



TTT Tapping-Torque-Testsystem
Laboratory "screening- and analysis"
measurement system

"When monitoring lubricants"

For customer of the
lubricant industry

Dear Customer

Thank you very much for your interest in our new
„**TTT Tapping-Torque-Testsystem**“ incl. the smart
developed WinPCA3 "**screening and analysis
software**" and integrated manual X-Y-positioning
system MPT for safe handling

The **TTT**system is equipped with all needed
components to produce measurements without faults
based to the microtap **TTT**methodology

Tapping-Torque-Testsystem

TTTsystem

labtap G8, WinPCA3, ZAP & MPT
technical specifications see encl. Datasheets

€ 29.000,00

TTT Measurement-Starter-Set

Please select 5 x Aluminium and 3 x Steel TTT_testbars

8 TTT-testbars and 15 TTT-tools

€ 3.200,00

Total

€ **32.200,00**

Two day **schooling** foreign countries
Plus flight and hotel expenses

€ 500,00

[Upgrade WinPCA3](#) V2.7 – 2.7V6

€ 1.000,00 V2.7 – 2.7V6

The Win**Trial** testversion is fully operative for a period of
30 days free of charge. All data files of old measurements
can be loaded and analysis with new functions incl.
telephon-support for quick instruction

2.500,00 V2.5 – 2.6V3

Conditions

Alterations reservations

Packing

4 – 5 special multiple boxes 450,-- €

Pricing in Euro

ex work, exc. packing, without sales tax

Warranty

24 month

Payment

In advance

Delivery terms

[Terms of delivery](#) of microtap GmbH

Validity of this offer

Until **15th May 2010**

If you have any further questions, please do not hesitate
to contact us again

Sincerely Yours

Klaus Maximilian Mueller

microtap GmbH / TTT Systems

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Tel +49-89-61279213 (6128051) / Fax +49-89-6127488

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

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TTT_System-OFFER.doc



April 2010

TTT Tapping-Torque-Testsystem

Laboratory "screening- and analysis"
measurement system

TTTsystem - When monitoring lubricants

Torque controlled „Laboratory-Complete-System“

Easy laboratory system in method, handling and software.
Designed with automatic in feed device, integrated X-Y-positioning table for aligned positioning as well as for recording of series of measurement plus analysis of results

Range of performance

TTTsystem / labtap G8

With Measurement-Methodology and TTT-Equipment

Range of measurement torque
Range of speed

50 - 700 Ncm
300 - 3000 RPM

ZAP

Z-axis balanced feeding system with special start-functions for easy operations in laboratories

MPT

Integrated manual X-Y-positioning table for exactly controlled handling and TTTsystem-start for faultless measurements

TTT_Software WinPCA3

PC-screening & analysis software for comparative value observation with allocated storage of definable series of measurement plus an analyser for individual automatic analysis including flexible differentiations of various single- and series of measurement results
Please see separate information sheet

TTT_Measurement-Equipment

Application / Features

- For evaluation & development:
 - of cooling lubricants (MWF), metal processing lubricants and neat and soluble oils (Multiple Evaluation System MES)
 - of sales and distribution arguments (acquisition) and honest customer-support (screening) for best production results and customer's benefit (added value)
 - of quality control procedures for the lubricant production (final-control)
- For evaluation & development of optimized tap tool geometries and tool coatings
- For achievement of optimized production parameters
- For analysis of errors and influences (FMEA)
- For process-controlled and safe production regarding quality standard ISO 9000 with quality assessment including protocol

Characters / Advantages / Benefits

- Easy and fast handling for faultless measurement results
- With flexible analyser for direct evaluations and interpretations
- Multiple Evaluation System (MES)

microtap GmbH / TTTsystem - when monitoring lubricants

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TTT_Overview.doc



March 2010

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Technical data

Measurement capacity labtap G8

Testbars-Material / Forming and Cutting

TTT_Methodology

Spindle speed range RPM

Measurement depth depends on TTTmethods

Column with hand crank

Spindle/worktable distance max.

Width / depth / height

Mains voltage / power consumption

TTTsystem - labtap G8 / ZAP / MPT / WinPCA3-SW

50 – 700 Ncm / M4F/S / Special thread measurement tools

Aluminium / Carbon and Stainless Steel / INOX / Titan grade 5

Recommended TTT-tools M4F (forming) and M4S (cutting)

300 - 3000 RPM / infinitely variable / from 470 Ncm max. 2060 RPM

6 – 8 – 12 mm

750 mm adjustable

0 - 400 mm distance

320 / 475 / 1290 mm

230 Volt / 50 - 60Hz / 2900 Watt

ZAP pneumatic "counter balance" feeding system

MPT controlled / accessed integrated

smooth-slide manual X-Y-positioning table

Compliance to safety regulation

Parallel interface

Serial interface

TTT-Laboratory finish

Operation

Error messages

Machine-Software

2 –5 bar / Hose 4/6 mm without service unit

250 x 600 mm with 8 mm T-nut incl. fixing equipment

with 2 special auto-start control functions for exactly handling and system-start for faultless measurements

CE / EMV conform (GS Certification Germany)

I/O parallel / galvanic isolated / PLC-compatible

RS232 (V24) 9600 Baud / galvanic isolated

RAL 1015 bright ivory

Menu driven / PC with WinPCA-software

Acoustic alarm / I/O / RS232 / display with error message

Language selector D/GB-E/F/NL/B/DK/S/I

Metric / Inch selector for tool-size and depth of measurement tableau

Ncm torque control setting / Mz min. – max. (torque-window)

Fast, normal and slow reverse speeds / Right or left-hand drive

Automatic start programs with position depth control and controlled fixing

Pneumatic feeding force FZ with start sensor

Variable automatic chip clearance parameter / settings

Program for lubricant control with pulse and time-flow (for MMS)

Program for measurement-tools (cutting and forming and special-tools)

Program for thread inserts & -sockets / Program for screw setting

Program for motor continuous running left/right i.e. sinking / second drilling

I/O port for automation / instep-stick / cylinder / 24V/DC

TTT_Software WinPCA3

PC-Screening & analysis software for comparative value observation

with allocated storage of definable series of measurement plus an analyser for individual analysis including flexible differentiations of various single- and series of measurement results etc.pp.

Collet chuck incl. collet for TTT-tool / range 5-4 mm (SZS1)

Measurement-tool-holder system

Delivery and training

Packing

Conditions

Pricing €

Payment terms

Warranty

Delivery terms

Alterations

On site 1-2 day training on request / recommended

Multiple special-boxes 450,00 €

[General delivery conditions](#) of microtap GmbH

Ex work, excl. packing, without sales tax

Payment in advance

24 months

Approx. 4-8 weeks after incoming order

Reservations

info@microtap.de

TTT_System-G8E.doc

microtap GmbH / TTTsystems - when monitoring lubricants

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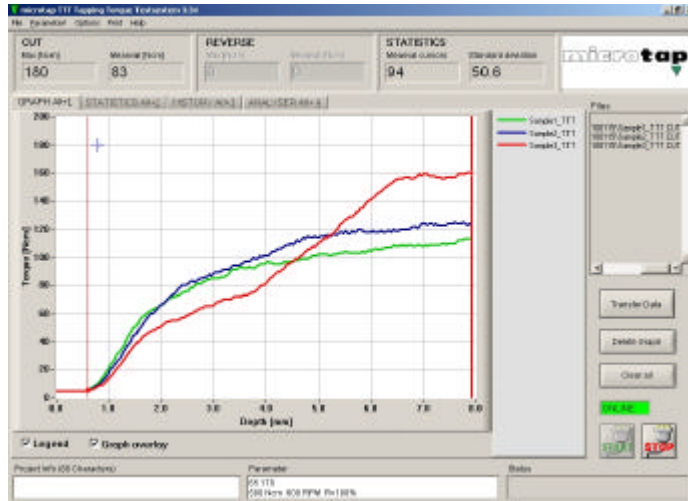


March 2010

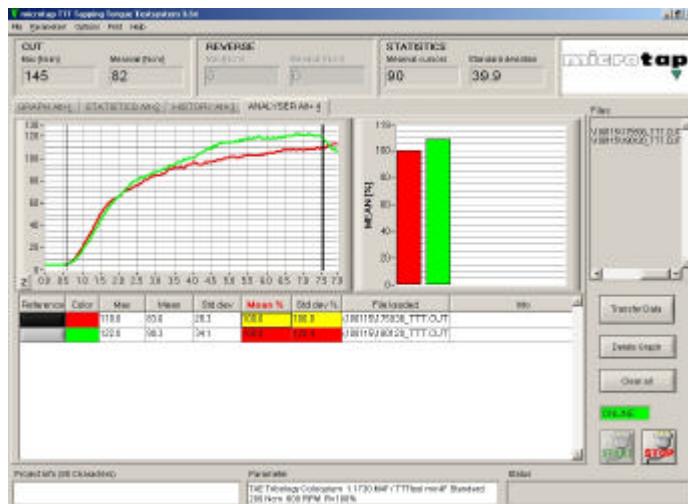
TTT_Tapping-Torque-Testsystem
 New development for the request
 of the MWF / Lubricant-Industry

WinPCA3 - „Monitoring & Analysis Software“

Measurement process



Analyser



Measurements are compared (process quality controlled) and values displayed on the screen as a graph, with applied torque shown as a bar chart. The formulas used to find the mean & the standard deviation are as follows

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

Mean value / Arithmetic method

The expression is called arithmetic methods of n sizes a_1, 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
$$c_A = \frac{a + b}{2}$$

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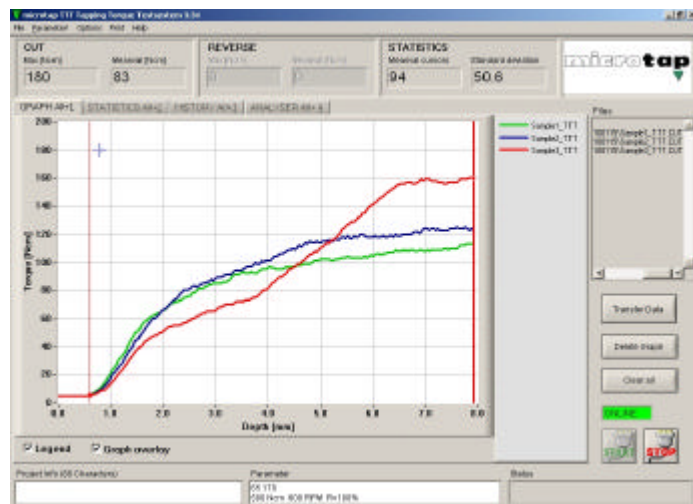
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 “When monitoring lubricants”

WinPCA3 - „Screening & Analysis Software”

Practical Example

Your Customer is testing a new tool to improve productivity with higher cutting speeds and a similar or longer tool life.

This may lead to the conclusion that your water miscible fluid (emulsion) or „neat oil” is no longer helpful because the additives may not affect its power! Lower friction for example, caused by the new tool (coating!), lowers operating temperature



Results and analysis

Your lubricant may not improve the results, or with higher temperatures (caused by resistance), your additives may burn off

Consider this example

The **green** graph displays the torque with the uncoated tool. The **blue** graph displays the coated new tool

Now let us try to construct the following hypothesis: Regarding the lower resistance caused by the coating, the additive do not reach temperature. The negative effect is that your lubricant works on half power and therefore the torque becomes higher because the coating effect does not allow your good working additive to function

The **red** graph displays, the other assumption or possibility, that the coating and additives are working well in the beginning – but in the end the additives are burnt off due to higher temperature, caused by “high speed”

Please note that each graph is the result out of ten measurements – we call it „summary.cut” – and for each product – shown in the graph – we used a new tapping tool



TTT_Tapping-Torque-Testsystem
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Measuring tools & test bars

Conditions and tolerances

The following test materials and test tools will be delivered in consistent quality every time or will be used for customer specific laboratory examinations / requirements. **Further complementary test-methods** and -materials are in treatment

TTT_Laboratory Testbars

Aluminium

AlMgSi1 / 3.2315 / EN 6082 (AlSi/SAE/ASTM)
Hardness R_m 420-450 N/mm² / $R_{p0,2}$ 340-370 N/mm²
Ultimate elongation A 5 > 5-7% / 140 HB / $R_{p0,2}$ min. 340 N/mm²

AlZnMgCu0,5 / 3.4345 / EN 7022 (AlSi/SAE/ASTM)
Hardness R_m 420-450 N/mm² / $R_{p0,2}$ 340-370 N/mm²
Ultimate elongation A 5 > 5-7% / HB 140 / density 2.78 Kg/dm³

AlZnMgCu01,5 / 3.4365 / EN 7075 (AlSi/SAE/ASTM)
Hardness 420-450 N/mm² / $R_{p0,2}$ = 420 N/mm²
Ultimate elongation A 5 > 5-7% / HB 140 / density 2.78 Kg/dm³

G-AlSi12cu / 3.2583 / GD-3-2983
Hardness R_m 150-290 N/mm² / $R_{p0,2}$ 80-130 N/mm²
Ultimate elongation A 5 (1-3,5%) / HB 50 / density 2,65 Kg/dm³

Price each test bar
Price for delivery 5 resemble pieces

€ **300,-- / pcs.**
€ **250,-- / pcs.**

Dimensions & Methods

Test bar sizes: 125 x 47 x 18 mm with counter sinking
140 drilled array at 6 mm for TTT StandardTools – M4F and M4S
- Diameter 3,7mm / 15 mm depth for TTT-Tool M4F
- Diameter 3,3mm / 15 mm depth for TTT-Tool M4S

TTT_Tools / microtap AL measuring tools

TTT-Tool M4F Standard (vaporised / nitrated forming)
TTT-Tool M4S Standard (blank or nitrated cutting)
TTT-Tolerance-gauge M4F and/or M4S

Price for delivery 10 pieces
Single price

€ **500,-- / total**
€ **60,-- / pcs.**



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Measuring tools & test bars

"When monitoring lubricants"

TTT_Laboratory Testbars

Steel / Titan

Carbon steel

C45N/C45E / 1.1730 (Ck45 / 1.1191) / AiSi/SAE/ASTM -1045
Hardness R_m 600N/mm² / 175 HB / 85 PSIx1000
Ultimate elongation A 5 (%) > 14 / $R_e > 355$ N/mm²

Price each test bar
Price for delivery 5 resemble pieces

€ **400,-- / pcs.**
€ **320,-- / pcs.**

Stainless Steel

X6CrNiMoTi17-12-2 / 1.4571 (V4A) / AiSi/SAE/ASTM - 316Ti
Hardness 725N/mm² / 225 HB / 112 PSIx1000
Ultimate elongation A 5 (%) > 40 / $R_m = 775$ N/mm²

Price each test bar
Price for delivery 5 resemble pieces

€ **460,-- / pcs.**
€ **370,-- / pcs.**

Heat treated steel

42CrMo4V - / 1.7225 (CrMo4) / AiSi/SAE/ASTM - 4140
Hardness R_m 1100N/mm² / 300 HB / 145 PSIx1000
Ultimate elongation A 5 (%)

Price each test bar
Price for delivery 5 resemble pieces

€ **500,-- / pcs.**
€ **400,-- / pcs.**

Titan Grad 5

TiAl6V4 / 3.7164 (T-A6V) 49-11/-28/-35/-54/-65/-67 (AiSi/SAE/ASTM)
Hardness R_m 1150N/mm² / 340 HB / 163 PSIx1000 / 36 HRC
Ultimate elongation / R_e m²

Price each test bar
Price for delivery 5 resemble pieces

€ **600,-- / pcs.**
€ **500,-- / pcs.**

Dimensions & Methods

Testbar sizes: 125 x 47 x 18 mm with counter sinking
140 drilled array at 6 mm for TTT-Tools – M4F and M4S
- Diameter 3,7mm / 15 mm (3xD) measurement range for TTT-Tool M4F
- Diameter 3,3mm / 15 mm (3xD) measurement range for TTT-Tool M4S

TTT_Tools / microtap measuring tools

TTT-Tool M4F Standard (vaporised / nitrated forming)
TTT-Tool M4S Standard (blank or nitrated cutting)
TTT-Tool M4F-T for Titan applications (**new**)
TTT-Tolerance-gauge M4F and/or M4S

Price for delivery 10 pieces
Single price

€ **500,-- / total**
€ **60,-- / pcs.** (TiAl6V4 – 80 € / pcs.)

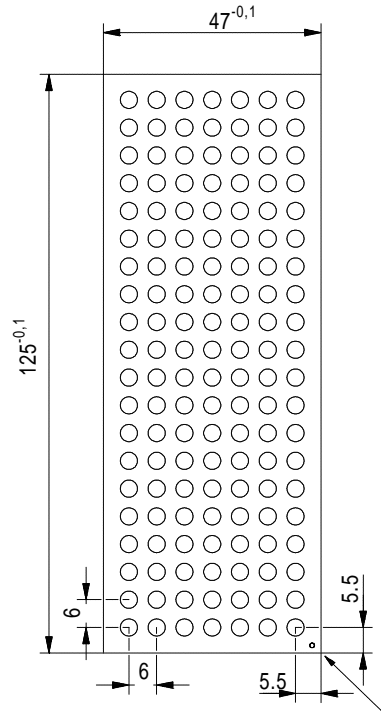
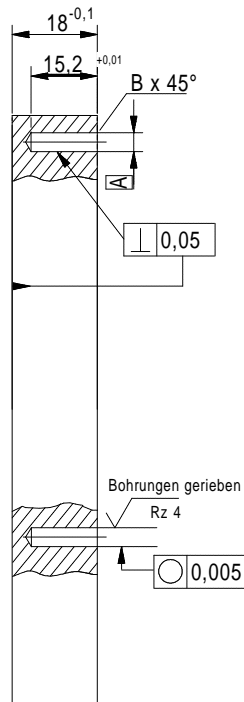
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Measuring test bars

Material conditions / tolerances
 for Standard TTT-tool M4F & M4S



marker = corner
 for reference hole
 $X=5,5/Y=5,5$
 chamfered edges

Dimensions & Methods

Test bars size 125 x 47 x 18 mm / 140 holes – M4

TTT-Methodology

Forming

special
 Counterbore

Forming, cutting and special applications

A = 3.70 mm / +0.03 - for standard TTT-Tool M4F

A = 3.65 mm / +0.03 - for special TTT-Tool M4FX

B = 0.2 mm

Cutting

Counterbore

A = 3.3 mm / +0.03 for standard TTT-Tool M4S

B = 0.4 mm

Conditions

Pricing
 Payment
 Delivery time

[Terms of delivery](#) of microtap GmbH

€ ex work, excl. packaging

14 days net / Foreign countries payment in advance

Approximately 2-4 weeks after order

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R_m Hardness
A Fracture strain

R_e Yield strength

R_{p0,2} 0,2% Yield point

Stress-Strain-Chart

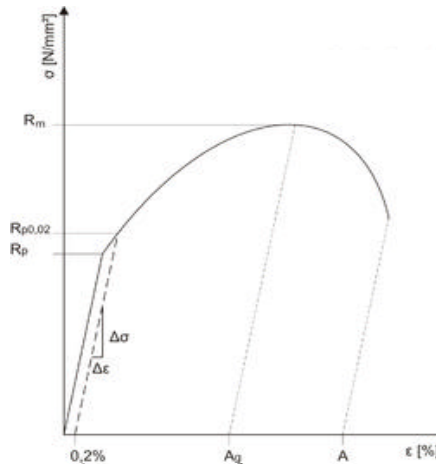
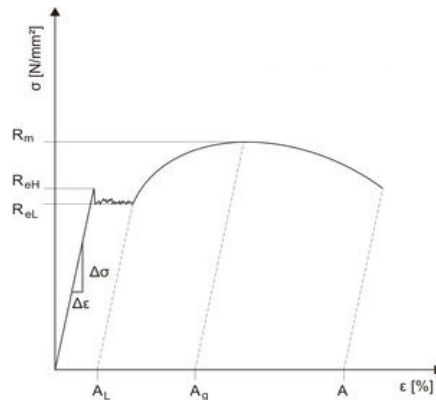
Legend

Indicates the tension at the peak of the stress-strain-chart.

Indicates the remaining distension when breaking. This is the measure for the utmost distension of a material.

Indicates the tension prevailing in material immediately before stretching.

Indicates the tension at which tension test displays a yield point of 0,2 % of plastic deformation after release. R_{p0,2} value is only used with materials lacking a yield strength.



- R_{eH}** Upper yield strength
- R_{eL}** Lower yield strength
- E** Flexibility module
- A_g** Symmetry distension / start of necking
- e** Distension [%]
- s** Tension [N/mm²]
- A** Fracture

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Legend.doc

March 2010

TTT_Tapping-Torque-Testsystem

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Lubricant - Industry

Additives International	USA
Afton	USA
American Saw	USA
AMCOL	USA
Blaser	Switzerland
Bechem	Germany
BP / Castrol / ARAL	Germany / Italy / USA
Benz Oil	USA
Belgin Madenie Yaglar	Türkei
Binol Filium	Sweden
Blaser Swisslube	Switzerland
Blue Chip Metallworking Fluids	USA
Buhmwoo Chemicals	Korea
Chai	Israel
Chemetall Oakite	USA
Century Oils (Fuchs)	Canada / GB
Coral Chemical	USA
Cincinnati Vulcan Oil Company	USA
Cimcool	Netherlands / USA
Clariant Corp.	Germany / Japan / USA
Customs Synthetics	USA
D.A. Stuart (Houghton)	USA / Canada / GB
Degussa (Evonik) Goldschmidt Chemical	USA
DOG	Germany
Diversified Chemical	USA
DNR / University Illinois	USA
Dover Chemical	USA
Exon / MOBIL	USA
Eng. Lubricants	USA
Fuchs Lubricants	Germany / USA / CDN / Great Britain / Spain
Fuchs Lubricant ASIA	China / India / Korea / Japan
Ferro (Dover) / Keil Chemical	USA
Georgia-Pacific / Resins / Actrachem	USA
General Motors / R&D	USA
Guangzhou Research Institute	China
Henkel	USA / Germany / China
Hangsterfer's Laboratories	USA
Hoechst Celanese	Germany / USA
Houghton International	USA / Germany / GB
Innovative Machining Technologies	USA
Kao Chemicals	Germany

References



TTT_Tapping-Torque-Testsystem

Laboratory "screening- and analysis"
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Lubricant - Industry

References

LubeRos	USA
Loctite	USA
Lubrizol	Germany / USA / China
Lube Ros	USA
Master Chemical	USA
Milacron	USA
MSI	USA
Mineralölwerk Osnabrück / TOTAL	Germany / Switzerland
Nalco Chemical	USA
Nippon Grease	Japan
Nicotech Oilservice	Japan
Oemate	Germany
Olistore	Switzerland / GB
PCC Chemax	USA
Petrofer	Germany
Polartec Additives	USA
Process Solutions (US Fluids)	USA
PTT Research & Technology Institutue / Oil-House	Thailand
Quaker	China
Rhenus	Germany
Rhein Chemie	Germany / China
Rocol	Great Britain
Rock Valley Oil & Chemical	USA
Ruetgers Organics (Sunbelt Lub.)	USA
Shell Global Solutions	USA
SINOL / Shell	Italy / USA
Solutia Inc.	USA
Spartan Chemical	USA
Sunbelt Lubricants	USA
Tapmatic do Brazil	Brazil
Total	USA / France / Germany
Tower Oil	USA
Uniqema / Croda / ICI	USA
University of Michigan	USA
University of Illinois	USA
Yuma Industries	USA / Japan
Yushiro Chemical	Japan / China
ZET Chemie	Germany

TTT_Tapping-Torque-Testsystem

Laboratory "screening- and analysis"
measurement system

**Tap manufacturers / Coatings
Industry / Universities / Institutes
Process-controlled Production**

Boss Jakob	Germany / Ungarn
Blaser	Switzerland
CD Tech	Switzerland
DC Daniel Charpilloz	Switzerland
DNR / University Illinos	Germany
EMUGE	Germany
Fraisa	Switzerland
FANAR	Poland
General Motors / R&D	USA
GMERI	USA
Gühring	Germany
GWG Gabrovo	Bulgaria
Hanson Whitney	USA
Hoffmann	Germany
Jarvis Cutting Tools	USA
Kennametal	Germany
Linig	Germany
Link / JEL	Germany
Manigley	Switzerland
Narex	Tschechien
Prototyp PWZ (Titex)	Germany
PWA	Germany
Schäublin / Eso	Switzerland
Sutton Tools	Australia
Vökel	Germany
Unaxis Balzers	Lichtenstein
Werkö	Germany
Yamawa	Japan
Yangzhou Jiangyu Cutting Tools	China
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Allweier	Germany
Astrium	Germany
BOSCH	Germany
BMW	Germany
CD Tech	Switzerland
DLR	Germany
DNR / University Illinos	USA
EADS	Germany
EHA	Germany
Ejot	Germany

References

TTT_Tapping-Torque-Testsystem

Laboratory “screening- and analysis”
measurement system

**Tap manufacturers / Coatings
Industry / Universities / Institutes
Process-controlled Production**

Feix	Germany
General Motors / R&D	USA
GMERI	USA
Hoffmann	Germany
Holzhauser	Germany
IPT	China
Kennametal	Germany
Max Planck Institute	Germany
MIT Massachusetts Institute of Technology	USA
Minebea	Japan
Shur-Lok Corporation	USA
Skoda	Czech
SIEMENS	Germany / USA
University of Michigan	USA
University of Illinois	USA
TU - München	Germany
VW	Germany
Werkstätten für Behinderte / Lebenshilfen und Geschützte Werkstätten	Switzerland / Austria

References



Gewindefertigungstechnik

Maschinen / Optionen / SW

Preisliste 2010

Typen /	Gewindegröße Edelstahl	microtap II megatap II	jobtap	labtap	TTTsysteme
	G2 / M0,5 - M2	9.600	-	16.600	-
	G5 / M1 - M5	8.100	6.900	15.100	-
	G8 / M2,5 - M8	11.800	9.500	22.500	29.000
	G14 / M3,5 - M12	12.600	10.500	24.600	-
	G16 / M4 - M14	12.800	10.700	24.700	-
Optionen / Zubehör					
ZAP	gewichtsneutraler Z-Achsen Vorschub pneumatisch	1.250	1.250	1.250	+
MMS	angesteuerte Minimalmengen-Schmierkühlsysteme	890	890	890	890
SWS & SZS	Schnellwechsel- & Spannzangen-systeme	Anfrage	Anfrage	Anfrage	+ (SZS1/2)
QND	angesteuerter Qualitätsnachweis-Protokolldrucker	500	-	500	500
DSK	Doppelspindelkopf adaptiv	3.700	3.700	3.700	3.700
SHV & HVS	Säulenhöhen- & Horizontalverstellungen	Anfrage	Anfrage	Anfrage	Anfrage
LSM	Luftsperrre Motorspindelaustrag	350 - 475	350 - 475	350 - 475	350 - 475
MLM	Maschinenleuchte magnetisch	150	150	150	150
SSB	Schlüsselschalter oder ASL akustische Signalleuchte	250	250	250	250
MPT	integrierter manuell angesteuerter XY-Kreuztisch	5.500	-	-	+
APT	XY-Kreuztisch gesteuert	13.900	-	-	13.900
SSW	Kundenspezifische Software f. Handling-Ansteuerungen	Anfrage	-	Anfrage	Anfrage
RS232	serielle Schnittstelle / V24	+	-	+	+
I/Oport	parallele Schnittstelle / 4 x I/O	+	-	+	+
WinView	PC-Anzeigesoftware, die den Verlauf des aktuellen Gewindegewinns zur Prozessparameter-Optimierung, z.B. zum Auffinden der optimalen Drehzahl und des besten Schmiermittels und Gewindegewinns, graphisch darstellt	+	-	+	+
WinPCA3	PC-Auswerte- & Analysesoftware zur Messreihen-Vergleichsermittlung und Speicherung der Messreihen inkl. Analyser-Auswertung. Zur Entwicklung von Schmierkühlmitteln & Gewinde-werkzeugen u. zur Ermittlung bester Prozessparameter mit Protokollierung/QS-Nachweis von Fertigungsprozessen (Datenblatt TTT_WinPCA3_Upgrade)	-	-	2.000 Upgrade 30 Tage Testversion	+
SWProgramme	zum Schrauben & Gewinde-Einsätze eindrehen und Motordauerlauf zum Senken & Aufbohren	+ Nicht G2	-	+ Nicht G2	+

Änderungen vorbehalten

Preise € zzgl. MwSt. / + = inklusive / - = nicht verfügbar

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