienhagen/Germany

Quality Policy

MICON stands for high quality products Made in Germany. This high quality standard builds the basis for our success and is an integral part of the company policy. This is reflected by long-term and trustful cooperation with our customers.

In order to achieve our high quality objectives the MICON Group manufacturing companies have implemented quality management systems certified according to international standards. The actual certification status of the Group companies is as follows:

MICON Downhole-Tools GmbH:

- ISO 9001:2015 - 0019058
- API Spec. Q1 (No. Q1-4689)
- API Spec. 7-1 (Monogram License 7-1-1271)

MICON GmbH & Co.KG:

- ISO 9001:2015 - 00007159
- ISO3834-2:2006 (D-ZE-16083-01-00-ISO3834-2019.0013.002)

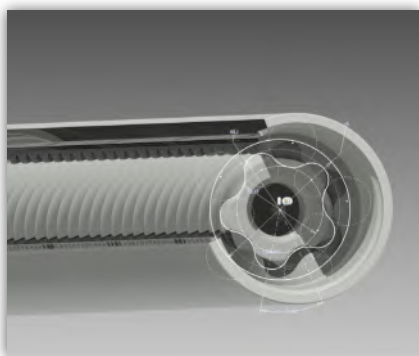
Our global quality objectives lead to specific targets, which are defined by the top management in cooperation with the quality manager. The fulfilment of these specific quality targets is evaluated at least every 12 months in the management review. Our ambition is product reliability and quality that meets the customer requirements as well as your high quality standards. The MICON product cycle includes different process steps. Rigorous acceptance criteria at every process step ensure a consistent high quality level of each product.



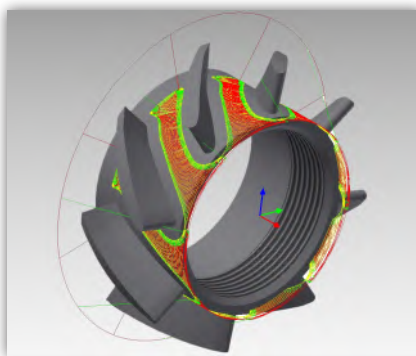
7-1-1271



Q1-4689



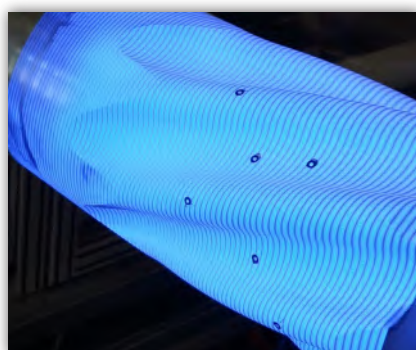
CAD based product development



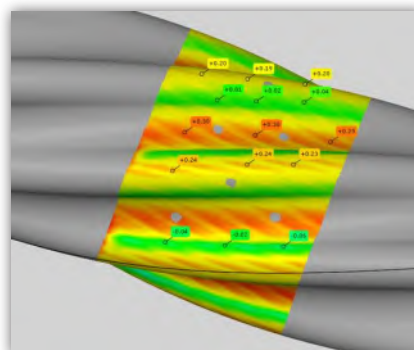
CAD – CAM manufacturing



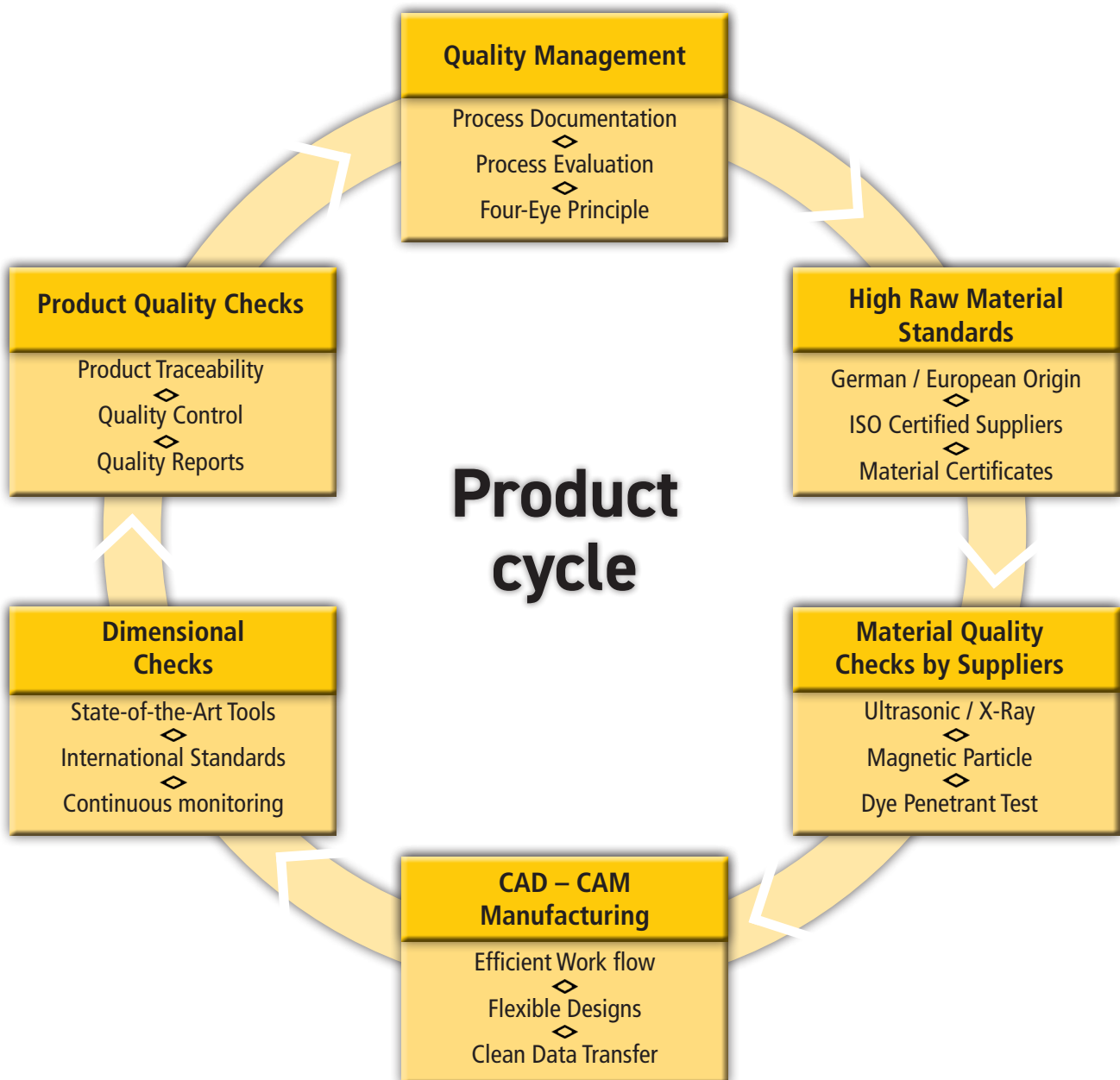
Permanent quality checks



High resolution 3-D scanning



3-D scan evaluation



Electronic Multishot System (EMS)

The digital EMS represents the latest generation of survey instruments that root in the long tradition of Eastman Whipstock measurement tools.



Equipped with high accuracy sensors, the EMS is specialized on precise and reliable directional borehole measurements. Because of its modular construction, it is not only a multishot system. The EMS can be adapted for further applications like orientated coring, real-time directional drilling survey or simple inclination measurements. Additionally, our ATEX certified version enables survey operations in explosion hazardous areas.

Why choosing the EMS?

- ◇ Compact and easy to handle
- ◇ Modular System
- ◇ 3 axes high precision sensors
- ◇ Robust construction (up to 800 bar)
- ◇ Temperature resistance (up to 200°C)
- ◇ Flexible measurement intervals
- ◇ Wide range of additional equipment
- ◇ ATEX  certified version available
- ◇ User friendly software package
- ◇ Rental Service (with personnel if required)

EMS Configurations

Steering Tool

Real-time directional drilling monitoring with cable connection

Drift Indicator

Borehole inclination measurements undisturbed of magnetic interferences

Borehole Survey

3-D borehole path survey operations

ATEX

3-D borehole path survey operations in explosive hazardous areas

Oriented Coring

Oriented coring operations in combination with a MICON core barrel

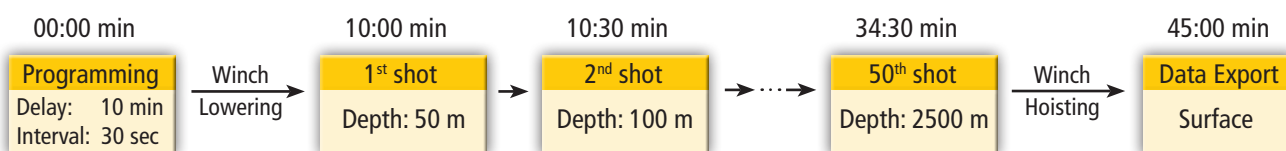
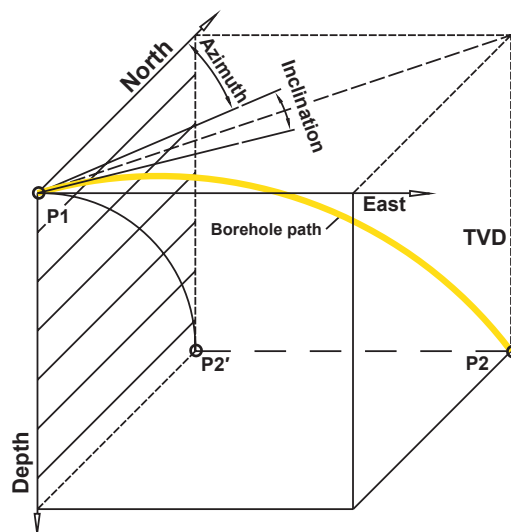
Software and Service

Our user-friendly software package ensures an easy data export via USB port and enables further data processing applications. Some examples are the borehole path visualization, true vertical depth analysis or data transformation into different geographical coordinate systems.

We offer an extensive rental service package for the Electronic Multishot System including EMS kits, winches, service engineers and maintenance service. In addition, we supply practice orientated EMS training seminars for our customer's staff.

Project Example

In order to perform 3-D borehole path survey operations, the EMS is lowered into the borehole by using a winch. After a programmed time delay, the first survey "shot" is performed. Each measurement point records azimuth (direction), inclination (dip), tool-face orientation (probe orientation angle), time and borehole temperature. The next „shots" follow automatically within an individual programmable time interval. Back at the surface, all measured data can be displayed directly on the optional display unit. The data export for further analysis can be operated easily via USB connection.



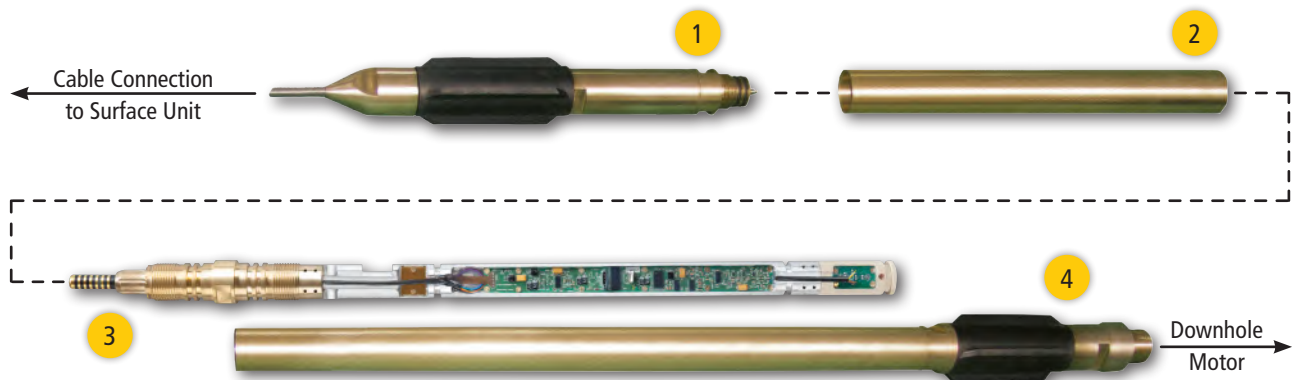
Item (Shot)	Depth	Azimuth	Inclination	Temperature	Toolface	Time
[-]	[m]	[°]	[°]	[°C]	[°]	[min:sec]
1	50	44	88	12	115	10:00
2	100	45	87	12.5	110	10:30
...
40	2000	43	38	60	102	29:30
41	2050	44	37	61.5	108	30:00
...
50	2500	45	45	75	110	34:30

Borehole Survey Configuration



Position	Description
1	Display Unit
2	Battery Unit
3	Master Sensor Unit
4 a - c	Pressure Case Assembly

Steering Tool



Position	Description
1	Cable Connection Module
2	Data Transmission Connector
3	Master Sensor Unit
4	Pressure Case for Steering Tool

Additional Equipment *



Steel Centralizer



Bullnose with Shock Absorber



Rubber Centralizer

*Further equipment available on request.

Technical Data

Electronic Multishot System (EMS)	
Dimensions	
Electronic Unit	Ø 25,4 mm
Pressure Case	Ø 35 mm
Length	1,563 mm (Configuration dependent)
Accuracy*	
Inclination	+/- 0.2°
Azimuth	+/- 1.0° (Inclination > 20°)
Toolface	+/- 0.2°
Sensors and Electronics Assembly	
Sensors	3 Axis Gravitation
	3 Axis Magnetic Field
	Temperature
	Voltage
Memory Space	8142 Measurement Points
Measurement Intervals	Measurement Lag up to 99 Minutes
	Interval 5 - 300 Seconds
Energy Supply**	Rechargeable Batteries
	Lithium Batteries***
Runtime	20 h NiMH Rechargeable Batteries / 60 h Lithium Batteries
Area of Application	
Pressure	max. 800 bar****
Temperature	max. 60 °C with NiMH Rechargeable Batteries
	max. 100 °C with Lithium Batteries
	max. 200 °C with Heat Shield
Shock Resistance	max. 1,000 g
Vibration	max. 25 g (5-500 Hz)

* Field operation accuracy.

** Energy supply of Steering Tool version via cable connection.

*** Lithium batteries not available for ATEX version.

**** 300 bar with standard pressure case.

Notes

Notes



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