

Thread Tapping Technology



Productinformation Advantages & Benefits

For Users & Managers
Bosses & Controllers
for best Decision & Investments

Characteristics & Advantages

Customer - Benefits
Request & Applications
Competition – Comparison
... the big technical advantages

Process Controlled Production and

Laboratories Comparisons
WinPCA analysis and evaluation
examples

Productinformation Overview

Software-Functions & Production features

References

Conditions

Pricing €
Payment terms
Delivery time
Installation and training
Alterations

The terms of German "General delivery conditions for products and services of the electrical industries" are valid for all deliveries.

excludes sales tax, packing, shipping, and handling
net 30 days / payment in advance
approximately 4-8 weeks after order
additional
additional

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<http://www.microtap.de/>
<http://www.tapping-torque-test.com/>

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ProductNOTE.doc



March 2008



Thread tapping technology
Characteristics
Advantage

Customer - Benefits

Characteristics

- **Torque controlled** drive
- Mechanical counter-balanced compensation
- Production program for special features
- Production of quality reports
- Repeatable production / data bank
- Integrated interfaces for controlling / RS232 & I/O
- CE + GS-sign checked by TÜV

Advantages

- **Process controlled** production
- Error recognition with good / bad selection
- Avoid scrap and tool breakage / tap protection
- Optimisation of process parameter based on measured production results
- Low axial power to tap-pitch (flanks) of threads
- Can be upgraded from stand-alone unit up integration with automatic transfer- and handling systems
- No further costs, i. e. lead screws

Benefits

- Complete production security
- **Assured profitability**
- Production protocol secures further orders, customer satisfaction and quality products
- High tool service life
- secure investment:
 - can be developed for tomorrow's needs of automation
 - through interfaces RS232 / 4 x I/O
- Reduction of costs
- For flexible semi - automated and contract production
- Can be mounted on a mobile table and moved to different machines / work areas or outwork

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Character-Advantage-Benefits.doc





Thread tapping technology Request

Applications

Flexible production

- Thread production for „inside & outside threads “
M0,5 – M14 (V2A-steel / INOX)
- Practice orientated special features & production programs
 - thread cutting and forming
 - **thread inserts** (Ensat/Helicoil)
 - **screw setting**
 - counter sink & secondary drilling (similar do reaming)
 - core hole quality for size and depth
 - check **threads** (gauge- & depth - control)
 - comparative **laboratory features**

Applications

- **Special machines** & handling solutions /
Transfer- & semi-automatic
- Can be developed for tomorrow's needs
- Fast cycle time
- Quality documentation / protocol

Control and process security

- **WinPCA**, analysis and evaluation software for process
control & quality analysis
 - quality analysis process protocol and control
 - production security based on process monitoring
 - real time monitoring of the manufacturing process to help
determine the effects of operating parameters including
lubrication and tool function
 - automatic storage to document the measurement
statistics (Gauß)
 - development to determine the best tool geometry and
coatings as well as for lubricant cooling ingredients and
emulsions

Service and funding

- Laboratory analysis & custom design at microtap
- Delivery & training on request
- Hire, hire purchase & leasing



Thread tapping technology

Competition

Free floating spindle

spindle is directly driven
No lead screw
Control of the cutting load

Torque monitoring

Maximum torque
Torque set-point is adjustable
Current torque in Ncm is readable
Minimum torque in Ncm is not reached

Only necessary torque is used
Programming, menu driven

Supervised manufacturing

Parameter settings

minimum torque
maximum torque

speed RPM
depth
control in quality
special features

Quality control

PC-Software **WinPCA** and **printtap**

Speed control

Standard-Interfaces

CE- / GS-Sign, incl. EMV

... the big advantages

- Counter balance compensation
- threading takes place with the pitch of the tap
- in Z-direction, only with **ZAP**
- below the static breaking point of the tap
- error info when pilot hole too small or dull tap
- tool failure and scrap are avoided
- quality and service life monitoring
- pilot hole is too large
- or thread pitch is worn out
- cutting action in Ncm lies below tool breaking point
- all parameters are indicated in the display
- good/bad are indicated *during* the manufacturing

- part position tolerance Δ Delta-Sz - with **ZAP**
- Torque control window, min-max
- Depth setting to 0,1mm
- pilot hole tolerance recognition
- no breakage
- pilot hole to small
- automatic chip clearance
- observe service life for the taps
- optimum speed
- exact *depth is achieved +/- 0.1 mm*
- *optimum performance and service life of taps*
- *for depth > 1,5 d minimum power and torque for greater depth, without scrap and breakage using programmable chip-clearance*

- Online-Protocol for Quality management
- Develop optimum performance with feedback
- Identifies the best tools
- Tool geometry, coatings, and lubrication are evaluated in the process for the best service life.
- 8 bit input / output parallel interfaces
- RS232 (V24) 9600 Baud
- for Automation and communication

- **CE-Certificated, TÜV Certification**
- Norm: EN 60 204-1; 1992;
- DIN EN 292 T1,T2; DIN EN 294; DIN EN 349; DIN 8418
- **ElektroMagnetische Vertraeglichkeit EMV**
- Norm: EN 55011/50081-2/50082-2



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July 06



Thread tapping technology Competition

microtap thread tapping system

Torque continuously controlled

Set operating torque according to material and size of thread, and below the breakpoint of the tool
The thread is constantly controlled and analysed
This allows continuous verification of thread quality
The actual torque is shown on the display

Tool breakage prevented

Increase of torque during operation or incident will be recognised. Thread cutting with worn tools or lack of lubrication will be prevented

Free floating spindle

The spindle exerts no opposing forces in a stress-free balance of tool and work piece. The tap pulls itself into the work piece by its own lead
The advance occurs by hand or with the automatic feed system

Precision -- from beginning to end

The measuring of depth is achieved by an electronic depth measurement system (resolution 0.05 mm). The accuracy of depth (+/- 0.1 mm) is shown on the display

Approach electronically controlled

The work piece location is also measured by the depth control system (+/- 0.1 mm). The permissible tolerance is adjustable

All parameters are controlled during production

...when you think thread tapping –

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Competition - Comparison.doc

Comparison

Conventional thread tapping

Breakpoint is not considered

The operating torque cannot be recognised during operation. Optimisation of all parameters is not possible. The breakpoint of the tap is not considered. An automatic clutch is generally too sluggish

Increase of scrap

Wear of tool will not be recognised and there is a danger of breakage and scrap. There is no quality control or verification of quality

Increase of wear

Each tap of a different size or pitch requires its own lead screw that, when out of synchronisation, can cause increased wear. Time for retooling will add more costs. Tool breakage, especially when reversing, can often not be avoided

Additional expenses

The true depth of the thread will have to be gauged at the end of the process, which causes additional time and expenses

Verification of quality only post process

Tolerance of work piece (height, width, depth) show only after process when quality is checked

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...thank you for your interest

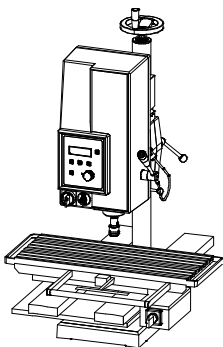
Process controlled production & laboratory line

labtap II – G8

Application

Thread capacity
(DIN13, sheet 34 / 1,2 x D)
Torque range Mz
Spindle speed range
Color / paint finish
Software

WinPCA



Spindle B12 / 01

Alternative

Testing material
Delivery / Training
www.microtap.de

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Controlled Production with Analysis

microtap



with Analysis

Tapping machine for "process-controlled-production" and Laboratory Applications with acquisition PC-Software **WinPCA** and interfaces RS232 and 8 bit I/O

The optimum line for Process Controlled Production and Laboratories includes the latest **WinPCA analysis and evaluation software** to compare procedures for best production results.

Automatic data acquisition and storage of production parameters used in the manufacturing process to develop quality protocol and solutions.

M2.5 - M8 X5CrNi189 / 1.4435
M2.5 - M10 9sMn28 / 1.0715
50 - 700 Ncm / ab 470 Ncm max. 2060 RPM
300 – 3000 RPM

RAL 1015 bright ivory

- Program for thread tapping and forming
- Program for thread inserts (Ensat/Kato/Helicoil)
- Program for screw setting & secondary hole (similar reaming)
- Program for continuous motor running routines
- PC Control and data acquisition software for comparison with automatic storage of all data and statistics based on torque readings (Gauss)

Formulas of the statistical evaluation through the WinPCA calculate standard deviation and the mean value of the measured data. The formulas that the arithmetic method and the standard-deviation **calculate are**

$$\text{Average (aver)} = \sum_{i=0}^{n-1} x_i / n \quad / \quad \text{sDev} = \sqrt{\sum_{i=0}^{n-1} [x_i - \text{ave}]^2 / n}$$

Mean value / Arithmetic method

The expression is called arithmetic methods of n sizes.

$a_1 \cdot a_2 \cdot \dots \cdot a_n$

$$c_A = \frac{a_1 + a_2 + \dots + a_n}{n} = \frac{1}{n} \sum_{k=1}^n a_k$$

For two sizes a and b emerges

$$c_A = \frac{a + b}{2}$$

Quick change system SWS1

including 6 Inserts DIN371M2-M10 / DIN374/376 M4-M11

Collet System SZS1

including 5 Collets 8-7/6-5/5-4/4-3/3-2

On request / separate data sheet

After agreement

[/Produkte/labtapDaten.htm](http://Produkte/labtapDaten.htm)

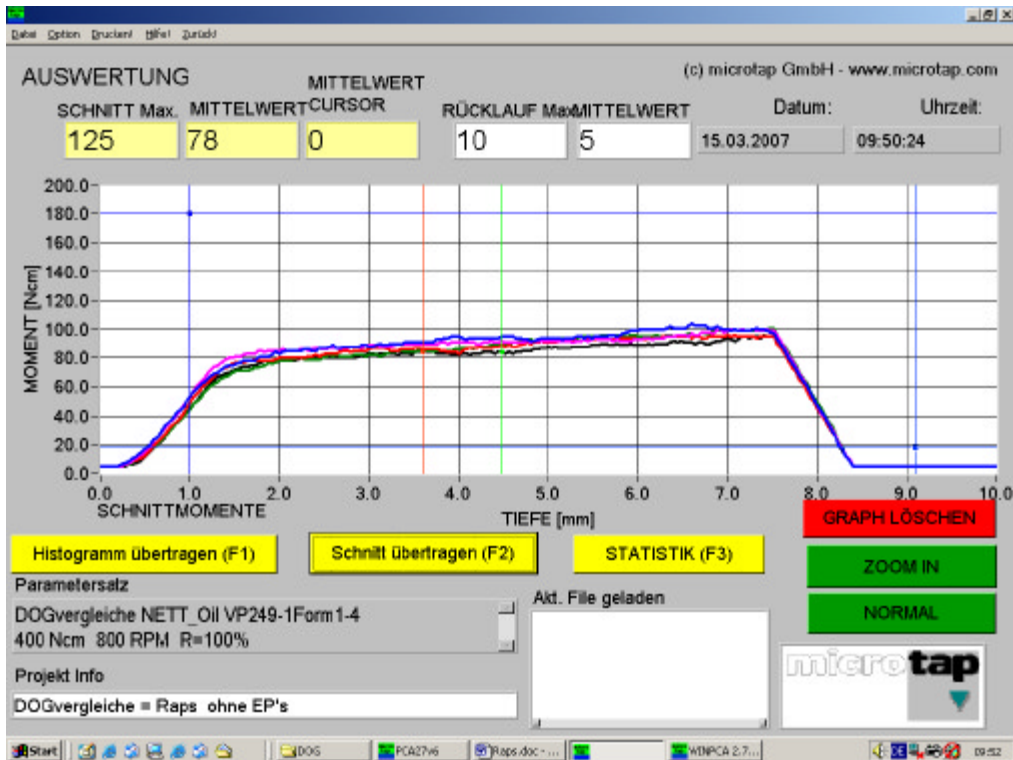
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Tapping Torque Test with WinPCA & labtap G8



Analysis- & Evaluation Software Graphs about MWF Lubricant Optimization Reference Rapsoil without EP's

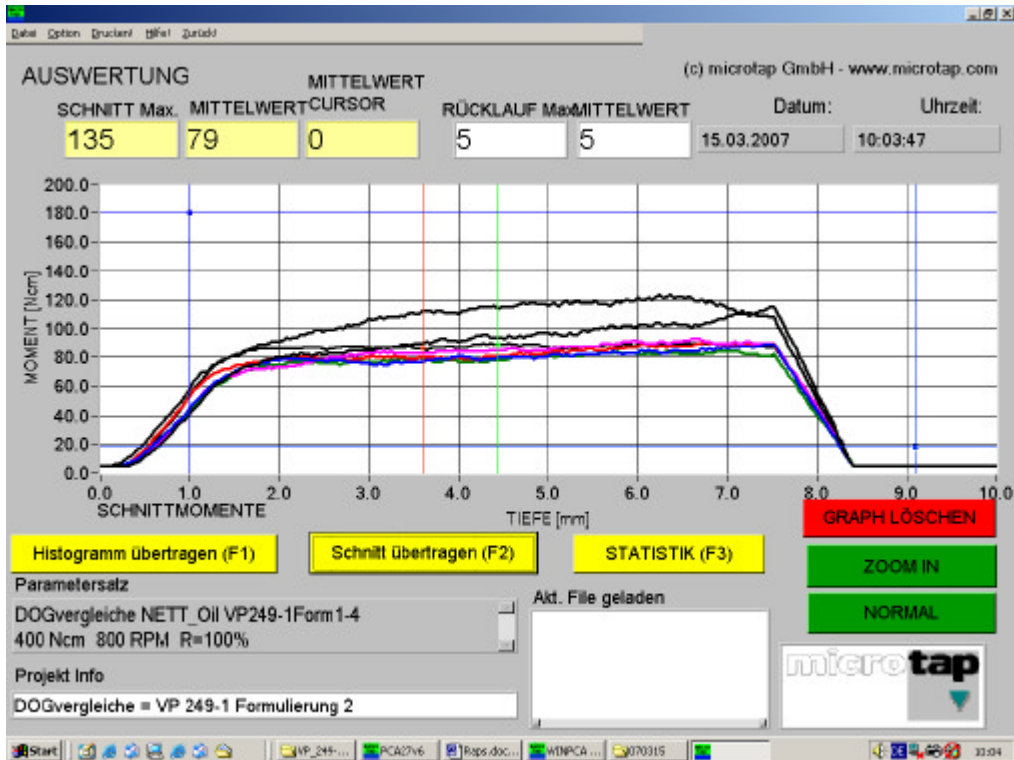


Rapsoil without EP's

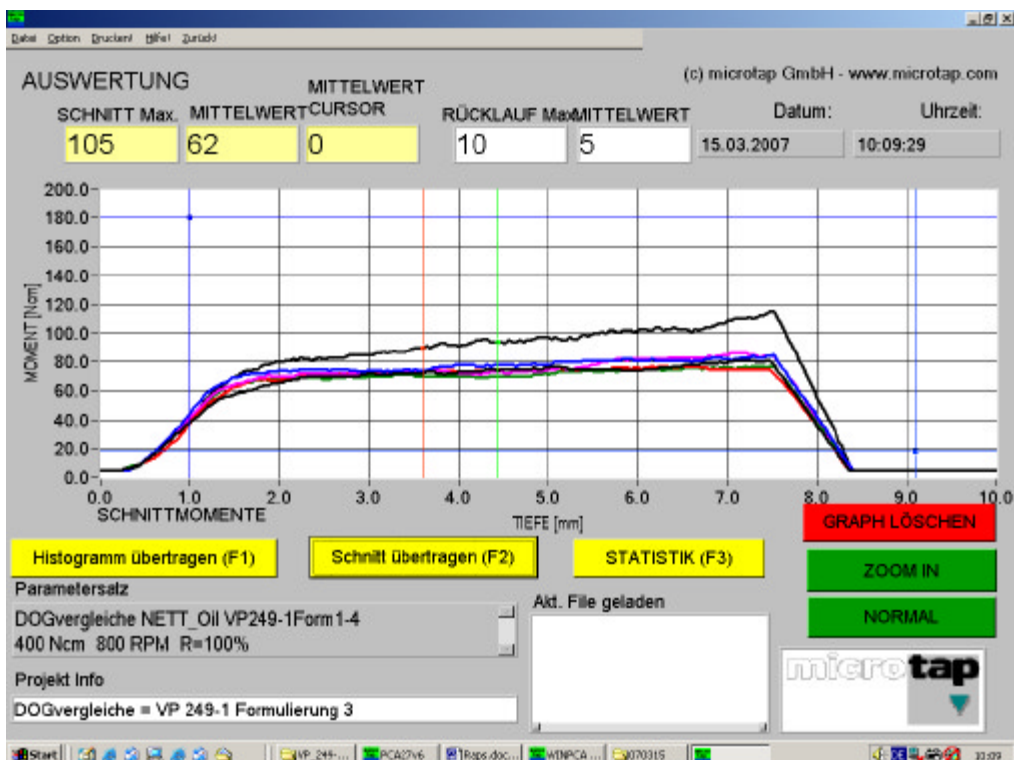


Comparsion

Analysis- & Evaluation Software
Graphs about MWF Lubricant Optimization



Comparsion 2

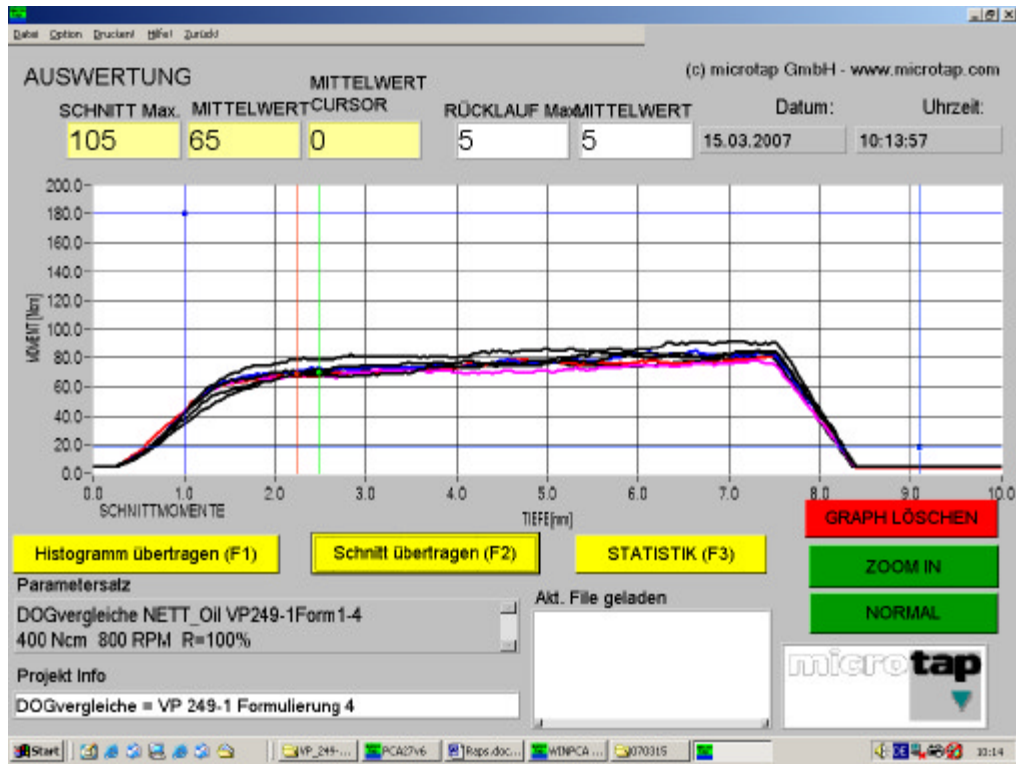


Comparsion 3

Tapping Torque Test with WinPCA & labtap G8



Analysis- & Evaluation Software Graphs about MWF Lubricant Optimization



Comparsion 4

microtap Lab Germany 2007.03

M4 BLINDHOLE TO 6MM 1.4571 Forming				
FLUID/HOLE	Value in Ncm			
	CUT	MEAN	STAT	STD DEV
A1	135	85	45,70	48,10
A2	140	89	47,50	49,50
A3	145	88	46,80	49,30
A4	145	94	50,20	53,40
A5	150	91	48,60	51,20
AVERAGE	143,00	89,40	47,76	50,30
DIFF.. OF B	89,94%	95,11%	95,33%	93,91%
DIFF. OF C	98,62%	94,70%	95,06%	95,45%
DIFF. OF D	81,25%	85,14%	85,41%	84,97%
DIFF. OF E	83,63%	85,80%	86,15%	85,40%
DIFF. OF W	94,33%	94,50%	90,73%	94,58%
FLUID/HOLE				
B1	155	87	46,60	49,30
B2	155	94	49,90	53,20
B3	145	91	48,80	51,20
B4	165	99	52,40	56,20
B5	175	99	52,80	57,90
AVERAGE	159,00	94,00	50,10	53,56
DIFF. OF A	111,19%	105,15%	104,90%	106,48%
DIFF. OF C	109,66%	99,58%	99,72%	101,63%
DIFF. OF D	90,34%	89,52%	89,59%	90,47%
DIFF. OF E	92,98%	90,21%	90,37%	90,93%
DIFF. OF W	104,88%	99,37%	95,17%	100,71%
FLUID/HOLE				
C1	140	93	49,60	52,10
C2	140	97	51,30	53,80
C3	160	98	52,00	54,80
C4	140	90	48,10	49,70
C5	145	94	50,20	53,10
AVERAGE	145,00	94,40	50,24	52,70
DIFF. OF A	101,40%	105,59%	105,19%	104,77%
DIFF. OF B	91,19%	100,43%	100,28%	98,39%
DIFF. OF D	82,39%	89,90%	89,84%	89,02%
DIFF. OF E	84,80%	90,60%	90,62%	89,47%
DIFF. OF W	95,65%	99,79%	95,44%	99,10%
FLUID/HOLE				
D1	165	103	54,50	57,80
D2	185	105	56,10	59,30
D3	175	106	56,40	59,40
D4	175	104	55,60	59,00
D5	180	107	57,00	60,50
AVERAGE	176,00	105,00	55,92	59,20
DIFF. OF A	123,08%	117,45%	117,09%	117,69%
DIFF. OF B	110,69%	111,70%	111,62%	110,53%
DIFF. OF C	121,38%	111,23%	111,31%	112,33%
DIFF. OF E	102,92%	100,77%	100,87%	100,51%
DIFF. OF W	116,09%	110,99%	106,23%	111,32%
FLUID/HOLE				
E1	175	100	53,20	56,20
E2	170	101	54,20	57,90
E3	170	104	55,60	58,50
E4	165	105	55,80	59,20
E5	175	111	58,40	62,70
AVERAGE	171,00	104,20	55,44	58,90
DIFF. OF A	119,58%	116,55%	116,08%	117,10%
DIFF. OF B	107,55%	110,85%	110,66%	109,97%
DIFF. OF C	117,93%	110,38%	110,35%	111,76%
DIFF. OF D	97,16%	99,24%	99,14%	99,49%
DIFF. OF W	112,80%	110,15%	105,32%	110,76%
FLUID/HOLE				
W1	152	95	59,10	54,50
W2	152	95	51,10	53,40
W3	151	95	51,10	52,40
W4	150	94	51,10	52,70
W5	153	94	50,80	52,90
AVERAGE	151,60	94,60	52,64	53,18
DIFF. OF A	106,01%	105,82%	110,22%	105,73%
DIFF. OF B	95,35%	100,64%	105,07%	99,29%
DIFF. OF C	104,55%	100,21%	104,78%	100,91%
DIFF. OF D	86,14%	90,10%	94,13%	89,83%
DIFF. OF E	88,65%	90,79%	94,95%	90,29%

Printed

04. Sep 07



Description

CUT = Maximum torque encountered during the cut.
 MEAN = Mean value of torque exerted over the depth of the cut.
 STAT = Mean value from Statistics screen
 STD DEV = Standard Deviation number from Statistics screen

FLUID/HOLE = Example - Fluids No.1 to No.5 used / Hole sequence tagged on bar.

FLUID W = Standard fluid for comparison / REFERENCE

The MEAN value is the evaluation statistic of true energy extended.

Material 1.4571 (V4A) Plates with blindhole

Plate - 150mm X 150mm with 3.8mm diameter holes with drilled 10 mm depth
 Measurement-Tool Emuge M4-6HX 1Drück-S

MEGATAP II-G8 1000RPM / 8mm depth

WinPCA - Measurement equipment

Fluid Comparative Analysis

Summary:	Fluid	MValue	MDeviate	WDeviate
	A	89,40	91,79%	94,50%
	B	94,00	96,51%	99,37%
	C	94,40	96,92%	99,79%
	D	105,00	107,80%	110,99%
	E	104,20	106,98%	110,15%
	W			94,60
Mean		97,40	100,00%	

MValue = average of mean values from each fluid.

MDeviate = percent of deviation from the average mean value.

WDeviate = percent of deviation from the sample fluid mean.

The lowest deviation percentage is under the prepared

conditions the best lubricity.

The smaller torque value for same work determines

the best performance of the tapping tool.

Fluid Standard Deviation Analysis

(a measure of smooth cutting)

Summary:	Fluid	Std Dev	MDeviate	WDeviate
	A	50,30	91,57%	94,58%
	B	53,56	97,50%	100,71%
	C	52,70	95,94%	99,10%
	D	59,20	107,77%	111,32%
	E	58,90	107,22%	110,76%
	W			53,18
Mean of StdDev		54,93	100,00%	

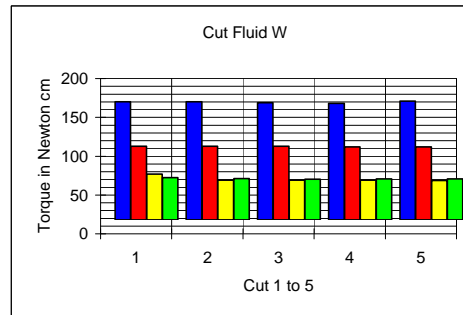
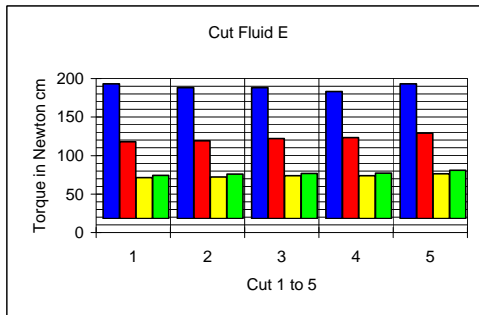
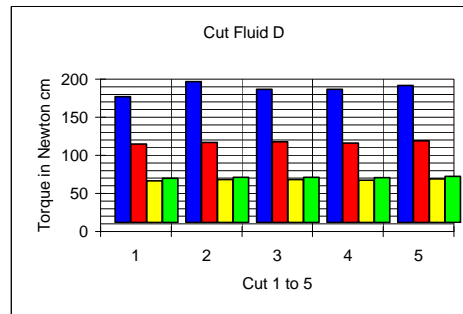
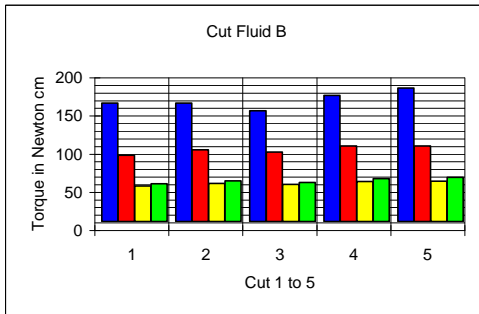
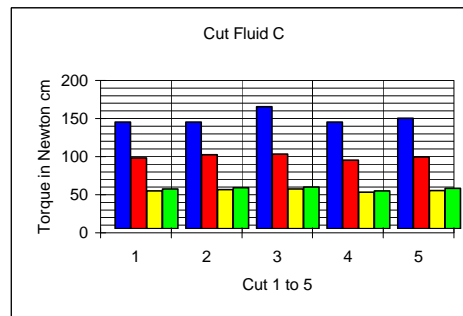
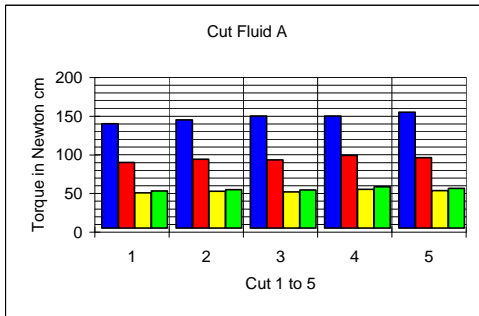
- A = No.1
- B = No.2
- C = No.3
- D = No.4
- E = No.5
- W= Standard Rape Oil (w/o ads)

Test performed by microtap Germany

Oliver Posch - Roger Rowley - K. M. Mueller

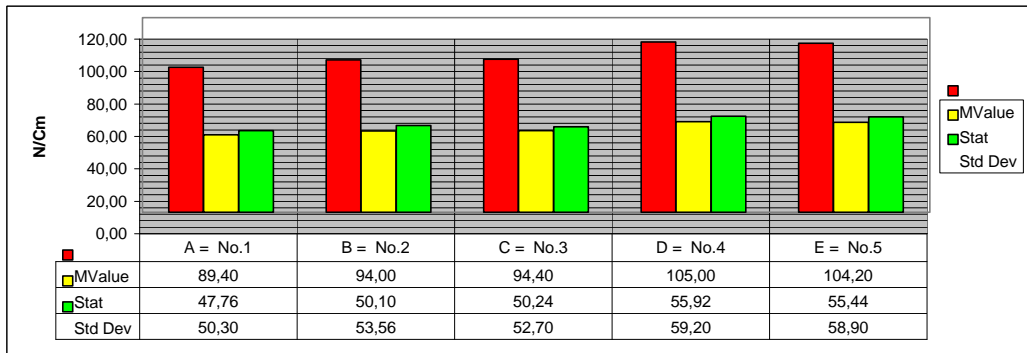
Test conducted May 2007

M4 BLINDHOLE TO 6MM 1.4571 Forming



CUT MEAN STAT STD DEV

CUT = Maximum torque encountered during the cut.
 MEAN = Mean value of torque exerted over the depth of the cut.
 STAT = Mean value from Statistics screen
 STD DEV = Standard Deviation number from Statistics screen





TTT

Tapping Torque Test System Thread Tapping Technology - Process controlled tapping production



labtap

...the High-Tec Product- & Laboratory Test-System

The optimum line for Process Controlled Production and Laboratories includes the latest **WinPCA analysis and evaluation software** to compare procedures for best production results:

Automatic data acquisition and storage of production parameters used in the manufacturing process to develop quality protocol and solutions

Quality assurance and statistical analysis is based on sanctioning of accrued data

For development to determine the best tool geometry and coatings as well as for lubricant cooling ingredients and emulsions

Real time monitoring of the manufacturing process to help determine the effects of operating parameters including lubrication and tool function



Specials

Consultation and training can be arranged

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TTT

“Process controlled Production” with WinPCA PC-Control and Data Acquisition Software

Thread tapping incl. program for screw setting and insert screwing production units
with reliable quality assurance including all statistical data and documentation

On the production line

- for establishing optimum operating values before a production run
- for quality control during production. If quality drops below limit, production can be stopped automatically
- for failure modes and effects analysis
- for economic production in accordance with ISO 9000 (BS 5750) requirements, complete with QA documentation and certificates
- for thread cutting and forming, 100% control of quality is maintained

For manufacturers of taps and lubricants

- to deliver the R & D tools for comprehensive analysis and product effectiveness
- to establish the optimum operating parameters for developing better products

With WinPCA it is possible

- to optimize the operating parameters to ensure the desired tool life and the production of threads within ISO quality limits,
- to record applied torque and tapped depth for all threads and to evaluate the results statistically,
- to identify and rectify potential faults (such as cold welds) by measuring increase in torque due to worn taps or lack of lubricant,
- to ensure correct tapping by monitoring torque values to stay within preset limits,
- to evaluate the effectiveness of lubricant, tool geometry and coating as operational factors

Most displayed data can be stored and may be printed out on an associated printer as documentary evidence, or can be further processed under with a spreadsheet program



labtap II-G8

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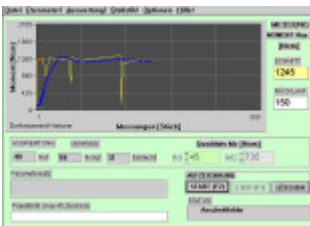


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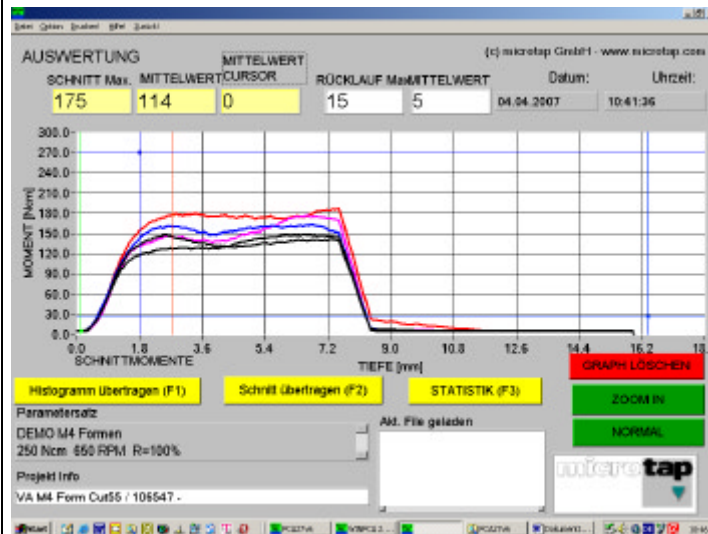
Tapping Torque Test System

The Histogram

Shows the number of good and bad parts produced with the percentage total of good parts. Applied instantaneous torque is indicated and the histories of maximum and minimum torque values are shown by a continuous graph, to insure maintaining limits required for production within specified tolerances. This will graph the prior 300 hits to observe performance and tool wear



The display of cutting process



Display of cutting process with torque plotted against depth. This display permits optimum parameters to be established and faults to be avoided. New **autosave** function stores all or selected CUT files for further processing with a spreadsheet program.

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The laboratory system TTT

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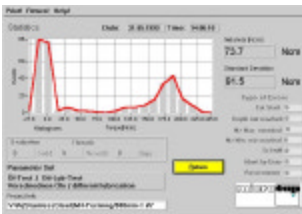
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Display of cutting process with torque plotted against depth. This display permits optimum parameters to be established and faults to be avoided. New **autosave** function stores all or selected CUT files for further processing with a spreadsheet programme

The Statistics

Quality control is documented by displaying applied torque as a bar chart of values, plus mean value and standard deviation

Purpose computes the standard deviation and the mean (average) values of the input array. The formulas used to find the mean and the standard deviation are as follows:



$$\text{Average / meanval} = \sum_{i=0}^{n-1} x_i / n$$

$$\text{StdDev} = \sqrt{\sum_{i=0}^{n-1} [x_i - \text{ave}]^2 / n}$$

Meanvale / Arithmetic method:

The expression is called arithmetic methods of n sizes

a_1, a_2, \dots, a_n

$$c_A = \frac{a_1 + a_2 + \dots + a_n}{n} = \frac{1}{n} \sum_{k=1}^n a_k$$

For two sizes a and b emerges:

$$c_A = \frac{a + b}{2}$$

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Thread tapping machines Machines

microtap – megatap – jobtap

G2 Thread capacity

(DIN13, sheet 34 / 1,2 x D)

Torque range Mz
Spindle speed range
Thread depth / stroke max.
Software special

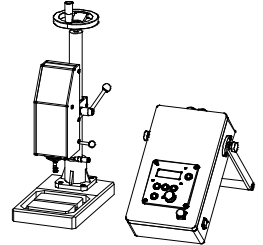
Spindle B6 / ER8

M0.5 - M2 X5CrNi189 / 1.4435
M0.5 - M2 9sMn28 / 1.0715
M0.5 - M3 AlCuMgPb / 3.1645

2 - 65 Ncm
150 - 1000 RPM
30 / 32 mm

- Tapping torque display min/max. Mz
- Lubrication pulse control
- Chip clearance function
- Automatic Start / QS and SZ - control
- 50 programmable data memories

Tap adapter chuck holder system holder
system complete with 5 adapters (1,0 mm to 3,0 mm)



G5 Thread capacity

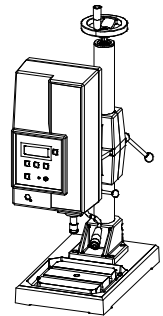
(DIN13, sheet 34 / 1,2 x D)

Torque range Mz
Spindle speed range
Thread depth / maximum stroke
Spindle B10 / 00

M1 - M4 X5CrNi189 / 1.4435
M1 - M5 9sMn28 / 1.0715
M1 - M6 AlCuMgPb / 3.1645

5 - 220-Ncm
250 - 2200 RPM
45 / 65 mm

Quick change system SWS0 & 5 Inserts
DIN371/ M0,8-1,8/ M2-2,6/ M3/ M4/ M4,5-6



G8 Thread capacity

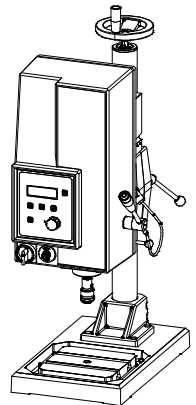
(DIN13, sheet 34 / 1,2 x D)

Torque range Mz
Spindle speed range
Thread depth / maximum stroke
Spindle B12 / 01

M2.5 - M8 X5CrNi189 / 1.4435
M2.5 - M10 9sMn28 / 1.0715
M2.5 - M12 AlCuMgPb / 3.1645

50 - 700 Ncm / ab 470 Ncm max. 2060 RPM
300 - 3000 RPM
75 / 85 mm

Quick change system SWS1 & 6 Inserts
DIN371/ M2/ M3/ M4/ M4,5-6/ M8/ M10



G14 Thread capacity

(DIN13, sheet 34 / 1,2 x D)

Torque range Mz
Spindle speed range
Thread depth / maximum stroke
Spindle B12 / 01

M3.5 - M12 X5CrNi189 / 1.4435
M3.5 - M14 9sMn28 / 1.0715
M3.5 - M16 AlCuMgPb / 3.1645

120 - 1680 Ncm / ab 1128 Ncm max. 858 RPM
125 - 1250 RPM
75 / 85 mm

Quick change system SWS2 & 7 Inserts
DIN371/374/376 / M3/ M4/ M4,5-6/ M8/ M10/ M12/ M14

G16 Thread capacity

(DIN13, sheet 34 / 1,2 x D)

Torque range Mz
Spindle speed range
Thread depth / maximum stroke
Spindle B12 / 03

M4 - M14 X5CrNi189 / 1.4435
M4 - M18 9sMn28 / 1.0715
M4 - M20 AlCuMgPb / 3.1645

150 - 2100 Ncm / ab 1430 Ncm max. 690 RPM
100 - 1000 RPM
75 / 85 mm

Quick change system SWS3 & 9 Inserts (SWS2 G14)
Including 9 inserts DIN371 M4-M10 DIN374/376 M4,5-20

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Machines Overview.doc

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Thread tapping technology All-in-One

Assignment

Machine Types / Stainless Steel

G2 / M0,5 – M2

G5 / M1 – M4

G8 / M2,5 – M8

G14 / M3 – M12

G16 / M4 – M14

Machine Software / Functions

Language selector GB/F/NL/B/DK/S/I/D	
Metric / Inch selector for tap and depth of cut	
Ncm Torque control setting, minimum – maximum	
Fast, normal and slow return speeds	
Motor rotation right or left-hand thread	
Auto start with position depth control, with ZAPtap option	
Cutting force start sensor, only with ZAPtap option	
User data storage for 40 different parameters	
Single and total thread / part counter	
Variable chip clearance function / Titanium chip function	
Lubricant control with pulse and timed flow	

Further production features

Program for thread cutting and forming	
Program for thread inserts / Ensaf / Helicoil / Kato	
Program for screw setting, secondary hole (similar reaming)	
Continuous motor running for counter-sinking	

Serial interface

RS232 / V24 interface	
Printtap QND Software for quality printer / RS232	
WinPCA - Data acquisition software / RS232	
Customer specific special software for automation	

Parallel interface

I/O port / parallel interface with four isolated outputs	
Control software for one 24 Volt DC Valve (I/O)	

Machine software & functions

microtap / megatap	jobtap	labtap
for very small threads	-	Laboratory-
for small threads	jobshop	& automation
Units with	machines	controlled unit
interfaces incl.	without scrap	Incl. statistics
quality-protocol	and breakage	through Gauss

microtap / megatap	jobtap	labtap
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+
+	+	+

+	+	+
+	-	+
+	-	+
+	-	+

+	-	+
€	-	€
€	-	+
€	-	€

+	-	+
+	-	+

+ = included / € = option / - = not available

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Software-Functions & Production features



Thread tapping technology All-in-One

Accessories

This is an overview of accessories for the different tapping machines. The functions of the accessories are explained on separate data sheets

Accessories / product groups	microtap / megatap	jobtap	labtap
ZAP controlled pneumatic feeding system	+	+	+
MMS minimum quantity lubrication unit	+	+	+
DSK twintap double-spindle head adapter	+	+	+
MLM spottap magnetic machine light	+	+	+
LSM cleantap spindle motor air seal	+	+	+
SVH heighttap column upgrade -- manual	+	+	+
SVE column height adjustment -- electrical	+	+	+
HVS horitap horizontal reach adjustment	only G5/G8	only G5/G8	only G5/G8
SWS standard-set quick change tool holder system	+	+	+
SWE standard quick change tool inserts	+	+	+
SZS optional fixed collet holder system	+	+	+
SSB keytap security key	only G8/G14/G16	only G8/G14/G16	only G8/G14/G16
MPT matrixtap manual positioning table	+	without interface	+
APT XY-autotap controlled positioning table	+	+	-
MTA mechanical depth system	+	+	+
ASL signaltap audible signal light	+	-	+
QND printtap serial printer for quality reports	+	-	+
WinPCA Data acquisition software / RS232	+	-	+

+ = available / - = not available

... the tap protector —

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AllinOne-Options-ProductOverview

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References

TTT Tapping-Torque-Testsystem labtap & WinPCA

Tap manufacturers

Boss Jakob	Germany / Ungarn
DC Daniel Charpilloz	Switzerland
CD Tech	Switzerland
EMUGE	Germany
Gühring	Germany
Fraisa	Switzerland
FANAR	Poland
GWG Gabrovo	Bulgaria
Hanson Whitney	USA-CT
Hoffmann / Garant	Germany
Jarvis Cutting Tools	USA-NH
Linig	Germany
Link / JEL	Germany
Manigley	Switzerland
Narex	Tschechien
Prototyp PWZ	Germany
PWA	Germany
Schäublin / Eso	Switzerland
Sutton Tools	Australia
Völkel / Werkö	Germany
Yamawa / Garant	Japan / Germany

Lubricant- & Coating - Industry

& Laboratory

Afton	USA-VA
AGFA	Germany
American Saw	USA-MA
AMCOL	USA-MI
Balzers	Switzerland
Benz Oil	USA-WI
Belgin Madenie Yaglar	Türkei
Binol Filium	Sweden
Blaser Swisslube	Switzerland
Blue Chip Metallworking Fluids	USA-IN
Buhmwoo Chemicals	Korea
Chai	Israel
Chemetall Oakite	USA-NJ
Century Oils	Canada
Coral Chemical	USA-IL
Cincinnati Vulcan Oil Company	USA-OH
Cimcool	Netherlands / USA
Clariant Corp.	Germany / Japan / USA-NC
Customs Synthetics	USA-SC
D.A. Stuart	USA-IL / Canada
Degussa Goldschmidt Chemical	USA-VA
DOG	Germany



References

Lubricant- & Coating - Industry

& Laboratory

Diversified Chemical	USA-MI
DNR / University Illinois	USA-IL
Dover Chemical	USA-OH
Fuchs Lubricants	USA / Canada / Great Britain / Spain / India / China / Korea
Ferro (Dover) / Keil Chemical	USA-IN
Georgia-Pacific / Actrachem	USA-IL
Georgia-Pacific / Resins	USA-GA
General Motors / R&D	USA-MI
Guangzhou Research Institute	China
Henkel	USA-MI / Germany / China
Hangsterfer's Laboratories	USA-NJ
Hoechst Celanese	Germany / USA
Holzauer	Germany
Houghton International	USA-PA / Germany
Innovative Machining Technologies	USA-IL
LubeRos	USA-NC
Loctite	USA-CT
Lubrizol	Germany / USA-SC
Master Chemical	USA-OH
Milacron	USA-OH
Mineralölwerk Osnabrück / TOTAL	Germany
Nalco Chemical	USA-IL
Nippon Grease	Japan
Oemeta	Germany
Oilstore	Switzerland
PCC Chemax	USA-SC
Polartech Additives	USA-IL
Process Solutions	USA-MA
PTT Research & Technology Institutue	Thailand
Rhenus	Germany
Rhein Chemie	Germany
Rocol	Great Britain
Rock Valley Oil & Chemical	USA-IL
Ruetgers Organics (Sunbelt Lub.)	USA-SC
Shanghai Yushiro Chemical	China
Shell Global Solutions	USA-TX
Solutia Inc.	USA-MO
Spartan Chemical	USA-OH
Sunbelt Lubricants	USA-FL
Tapmatic do Brazil	Brazil
Unaxis Balzers	Lichtenstein
Uniqema / Croda / ICI	USA-DE
University of Michigan	USA-MI
University of Illinois	USA-IL
Yuma Industries	USA-IN / Japan
Yushiro Chemical	Japan
WfB's	Nuernberg / Suhl u.v.a
ZET Chemie	Ehingen

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März 08

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References_TTTsystem.doc



**Thread Tapping Technology
References**

Tap manufacturers

Boss Jakob	Germany / Ungarn
DC Daniel Charpilloz	Switzerland
CD Tech	Switzerland
EMUGE	Germany
Gühring	Germany
Fraisa	Switzerland
FANAR	Poland
GWG Gewindewerkzeuge Gabrovo GmbH	Bulgaria
Hanson Whitney	USA
Hoffmann / Garant	Germany
Jarvis Cutting Tools, Inc.	USA
Linig	Germany
Link / JEL	Germany
Manigley	Switzerland
Narex	Tschechien
Prototyp PWZ	Germany
PWA	Germany
Schäublin / Eso	Switzerland
Sutton Tools	Australia
Völkel / Werkö	Germany
Yamawa / Garant	Japan / Germany

Lubricant & Coating Industry

Afton	USA
AGFA	Germany
AMCOL	USA
Balzers	Switzerland
Benz Oil	USA
Binol Filium	Sweden
Blaser Swissslube	Switzerland
Blue Chip Metallworking Fluids	USA
Buhmwoo	Korea
Century Oils	Canada
Coral Chemical	USA
Cimcool	Netherlands / USA
Clariant	Germany / Japan / USA
Customs Synthetics	USA
D.A. Stuart	USA / Canada
Degussa Goldschmidt Chemical	USA
Dover Chemical	USA

labtap & WinPCA

Laboratory comparison analysis & acquisition systems

& Laboratory

Thread Tapping Technology References



Lubricant- & Coating - Industry & Laboratory

Diversified Chemical	USA
Fuchs Lubricants	USA / Great Britain / Germany / Canada
Ferro / Keil Chemical	USA
Georgia-Pacific Resins	USA
General Motors / R&D	USA
Guangzhou Mech. Eng. Research Institute	China
Henkel	USA / Germany / China
Hangsterfer's Laboratories	USA
Hoechst Celanese	Germany / USA
Holzauer	Germany
Houghton International, Inc.	USA
Innovative Machining Technologies	USA
LubeRos	USA
Loctite	USA
Lubrizol	Germany / USA
Master Chemical	USA
Mineralölwerk Osnabrück / TOTAL	Germany
Nalco Chemical	USA
Nippon Grease	Japan
Oilstore Ltd.	Switzerland
Process Solutions	USA
Rhenus	Germany
Rhein Chemie	Germany / USA
Rocol	Great Britain
Ruetgers Organics (Sunbelt Lub.)	USA
Shell Global Solutions	USA
Spartan Chemical	USA
Tapmatic do Brazil	Brazil
Unaxis Balzers	Lichtenstein
Uniqema / ICI	USA
University of Michigan	USA
University of Illinois	USA
Yuma	USA / Japan
Yushiro	USA / China
WfB's	Nuernberg / Suhl u.v.a
ZET Chemie	Ehingen

Thread Tapping Technology References

microtap



Process controlled production & laboratory line
with comparison analysis & acquisition system

Industry Most important customers

Airbus	Howmedica
AEG	Honeywell
Aesculap	INA
ARRI Arnold & Richter	Jaeger - Le Coultre
Alcatel	Junghans
Allweier	LEGO
AGFA	Liebherr Aerospace
Astrium	Mahr
BOSCH	Maxon Motor
BMW	MAMNESMAMM / Demag
Bell Helicopter	Max-Planck-Gesellschaft
Böhm & Wiedemann	Marconi
Budweg	Miele
Ceramtec	Nobelpharma
Cern	OSRAM
DASA	Patek Phillippe SA
DaimlerChrysler	PHILIPS
Dornier	Piguet & Cie. S.A.
DOM	Rhode & Schwarz
EADS	Rodenstock
Emmen Flugzeugwerke (Aircraft)	SIEMENS
ETA	Sitec Aerospace
FAG	SKF
Fraunhofer Institute	Universities Munich/Zürich/Berlin/Stuttgart etc.pp
Gardena	VDO
Hoffmann	VW
Heidenhain	Witte
Hella	ZEISS

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