The powerful preparation system for high quality specimen preparation

The Tegramin preparation system elegantly combines ease of use with advanced functionality. Innovative solutions improve preparation results and help you deal with a variety of specimens or materials, or high specimen volume.

Three system sizes
Tegramin is available for three different disc sizes: Tegramin-30 for 300 mm discs, Tegramin-25 for 250 mm discs and Tegramin-20 for 200 mm discs.

Variable speed of disc and specimen mover head
Tegramin is equipped with variable disc speed of 40-600 rpm and variable specimen mover head speed of 50-150 rpm. This allows for preparation of very sensitive materials at low speed, as well as fast preparation with high material removal at higher speeds.

High preparation capacity
On Tegramin-30: up to 6 individual specimens of 50 mm dia. and specimen holders size 160 mm or 200 mm dia.
On Tegramin-25: up to 6 individual specimens of 40 mm dia. or 3 individual specimens of 50 mm dia. and specimen holders size 140 mm or 160 mm dia.
On Tegramin-20: up to 4 individual specimens of 40 mm dia.
Sturdy and durable design
The entire base which is made of an AlSiMg alloy with high-
mechanical strength and chemical resistance, guarantees life-
long durability.

Dual column construction
On the cast base, a sturdy construction carrying the specimen
mover head is fixed. The up/down movement is based on two
strong columns making the entire systems as solid as possi-
ble. This has a very positive effect on specimen planeness and
noise during preparation.

MD-Disc with cone
It is very easy to remove the MD-Disc and it allows therefore
the fast exchange of the bowl liner. It has a higher mass than
the traditional MD-Disc so it also keeps the temperature of the
preparation surface lower and can easier be cooled down us-
ing the disc cooling function.

Easy cleaning with removable bowl liner
A bowl liner that fits precisely into the bowl collects all debris
that are not washed down the drain. When the machine has to
be cleaned, the bowl liner can easily be removed. It can then
either be cleaned or discarded.

Bowl flushing
To further facilitate cleaning, Tegramin-30 and -25 are
equipped with a bowl flush function. While the disc is rotat-
ing, disc cooling is activated. The water that is sprayed on the
bottom of the MD-Disc is distributed to the walls of the bowl,
washing away loose debris.

Spin function for cleaning and drying
By holding the disc key down the disc will spin up to maximum
speed and thus all excess water after cleaning will be removed
from the MD-Disc or the preparation surface.

Improved working area
Cover to encase the preparation area
As an option, a transparent cover that encloses the entire prep-
eration area, is available. The cover offers several advantages:
when alcohol-based consumables are used, all the fumes are
contained within the cover. The cover can be connected to an
exhaust and all fumes can be removed without any personal
exposure.

When the cover is closed, the user cannot get in contact with
any rotating parts and personal safety is improved. When the
cover is mounted, the Tegramin cannot be started when the
cover is open (unless manual preparation has been selected).
The machine will also stop if the cover is opened while a prep-
eration step is running.

Possibility to connect a recirculation cooling unit
One of Struers’ recirculation cooling systems can be con-
ected to Tegramin. This is especially useful to collect grinding
debris and to avoid blocking the draining system in the lab. It
is also very useful when water is scarce or when there simply
is no water connection nearby.

Shift valve to use both recirculation and tap water
For the first time with a table top machine it is possible to con-
nect both tap water and a recirculation cooling system at the
same time. Water from the recirculation system can be used
for grinding; for the OP-polishing step, where absolutely clean
water is a must, tap water is used.

Shift valve is activated automatically to direct the waste
water in the correct direction to avoid overfilling or emptying
of the recirculation cooling unit.

Easy specimen handling and operation
Preparation of individual specimens and specimen holders
Tegramin-30 and -25 are designed for preparation of both
individual specimens and specimens clamped in holders.
Simply switch between the two possibilities and insert either a
specimen holder or a specimen mover disc to run the required
method. Thus all options are covered. Tegramin-20 is for
preparation of individual specimens only.

Specimen mover head stopping again at start position
The specimen mover head is always stopping at the exact
same position it was started at. This makes it easier to insert
and remove the specimen holder or specimen mover disc as the
black release button always is in the same position. It also
makes it easier to identify individual specimens as they start
and stop exactly in the same position.

Easy insertion and removal of specimens
Tegramin is equipped with a key to rotate the specimen mover
plate automatically. One touch of the key rotates the plate 180°
and facilitates insertion and removal of the specimens.

Motorized horizontal positioning of specimen mover head
on Tegramin-30 and -25
It is possible to adjust the specimen mover head position rela-
tively to the preparation disc. The centre lines of both discs are
identical, so depending on the diameter of the specimen holder
or mover disc it can be moved left or right for the best possible
utilization of the preparation surface.

On Tegramin-20 the position is adjusted manually.
Sturdy and durable design
The entire base which is made of an AlSiMg alloy with high-mechanical strength and chemical resistance, guarantees life-long durability.

Dual column construction
On the cast base, a sturdy construction carrying the specimen mover head is fixed. The up/down movement is based on two strong columns making the entire systems as solid as possible. This has a very positive effect on specimen planeness and noise during preparation.

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Cover to encase the preparation area
As an option, a transparent cover that encloses the entire preparation area is available. The cover offers several advantages: when alcohol-based consumables are used, all the fumes are contained within the cover. The cover can be connected to an exhaust and all fumes can be removed without any personal exposure.

When the cover is closed, the user cannot get in contact with any rotating parts and personal safety is improved. When the cover is mounted, the Tegramin cannot be started when the cover is open (unless manual preparation has been selected). The machine will also stop if the cover is opened while a preparation step is running.

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One of Struers’ recirculation cooling systems can be connected to Tegramin. This is especially useful to collect grinding debris and to avoid blocking the draining system in the lab. It is also very useful when water is scarce or when there simply is no water connection nearby.

Shift valve to use both recirculation and tap water
For the first time with a table top machine it is possible to connect both tap water and a recirculation cooling system at the same time. Water from the recirculation system can be used for grinding; for the OP-polishing step, where absolutely clean water is a must, tap water is used.

Shift valve is activated automatically to direct the waste water in the correct direction to avoid overfilling or emptying of the recirculation cooling unit.

Easy specimen handling and operation
Preparation of individual specimens and specimen holders
Tegramin-30 and -25 are designed for preparation of both individual specimens and specimens clamped in holders. Simply switch between the two possibilities and insert either a specimen holder or a specimen mover disc to run the required method. Thus all options are covered. Tegramin-20 is for preparation of individual specimens only.

Specimen mover head stopping again at start position
The specimen mover head is always stopping at the exact same position it was started at. This makes it easier to insert and remove the specimen holder or specimen mover disc as the black release button always is in the same position. It also makes it easier to identify individual specimens as they start and stop exactly in the same position.

Easy insertion and removal of specimens
Tegramin is equipped with a key to rotate the specimen mover plate automatically. One touch of the key rotates the plate 180° and facilitates insertion and removal of the specimens.

Motorized horizontal positioning of specimen mover head on Tegramin-30 and -25
It is possible to adjust the specimen mover head position relatively to the preparation disc. The centre lines of both discs are identical, so depending on the diameter of the specimen holder or mover disc it can be moved left or right for the best possible utilization of the preparation surface. On Tegramin-20 the position is adjusted manually.
**Keep surface temperature low**

Disc cooling on Tegramin-30 and Tegramin-25

Underneath the MD-Disc, a nozzle can be opened to apply water to the backside of the disc and thus reduce the temperature increase that can occur during preparation, by up to 20°C. The thermographic images indicate some of the difference. With the disc cooling function the temperature of the preparation surface is kept low. This is particular relevant for high volume preparation and will not only improve preparation quality, but also keep consumption of suspensions and/or lubricants down.

As Tegramin-20 is designed for smaller volumes this feature is not necessary.

**Perfect preparation results**

**Precise torque control**

It is possible to start with a force as low as 5 N per specimen. This is used for small or sensitive specimens to avoid damage during grinding and polishing.

**Automatic locking of specimen mover plates**

After the specimen mover plate has been moved into the correct position over the preparation surface, the coupling is locked inside the specimen mover head. The possible small movements of the specimen mover disc are now avoided completely, and the result is a tremendous improvement in specimen planeness. On Tegramin-20 the specimen mover plate is loaded in place with an individual screw.

**Soft start and stop**

Both the start and stop sequence of a preparation step are controlled precisely. The force is increased and decreased gradually, and the speed of both preparation disc and specimen mover plate is ramped up and down at predefined "angles" to get the best possible preparation result without the risk of damaging the specimen because of preferential grinding.

**Direction of preparation head**

The rotational direction of the head can be set to either clockwise or to counter-clockwise. Normal preparation is always carried out using the counter-clockwise movement, i.e. same as the disc movement for the best possible dynamic relations. For special applications and for polishing with oxide polishing suspensions, the rotation is changed to clockwise to keep the suspension better on the disc.

**Removal measurement on specimen holders**

A built-in removal sensor allows for the measurement of material removal in the range from 50 - 5,000 µm. Instead of relying on preparation time, especially when grinding various numbers of specimens, the necessary amount of material to be removed can be specified. This guarantees the shortest possible grinding time while ensuring that sufficient material has been removed.

**Slow rotation while pre-dosing**

When a preparation step is started, the first few seconds are normally used for pre-dosing. During this time the disc is turning slowly for a more equal distribution of the suspension or lubricant and to avoid the liquid to be thrown off the disc.

**Convenient automatic dosing**

**Increase reproducibility**

Automatic dosing of consumables ensures that a controlled amount is applied every time. This greatly increases reproducibility and keeps consumables consumption under control.

**Different dosing modules available**

Three different dosing modules are available for Tegramin: A module with one pump for DP-Suspension or lubricant, a module with two pumps for DP-Suspensions or lubricants, and one module with two pumps for DP-Suspensions or lubricants and one pump with water connection for OP-Suspensions. These modules can be combined in various ways, opening for many different combination possibilities and up to 7 pumps in total.

**Manual preparation with automatic dosing and timer function**

It is possible to select manual preparation. In this menu it is possible to display the preparation surface to be used and to program the lubricant and/or suspension to be used together with the dosing level and the preparation time. After pressing start, dosing will start automatically and the disc will stop as soon as the preset time has expired. This allows e.g. for a controlled, short manual re-polishing of specimens after etching.

**Automatic level calculation**

It can be difficult to see the level in all bottles when they are placed in the bottle tray. Tegramin has an automatic level calculation so when a lubricant or suspension is filled into a bottle, the volume that is in the bottle can be specified in the bottle configuration.

**Sniff function when dosing DP-Suspensions and lubricants**

At the end of every preparation step the pump(s) used during that step reverse slightly to retract the suspension or lubricant from the dosing nozzle. This eliminates the risk of contamination at a later step from coarse abrasive on a finer grain size step.

**Cleaning function for all tubes**

The software contains a built-in cleaning routine for cleaning all the tubes for suspensions and lubricants. Tegramin monitors which suspensions and thus which pumps/tubes have been used and offers the possibility to clean just the tubes with the status "Used". It is also possible to select any tube for cleaning independently. Messages on the display tell exactly what to do and at the end of the operation the selected tubes are clean and ready for e.g. a change to a different grain size.

**Automatic tube cleaning after OP polishing**

At the end of the OP-polishing step the force is reduced to the lowest possible value, the rotation changed from counter- to co-rotation and a water valve is opened directly after the peristaltic pump. That means that the tube is flushed completely, all OP-Suspension is removed and at the same time both polishing cloth and specimens are cleaned as well. Therefore no chemical attack will take place after the OP-step is finished. At the very end of the step the pump will reverse to also replace the OP-Suspension between pump and bottle with water. Thus there is no risk of clogging tubes whatsoever.
Gradually, and the speed of both preparation disc and specimen is controlled precisely. The force is increased and decreased slowly for a more equal distribution of the suspension or lubricant and to avoid the liquid to be thrown off the disc. As Tegramin-20 is designed for smaller volumes this feature is not necessary.

Perfect preparation results
Precise force control
It is possible to start with a force as low as 5 N per specimen. This is used for small or sensitive specimens to avoid damage during grinding and polishing.

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Keep surface temperature low
Disc cooling on Tegramin-30 and Tegramin-25
Underneath the MD-Disc, a nozzle can be opened to apply water to the backside of the disc and thus reduce the temperature increase, that can occur during preparation, by up to 20°C. The thermographic images indicate some of the difference. With the disc cooling function the temperature of the preparation surface is kept low. This is particular relevant for high volume preparation and will not only improve preparation quality, but also keep consumption of suspensions and/or lubricants down.

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Built-in pump calibration

Tegramin is equipped with a calibration function that ensures constant dosing levels throughout the entire lifetime of the machine. At regular intervals a calibration routine can be carried out, and the actual pump capacity is measured. After the measurement the individual pump values are entered into the software, and the correct dosing levels are calculated based on these values. Thus any method will always produce the same preparation result.

Preparation methods ensure reproducibility and consistency

Increase reproducibility

Consistent preparation procedures are required to ensure repeatability and reproducibility. Tegramin includes a method database able to store as many as 200 preparation methods.

Start right away

Tegramin includes 10 Struers Metalog Guide methods which cover all major material groups. They are developed for maximum performance of the Tegramin and allow you to get started right away. They also provide an excellent starting point to the development of your own methods.

Different user-levels

Three different user-levels can be set: Production, Development and Configuration. This allows for the lab manager to configure the machine and develop preparation methods. When the user level then is changed to Production, only a few necessary parameters can be changed while the rest is locked to avoid changes to the preparation result.

A wide range of specimen mover plates are available for Tegramin.
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Automatic combination of preparation steps with same surface and suspension/lubricant

In some cases, it can be an advantage to divide a preparation step into two or three sub-steps with e.g. different force or dosing levels for even more reliable and fast specimen preparation. Tegramin automatically recognises steps as sub-steps when the same preparation surface and lubricant / suspension are used. It will therefore run these steps in succession, without any user-intervention. This function can be un-selected when SiC Papers are used, as here often several steps are created to allow the change of worn papers.

Technical data

<table>
<thead>
<tr>
<th>Tegramin-20</th>
<th>Tegramin-25</th>
<th>Tegramin-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>200 mm / 8&quot;</td>
<td>250 mm / 10&quot;</td>
</tr>
<tr>
<td>Speed</td>
<td>40-600 rpm, variable in steps of 10</td>
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<tr>
<td>Rotational direction</td>
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<td>Motor power continuous / max</td>
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<tr>
<td>Torque at idle</td>
<td>11.8 Nm / 17.6 ft-lbf</td>
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<td>Cont. at &lt;300 rpm</td>
<td>5.9 Nm / 4.4 ft-lbf</td>
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<td>Noise level</td>
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<td>Dust extraction</td>
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<tr>
<td>Dust-free running, at a distance, at idle, at idle</td>
<td>47-84 A</td>
<td></td>
</tr>
</tbody>
</table>

Struers’ products are subject to constant product development. Therefore, we reserve the right to introduce changes in our products without notice.

Struers’ equipment is in conformity with the provisions of the applicable International Directives and their appurtenant Standards (please contact your local supplier for details).

Built-in pump calibration

Tegramin is equipped with a calibration function that ensures constant dosing levels throughout the entire lifetime of the machine. At regular intervals a calibration routine can be carried out, and the actual pump capacity is measured. After the measurement the individual pump values are entered into the software, and the correct dosing levels are calculated based on these values. Thus any method will always produce the same preparation result.

Automatic combination of preparation steps with same surface and suspension/lubricant

In some cases, it can be an advantage to divide a preparation step into two or three sub-steps with e.g. different force or dosing levels for even more reliable and fast specimen preparation. Tegramin automatically recognises steps as sub-steps when the same preparation surface and lubricant / suspension are used. It will therefore run these steps in succession, without any user-intervention. This function can be un-selected when SiC Papers are used, as here often several steps are created to allow the change of worn papers.

Different user-levels

Three different user-levels can be set: Production, Development and Configuration. This allows for the lab manager to configure the machine and develop preparation methods. When the user level then is changed to Production, only a few necessary parameters can be changed while the rest is locked to avoid changes to the preparation result.

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### Specifications

**Tegramin-30**
- Automatic, microprocessor controlled machine for grinding and polishing of specimens on 300 mm MD-Disc with cone. Dosing modules, MD-Disc with cone and specimen holders are ordered separately. 06036127

**Tegramin-20 with cover**
- Automatic, microprocessor controlled machine for grinding and polishing of specimens on 200 mm MD-Disc with cone. Transparent cover. Dosing modules, MD-Disc with cone and specimen holders are ordered separately. 06026227

**Tegramin-25**
- Automatic, microprocessor controlled machine for grinding and polishing of specimens on 250 mm MD-Disc with cone. Dosing modules, MD-Disc with cone and specimen holders are ordered separately. 06026127

**Tegramin-25 with cover**
- Automatic, microprocessor controlled machine for grinding and polishing of specimens on 200 mm MD-Disc with cone. Transparent cover. Dosing modules, MD-Disc with cone and specimen holders are ordered separately. 06026227

**Tegramin Dosing Module with 1 DP pump**
- To be installed on Tegramin-30 / -25 or -20. With one pump for diamond suspensions or lubricants. 06036900

**Tegramin Dosing Module with 2 DP and 1 OP pump**
- To be installed on Tegramin-30 / -25 or -20. With two pumps for diamond suspensions or lubricants and one pump for OP suspensions. 06036902

**Bottle tray for Tegramin.**
- With space for six ½ l bottles and one 1 l bottle. To be used with Tegramin-30 / -25 or -20. 06036910

**Preparation Discs**
- MD-Disc with cone for Tegramin-30, 300 mm dia. 06086403
- MD-Disc with cone for Tegramin-25, 250 mm dia. 06086402
- MD-Disc with cone for Tegramin-20, 200 mm dia. 06086401

**Cover**
- Transparent cover for Tegramin-25 /-30 06036903
- Transparent cover for Tegramin-20 06016903

**Splash guard**
- For Tegramin-30 06036905
- For Tegramin-25 06026905
- For Tegramin-20 06016905

**Disposable bowl liner**
- For Tegramin-25 /-30 5 pc. 49900052
- For Tegramin-20 5 pc. 49900056

**Shift valve for Tegramin**
- For recirculation cooling unit (05766xxx) or drain. 06036904

**Struers Cooling Unit, System 3.**
- With 50 l tank, small pump, Cool-1, 50 l static filter with filter paper.
  - 1 x 100 V / 50 Hz 05766515
  - 1 x 220-240 V / 50 Hz 05766522
  - 1 x 100-120 V / 60 Hz 05766533
  - 1 x 220-240 V / 60 Hz 05766524
  - 1 x 100-120 V / 50-60 Hz CSA 05766616

**Levelling device.**
- For levelling 1 specimen in specimen holder (a 140 mm) 05256903
- For levelling 1 specimen in specimen holder a 140, 160 and 200 mm. 04886101
- With pressure foot for positioning of specimens 04886102

**Coupling**
- For Tegramin-30 and Tegramin-25 specimen mover plates. 06086908
- For Tegramin-20 specimen mover plates. 06086900

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### Specimen mover plates, for individual specimens

<table>
<thead>
<tr>
<th>For Tegramin-25</th>
<th>For Tegramin-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without holes</td>
<td>06086906</td>
</tr>
<tr>
<td>For 6 specimens 25 mm dia.</td>
<td>06086902</td>
</tr>
<tr>
<td>For 6 specimens 1&quot; dia.</td>
<td>06086909</td>
</tr>
<tr>
<td>For 6 specimens 30 mm dia.</td>
<td>06086903</td>
</tr>
<tr>
<td>For 6 specimens 1½&quot; dia.</td>
<td>06086910</td>
</tr>
<tr>
<td>For 6 specimens 1¼&quot; dia.</td>
<td>06086911</td>
</tr>
<tr>
<td>For 6 specimens 40 mm dia.</td>
<td>06086904</td>
</tr>
<tr>
<td>For 3 specimens 50 mm dia.</td>
<td>06086905</td>
</tr>
<tr>
<td>For 6 specimens 50 mm dia.</td>
<td>06086911</td>
</tr>
<tr>
<td>For Accustop 30</td>
<td>06086907</td>
</tr>
<tr>
<td>For Accustop 40</td>
<td>06086916</td>
</tr>
</tbody>
</table>

### Specimen mover plates for Tegramin-20, for individual specimens

<table>
<thead>
<tr>
<th>For Tegramin-20</th>
<th>For Tegramin-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 4 x 25 mm dia.</td>
<td>06086912</td>
</tr>
<tr>
<td>For 4 x 30 mm dia.</td>
<td>06086913</td>
</tr>
<tr>
<td>For 4 x 40 mm dia.</td>
<td>06086914</td>
</tr>
<tr>
<td>For 4 x 1½&quot; dia.</td>
<td>06086915</td>
</tr>
<tr>
<td>For 4 x 1¼&quot; dia.</td>
<td>06086916</td>
</tr>
<tr>
<td>For 4 x 1&quot; dia.</td>
<td>06086917</td>
</tr>
</tbody>
</table>