



**TTT_Tapping-Torque-
Testsystem**

Laboratory "screening- & 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 MPT manual X-Y-positioning system for safe handling

The TTTsystem is equipped with all needed components to produce measurements without faults based to the microtap TTTmethodology

TTT_Tapping-Torque-Testsystem

labtap G8 with X-Y-positioning table € 29.000,00

Screening & Analysis SW Win**PCA3**

Technical specifications see encl. Datasheets

ZAP pneumatic feeding system € 1.250,00

TTT_Measurement-Starter-Set € 3.600,00

8 Testbars and 15 Tools

Select 5 Aluminium and 3 Steel TTT_testbars
for around 1100 laboratory measurements

TTT_Measurement-Laboratory-Set € 8.000,00

20 Testbars and 40 Tools

Select 10 Aluminium and 10 Steel TTT_testbars
for around 2800 laboratory measurements

Two day schooling foreign countries € 800,00

Plus train / flight and hotel expenses

Conditions

Packing

Pricing in € / Euro

Warranty

Payment

Delivery terms

Validity

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

One month

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/>

26 January 2011

info@microtap.de

TTTsystem_OFFER.doc



TTT_Tapping-Torque-Testsystem

Laboratory "screening- & 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

Performance

TTTsystem / labtap G8

With famous measurement-methodology and -equipment

ZAP

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

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 lubricants 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 & 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 and 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)

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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 depth depends on TTTmethods

Column with hand crank

Spindle/worktable distance max.

Width / depth / height

Mains voltage / power consumption

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

TTT_Software WinPCA3

Measurement-tool-holder system

Delivery and training

Packing

Conditions

Pricing €

Payment terms

Warranty

Delivery terms

Alterations

TTTsystem

labtap G8 / ZAP / MPT / WinPCA3-SW

50 – 700 Ncm / M4F/S and 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

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

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 & controlled fixing

Pneumatic feeding force FZ with start sensor

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

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

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

Program for motor continuous running left/right

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

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TTT_System-G8E.doc

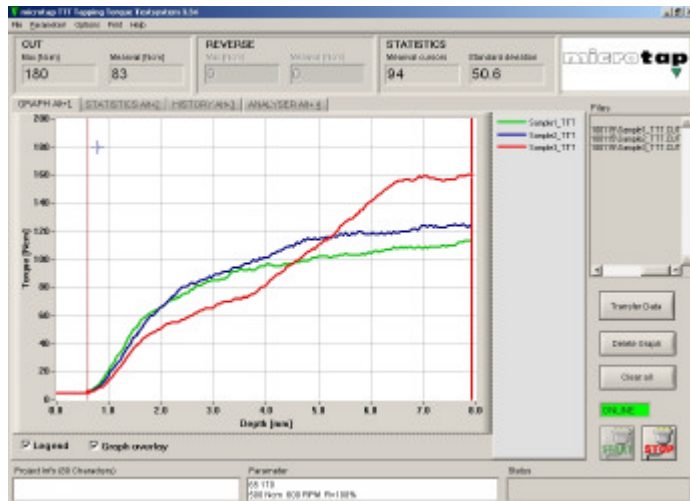
TTT_Tapping-Torque-Testsystem

New development for the request of the MWF / Lubricant-Industry

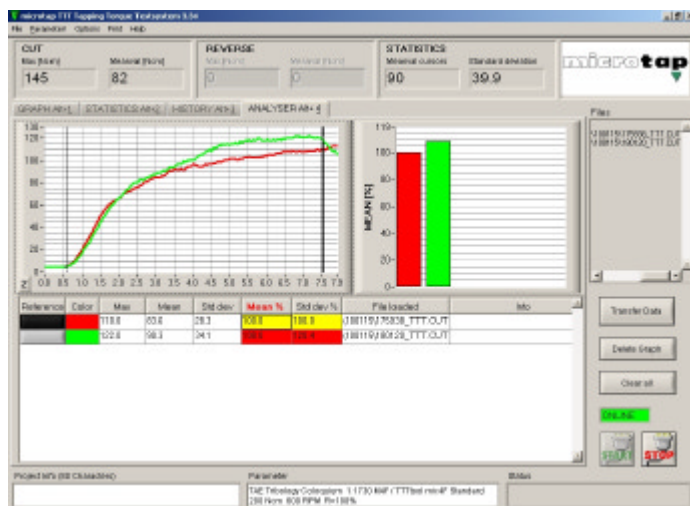


WinPCA3 - „Monitoring & Analysis Software“

Measurement process



Analyzer



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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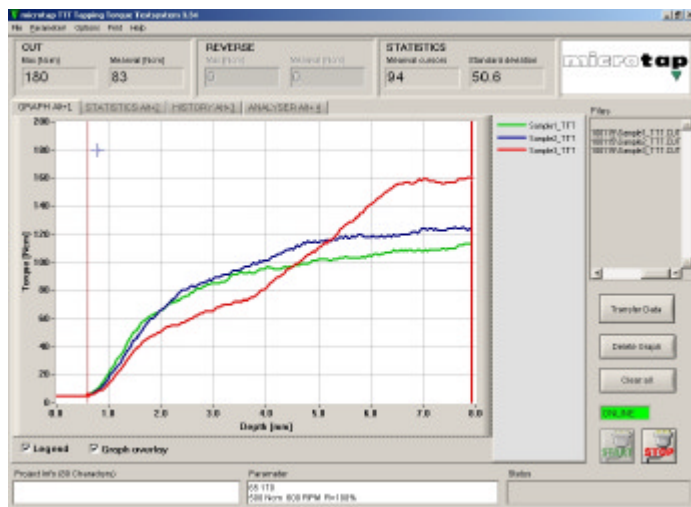


WinPCA3 - „Screening & Analysis Software”

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 additives 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

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TTT_Tapping-Torque-Testsystem

Laboratory "screening- & analysis" measurement system

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

€ **320,-- / pcs.**

€ **270,-- / 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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TTTsys_Measurement-Equipment.doc



TTT_Tapping-Torque-Testsystem

Laboratory "screening- & analysis" measurement 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>355N/mm²

Price each test bar
Price for delivery 5 resemble pieces

€ **380,-- / pcs.**
€ **300,-- / 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 = 775N/mm²

Price each test bar
Price for delivery 5 resemble pieces

€ **400,-- / pcs.**
€ **320,-- / 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

€ **450,-- / pcs.**
€ **370,-- / 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_em²

Price each test bar
Price for delivery 5 resemble pieces

€ **500,-- / pcs.**
€ **400,-- / 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 Tool M4F
- Diameter 3,3mm / 15 mm (3xD) measurement range for 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

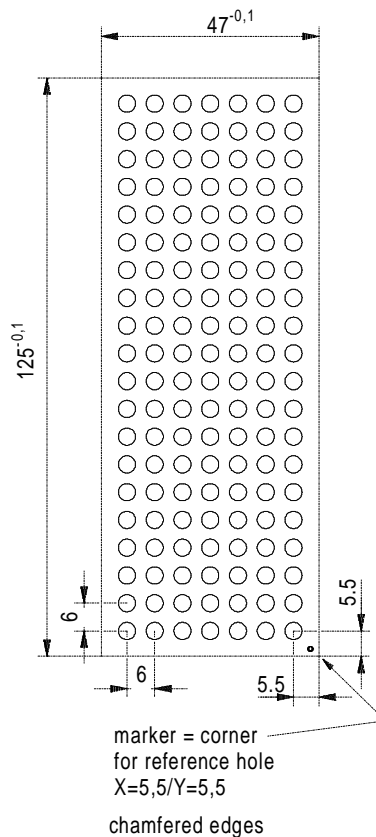
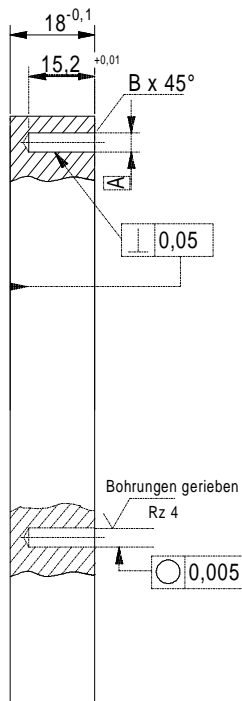
€ **500,-- / total**
€ **60,-- / pcs.** (TiAl6V4 – 80 €/ pcs.)

TTT_Tapping-Torque-Testsystem

Laboratory "screening- & analysis"
measurement system

Measuring test bars

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



Dimensions & Methods

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

TTT-Methodology

Forming

special
Counterbore

Cutting

Counterbore

Conditions

Pricing
Payment
Delivery time

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

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

B = 0.4 mm

[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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TTTsys_Measurement-Equipment_
TTT-methodology_M4.doc



**TTT_Tapping-Torque-
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R_m Hardness
A Fracture strain

R_e Yield strength

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

Stress-Strain-Chart

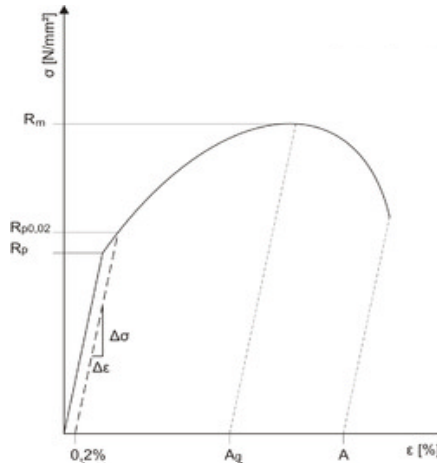
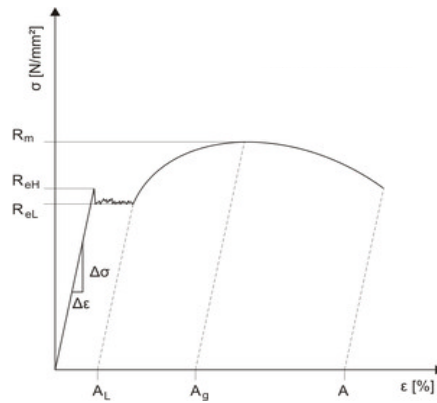
Legend

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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TTT Tapping-Torque- Testsystem

Laboratory Screening & Analysis
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
Condat	France
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
IOC Indian Oil Corporation	India

References

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Lubricant - Industry

Innovative Machining Technologies	USA
Kao Chemicals	Germany
LubeRos	USA
Loctite	USA
Lubrizol	Germany / USA / China
Lube Ros	USA
Master Chemical	USA
Milacron	USA[k4] / China
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 Institue / Oil-House	Thailand
PT Utama	Indonesia
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
Talent	China
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

References

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