



TTT Tapping-Torque-Testsystem

Laboratory "screening- and analysis"
measurement system

For customer of the
lubricant industry

Dear Customer

"When monitoring lubricants"

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

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

TTT Measurement-Starter-Set

Please select desired test bars enclosed

8 TTT-testbars and 15 TTT-tools

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

Total

TTTsystem

€ 29.000,00

€ 3.200,00

€ 500,00

€ **32.700,00**

€ 2.000,00

Upgrade WinPCA3 V2.5 – 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

Conditions

Packing

Pricing in Euro

Warranty

Payment

Delivery terms

Validity of this offer

Alterations reservations

4 – 5 special multiple boxes 450,-- €

ex work, exc. packing, without sales tax

24 month

In advance

Terms of delivery of microtap GmbH

Until **31 March 2010**

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

Sincerely Yours

Klaus Maximilian Mueller

microtap GmbH / TTT Systems

Rotwandweg 4 / D - 82024 Taufkirchen / Munich - GERMANY

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

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

info@microtap.de

TTT_System-OFFER.doc



February 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
TTT-Laboratory finish (paint)

50 - 700 Ncm
300 - 3000 RPM
RAL 1015 bright ivory

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

Application / Features

- For evaluation & development of optimized lubricants
- 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

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

microtap GmbH / TTTsystem - when monitoring lubricants

Rotwandweg 4

D - 82024 Taufkirchen / Muenchen (Munich) - GERMANY

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

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

info@microtap.de
TTT_Overview.doc



February 2010

TTT Tapping-Torque-Testsystem

Laboratory "screening- & analysis"
measurement system

Technical data

Measurement capacity labtap G8

Testbars-Material / Forming and Cutting

TTT-Methodology

Spindle speed range RPM
Measurement range mm / max. depth
Column with hand crank
Spindle/worktable distance max.
Width / depth / height
Mains voltage / power consumption

ZAP pneu. "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

TTT-Software WinPCA3

Measurement-tool-holder system

Delivery and training
Packing
Conditions
Pricing €
Payment terms
Warranty
Delivery terms
Alterations

info@microtap.de
TTT_System-G8E.doc

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 / 75 mm
750 mm adjustable
0 - 400 mm distance
320 / 475 / 1290 mm
230 Volt / 50 - 60Hz / 2900 Watt

2 –5 bar / Hose 4/6 mm without service unit
250 x 600 mm with 8 mm T-nut
with 2 special auto-start control functions for exactly handling and
system-start for faultless measurements
CE / EMV conform
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

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)

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

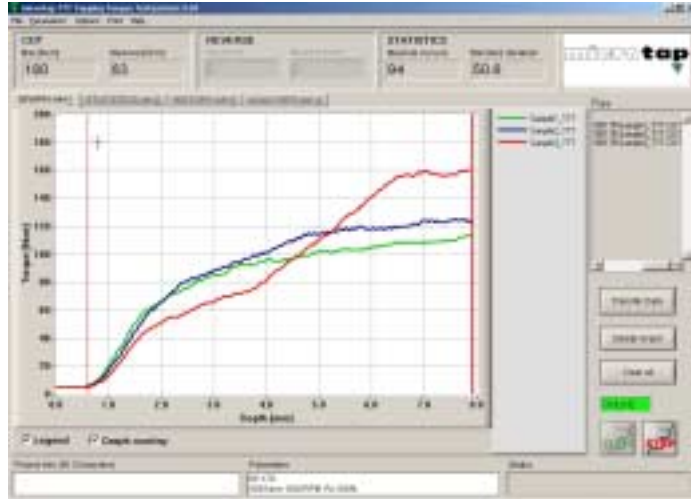
microtap GmbH / TTTsystems - when monitoring lubricants
Rotwandweg 4, D - 82024 Taufkirchen / Muenchen (Munich) - GERMANY
Tel +49-89-61279213 (6128051) / Fax +49-89-6127488
<http://www.tapping-torque-test.com/>



TTT Tapping-Torque-Testsystem
 New development for the request
 of the Lubricant-Industry

WinPCA3 - „Screening & Analysis Software”

Measurement process



Analyser



Comparable measurements are monitored (quality control) and documented by displaying applied torque as a bar chart of values, plus mean value and standard deviation (Gauss). Purpose computes the standard deviation and the mean (average) values of the input array. The formulas used to find the mean & the standard deviation are as follows

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

Mean value / Arithmetic method

The expression is called arithmetic methods of n sizes a_1, a_2, \dots, a_n

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

For two sizes a and b emerges $\chi_A = \frac{a + b}{2}$

Win**PCA3** - „Screening & Analysis Software”

An example by the practical use

Your customer is testing a new or existing 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, possibilities and exercises

Your lubricant may not impact the results, or - **worse** - in a negative way. And if it is the other way around, your additives, caused by higher temperatures (resistance), may be exhausted (burnt up)

What can we reflect in 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 additives miss temperature. The negative effect is that your lubricant works on half power and therefore the torque becomes higher because the coating effects less than the effect caused by a good working additive

The **red** graph maybe displays, that's the other assumption or possibility, that the coating and additives are working well in the beginning – but in the end the additives are burnt up 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 measurement tool



TTT Tapping-Torque-Testsystem

Laboratory "screening- and analysis"
measurement system

New Software Development „WinPCA3“

The expanded "**screening & analysis software**" WinPCA3 has specially been developed for the demands of the lubricant industry as well as for the tapping tool- and coating-manufacturers

Due to the torque coverage the TTTsystem is also used for screening and monitoring optimized process parameters with automatic recording of production processing and quality assessment

WinPCA 3

Options / Features

Level "0"

WinVIEW PC-display software. Only cut-, torque- and progress in depth at processing (threads) is diagrammed. Software is available for delivery of „microtap“ & "megatap" thread tapping units

Level "1"

PCA PC-Lab Software for comparative value observation with allocated storage of definable series of measurements

Level "2"

WinPCA PC-screening & analysis software for comparative value observation with allocated storage of definable series of measurements plus an analyser for individual analysis including flexible differentiations of various single- and series of measurement results

Test version

[WinTRIAL](#) This WinPCA3 is operative for a period of 30 days

Upgrades / Versions

V2.7 – 2.7V6

V2.5 – 2.6V3

[WinPCA3](#) (including 12 month update service)

2.000 €

2.500 €

Currently Updates / Versions

V3.0 – V3.4

WinPCA3

12 month update service free of charge

Instruction & training on-site service
WinPCA3 SW for several PC's

500 €/ foreign countries plus expenses

800 € for each PC / work station

Conditions

Prices €

Payment

Time of delivery

Delivery & briefing

Alterations

[Terms of delivery](#) of microtap GmbH

Net ex works, without packing material

14 days net / for customers abroad prepayment

1 - 2 weeks after order

as agreed upon

Reserved

microtap GmbH / TTTsystems - when monitoring lubricants
Rotwandweg 4 / D - 82024 Taufkirchen / München (Munich) - GERMANY
Tel +49-89-61279213 / Fax +49-89 -6127488

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

February 2010

© Copyright

info@microtap.de

TTT_WinPCA3_Upgrade.doc



TTT Tapping-Torque-Test Laboratory Analysis System

Measuring tools & test bars

TTT_Laboratory Testbars

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

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

€ 300,-- / pcs.

Price for delivery 5 resemble pieces

€ 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 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.



TTT Tapping-Torque-Test Laboratory Analysis System

Measuring tools & test bars

“When monitoring lubricants”

TTT_Laboratory Testbars

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

€ 400,-- / pcs.

Price for delivery 5 resemble pieces

€ 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

€ 460,-- / pcs.

Price for delivery 5 resemble pieces

€ 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

€ 500,-- / pcs.

Price for delivery 5 resemble pieces

€ 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_{em}^2

Price each test bar

€ 600,-- / pcs.

Price for delivery 5 resemble pieces

€ 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-Tolerance-gauge M4F and/or M4S

Price for delivery 10 pieces
Single price

€ 500,-- / total

€ 60,-- / pcs.

microtap GmbH / TTTsystem - when monitoring lubricants
Rotwandweg 4 / D - 82024 Taufkirchen / Munich - GERMANY
Tel +49-89-6128051/ Fax +49-89-6127488

info@microtap.de

TTTsys_Measurement-Equipment.doc

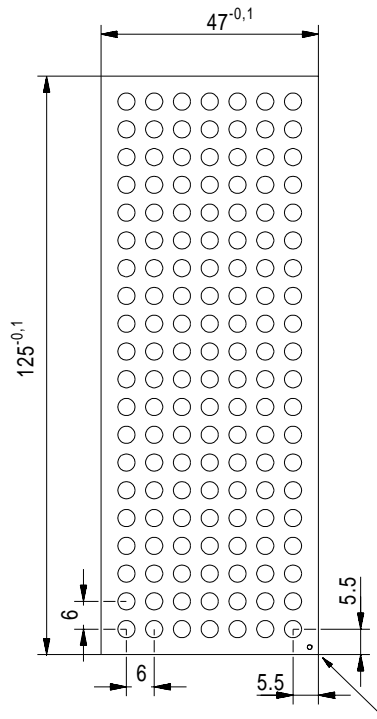
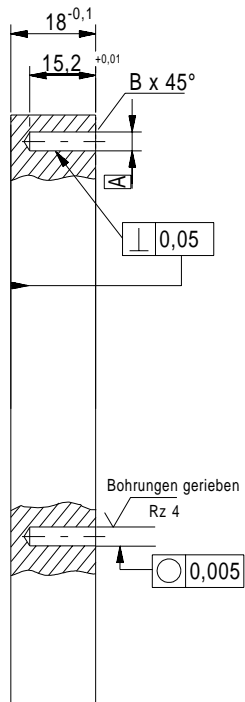
<http://www.tapping-torque-test.com/>



TTT Tapping-Torque-Test
Laboratory Analysis System

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

microtap GmbH / TTTsystem - when monitoring lubricants
Rotwandweg 4
D - 82024 Taufkirchen / Munich - GERMANY
Tel +49-89-6128051/ Fax +49-89-6127488
<http://www.tapping-torque-test.com/>

info@microtap.de

TTTsys_Measurement-Equipment_
TTT-methodology_M4.doc

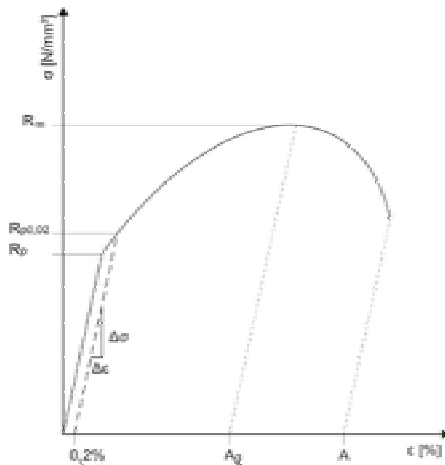
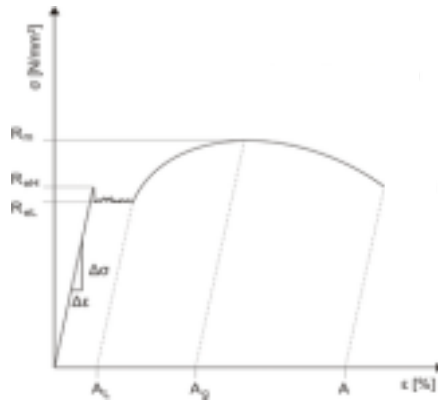


TTT Tapping-Torque-Test
Laboratory Analysis System

Legend

- R_m Hardness** Indicates the tension at the peak of the stress-strain-chart.
- A Fracture strain** Indicates the remaining distension when breaking. This is the measure for the utmost distension of a material.
- R_e Yield strength** Indicates the tension prevailing in material immediately before stretching.
- R_{p0,2} 0,2% Yield point** 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.

Stress-Strain-Chart



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

microtap GmbH / TTTsystem - when monitoring lubricants
Rotwandweg 4
D - 82024 Taufkirchen / Muenchen (Munich) - GERMANY
Tel +49-89-6128051/ Fax +49-89-6127488

TTT Tapping-Torque-Testsystem

Laboratory "screening- and analysis"
measurement system

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 / Actrachem	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"
measurement system

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 Institute / 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

References

Tap manufacturers / Coatings

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



Thread Tapping Technology

Machines / Options / SW

Price list 2010

Type / Thread-Size Stainless steel	microtap II megatap II	jobtap	labtap	TTTsystem
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	-

Options / Accessories

	microtap II megatap II	jobtap	labtap	TTTsystem
ZAP pneumatic "balanced" spindle feeding system	1.250	1.250	1.250	+
MMS controlled minimal lubricant fluid dispenser system	890	890	890	890
SWS & SZS tool holder systems	on request	on request	on request	+ (SZS1/2)
QND recording serial printer for quality reports	500	-	500	500
DSK adjustable double spindle head incl. adapter	3.700	3.700	3.700	3.700
SHV & HVS column specials & horizontal adjustment	on request	on request	on request	on request
LSM air seal for motor spindle	350 - 475	350 - 475	350 - 475	350 - 475
MLM machine light magnetic	150	150	150	150
SSB security key or ASL audible signal light	250	250	250	250
MPT integrated manual positioning XY-table	5.500	-	-	+
APT controlled automatic positioning XY-table	13.900	-	-	13.900
SSW customer specific special software for automation	on request	-	on request	on request
RS232 serial interface / V24	+	-	+	+
I/Oport parallel interface / 4 x I/O	+	-	+	+
WinView PC-display software. Only cut-, torque- and progress in depth at processing (threads) is diagrammed	+	-	+	+
WinPCA3 "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 (see WinPCA_Upgrade data-sheet)	-	-	2.000 Upgrade 30 days test free of charge	+
SWPrograms for screws & inserts incl. continue motor running for counter sinking and secondary drilling	+ Not G2	-	+ Not G2	+

Alterations reservations

Price €/ + = included / - = not available

microtap GmbH / TTT Tapping-Torque-Testsystems
 Rotwandweg 4
 D - 82024 Taufkirchen / München (Munich) - GERMANY
 Tel +49-89-6128051 / Fax +49-89-6127488

info@microtap.de

Pricelist_2010.doc



February 2010