Operating Instructions

ECO-mini „wet“

Operating Instructions
for the Disc-Finishing Machine
ECO-mini „wet“

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Dear Customer,
to guarantee perfect function of your machine, it is tested in our production line. This can leave residual amounts of media in the work-container.

We strongly recommend, the ECO-mini “wet” only use following grinding media.
-Plastic grinding chips no smaller than 3 mm (they get smaller with use and have to be sieved, then removed).
-Ceramic chips no smaller than 3 mm (they get smaller with use and have to be sieved, then removed).

Important note!
Do not process following work-pieces in the Eco-mini:
-Necklaces
–small chains (smaller than 4 mm) –close the chains before processing!
–hollow chains
We strongly recommend you examine the work-pieces to check they are suitable to process in Eco machines. For work-pieces which have weak spots or parts and might be damaged or break while processing, we can not give any guarantee.

1. Foreword

To ensure correct operation with the machine, please read the following operating instructions carefully.

The manufacturer Otec Präzisionsfinish will not give any warranty nor guarantee for damage or harm which is caused by not taking notice of the following operating instructions.

2. Safety instructions

- The machine has to be set up on an even surface.
- Allow the air to circulate through the lattice on the bottom of the machine. Do not block it.
- Do not put the machine into a container-otherwise there is the danger of water entering the electronic compartment.

Use the machine only with an earth leakage circuit breaker (ELCB, FI).

- Use only from Otec recommended media.
- Acid media might damage the machine and harm the safety.
- Always disconnect the electrical lead from the machine when not in use or while servicing.
- Never use the machine without having enough water-compound mixture - the pump could run dry.

Be sure the operator of the machine has read and understood the operating instructions.

3. Frequently Asked Questions

Q1. What kind of grinding media can be used in the *ECO-mini "wet"?*

A1. After extensive laboratory tests the best results were obtained with fine grinding plastic-chips. We recommend you only use the following Otec premium grade grinding plastic-chips.

- Plastic grinding chips KO 10 and PO 10 for pre-grinding.
- Plastic grinding chips KX 10 and PX 10 for fine grinding.
-Ceramic chips no smaller than 3 mm.

Q2. Will grinding with the *ECO-mini "wet"* damage jewelry stones, amber, plastic or pearls?
A2. Up to a hardness of 8.5 Mohs of the goods and using the appropriate procedure, you can process it.

Q3. How long can the plastic-chips be used?
A3. Due to abrasion they are getting smaller. The minimum size should be 3 mm.

Q4. What quantity of plastic-chips and jewelry pieces can I put into the *ECO-mini "wet"*?
A4. You can put approximately 1.5 liters of plastic-chips into the *ECO-mini "dry"*.
The amount of jewelry pieces depends on their design, volume and on the weight per piece. It amounts to a maximum volume of 100 – 200 ml with a maximum weight of about 100 g.

When processing more than one piece, the individual weight of each jewelry piece should not exceed 8 grams, to avoid damaging each other and leaving impact marks.
As a rule of thumb take a ratio of 1:7 (jewelry pieces : media)

Tip – Be cautious, always start with a small number of pieces. You will learn from experience the optimum load. Never overload, as this will cause pieces to create impact damage with each other

Q5. Can the *ECO-mini "wet"* overheat?
A5. Definitely not. The machine has a thermal switch. In the unlikely event of it getting too hot, it will stop automatically.

Q6. Is it possible to process chains with the *ECO-mini "wet"?*
A6. Only partially! Be careful with thin chains (< 3 mm), they may tie up in knots. Hollow chains may become squeezed flat (also be careful with necklaces). It is Important to close the chain fasteners, before you start processing.

We strongly recommend you take care to make sure the pieces to be processed in the *ECO-mini "wet"*, are not in danger of being broken by the grinding action. All processing is at the Customers risk and we are unable to guarantee against damage, or repay any costs for articles damaged.

Q7. Which kind of alloys can be processed?

A7. All alloys of gold, silver, platinum, titanium can be processed, except for soft cast alloys, as used in fashion jewelry, and also 23 and 24 carat gold alloys.

Q8. What are the advantages of the *ECO-mini "wet"* compared to conventional tumbling machines?
A8.

- Tumbling machines: In conventional tumbling machines all the dirt and the cut-off from the jewelry stays in the water-compound mixture and will be rolled or hammered into the micro-pores of the jewelry. Therefore the mirror-shining polishing result will not be given in the dry-polishing process.
- *ECO-mini "wet"*: All the dirt and the cut-off from the jewelry will be flushed out of the machine with the water-compound mixture. This means: Always clean surfaces.

Q9. How high is the noise emission when grinding?
A9. The *ECO-mini "wet"* is considerably quieter than a tumbling machine. When the machine starts to be louder, probably the foam is missing.

Q10. Have the work pieces to be cleaned after the grinding?
A10. Yes, definitely! Use an ultrasonic bath for about 2 to 3 minutes.

Q11. Can I cover the *ECO-mini "wet"* with a lid?
A11. Yes –a lid is offered by your dealer.

Q12. How can too small chips be removed from underneath the disc?
A12. Loosen the central screw, remove it, take off the disc and clean it. Replace the parts in reverse order.

Q13. Can you use gold and silver at the same time?
A13. Yes!

4. How to set up the machine

The ***Eco-mini "wet"*** is a bench type machine and is to be positioned on an even surface. Allow the air to circulate through the lattice on the bottom of the machine. Do not block it.

The ***Eco-mini „wet"*** consists of the following components:

- The ***Eco-mini „wet"*** itself, a wastewater-container, a dosing-pump with a little container for the pump and grinding media.
- Set the machine up as follows (see photo):
- Attach the wastewater-hose to the wastewater-container.
- Put the pump into the small plastic container and then put them both into the wastewater-container.
- Fill the wastewater-container with 10 liters of water and 0.5 liters of the compound SC 5. (dental industry should use instead 0.3 liters of SC 12).

- Insert the electrical plug into a socket. Be sure that the voltage of the socket matches the voltage of the machine.
- Now the machine is ready for use.

Important! The machine has to be operated with an earth leakage circuit breaker (ELCB, FI).

5. Technical Data

Width	240 mm	9.5 inch
Depth	240 mm	9.5 inch
Height	345 mm	13.6 inch
Basic Volume	3 lt.	3.0 liters
Weight	4 kg	8.8 pounds
Voltage	230V ; 50/60 Hz	115V 50/60Hz
Power consumption	60 W	60 W

Be sure to check the voltage shown on the machine label is the correct voltage for the country of operation.

The Manufacturer accepts no liability for damage to the machine when using the incorrect voltage !

6. Fillings and work-piece size

Max. load when filled with grinding media (guideline)	1,5 lt.
Max. weight per work-piece if you process several work-pieces	8 grams
Max. weight of all work-pieces in the machine	100 grams
Work-piece size	Bigger than 1mm

Only use media larger than 3 mm. Media smaller than 3mm has to be sieved and removed.

7. Use and Function of the Machine

The disc finishing machine ***Eco-mini „wet“*** is used for the wet surface treatment of jewelry and work-pieces in the dental Laboratory (mainly wet grinding).

Here the objective is to replace hand preparation (emery paper-work) of a work-piece by wet grinding with the ***Eco-mini „wet“*** and to create a surface which can be polished afterwards with a dry polishing machine like the ***Eco-mini „dry“***.

- The top of the process container is open and the disc at the bottom is designed to rotate. The container wall itself does not rotate.
- When the process container is filled with polishing or grinding media and the disc rotates, a toroidal movement is generated, which creates a long frictional path resulting in an extremely efficient polishing action on the work piece.

While wet-grinding, the water/compound mixture is continuously added to the media through a pump. This helps to drain the residual particles of the grinding process out of the work-container and to grind the work-pieces smoothly, keeping them clean and free from corrosion.

The waste-water flows via a hose into the waste-water container where the larger waste particles can settle and the water/compound mixture can be pumped back to the process.

After approximately 10 to 16 working hours the water/compound mixture should be replaced, otherwise too much

waste residue might get into the work-container and therefore back into the process. This would result in a poor finish.
Do not pour the waste-water into the drainage but take it to a refinery where the precious metals (which might be in the residual waste) can be recovered.

7.1. The Electrical Switches

The process timer with the scale (shows the time in hours) serves at the same time as START/STOP switch.

By turning the timer clockwise the time can be set and the machine starts processing. The pump will then be automatically activated.
Max. processing time: 15 hours (at 115V: 12 hours)
When the time set is reached, the machine will stop automatically.
By turning the timer counterclockwise to “0” the machine will stop.
Never use the machine when the pump can run dry.

7.2. Grinding with the Eco-mini „wet"

7.2.1. Grinding Media

In general one distinguishes between two different kinds of grinding media:

- Ceramic-bond media (especially for the dental sector). Here the ceramic abrasive media is bonded in a ceramic substance.

Advantage: short processing times, high pressure to the work-piece. Also many different shapes can be produced.
Disadvantage: ceramic can damage soft surfaces such as gold and silver.

- Plastic bond media (especially for the jewelry sector) Here the abrasive media is bond in a plastic substance.

Advantage: fine, smooth surfaces can be achieved.
Disadvantage: more expensive than ceramic media.

In these operating instructions we want to concentrate on the use of plastic grinding media.

7.2.2. Plastic Grinding Media and their Application

There are generally two forms of plastic grinding media:
Cones with the prefix “K”. They are especially suitable for even surfaces, jewelry with cubic zirconia, Sapphire etc. Through their round shape they will achieve a finer surface finish than with a pyramid shaped media.

Pyramids with the prefix “P” are especially suitable for the treatment of corners and edges etc.
Normally it is best to mix these two shapes in a ratio of1:1.

7.2.3. Blue plastic chips of the quality “O”

These plastic chips are strongly abrasive and are mainly used for pre-grinding of raw, not yet treated castings.
After grinding with these plastic chips you have to fine-grind with the plastic chips KX 10 (white) or PX 10.

Look out! These blue plastic chips can damage cubic zirconia or soft precious stones like rubies.
They can only be ground with KX 10 (you also could use PX 10 when the processing time is shorter than 3 hours)
Otec recommends blue pyramids PX 10 for the pre-grinding of raw, not yet treated castings and generally for the grinding of fairly cleaned platinum, stainless-steel or titanian jewelry machined on a turning lathe.

7.2.4. White plastic chips of the quality “X”

These plastic chips are used for very fine grinding and achieve a surface finish which is fine enough for being polished by a dry polishing machine (***Eco-mini „dry“***). For the processing of jewelry with cubic zirconia especially, the cone-shaped chips KX 10 are adequate.

7.3. Compounds and their application

In general the compound SC 5 is used in the ***Eco-mini „wet“***.
The compound SC 5 keeps the work-pieces clean and corrosion-free while grinding. Also, the sharpness of the chips is retained, by using this compound.
SC 5 should be mixed with water as per the following instructions:
Add 0.5 liters of the compound SC 5 to 10 liters of water.

7.4. Processing examples

7.4.1. How to process jewelry straight from the casting

When you want to process jewelry straight from the casting, the grinding should be done in two steps:

- Fill the work-container with approximately 1,5 liters blue plastic chips PO 10 (pyramids) .
- Select the processing time by turning the timer clockwise. The machine will now start.
    - Processing time to grind gold and silver: 2-3 hours
    - Processing time to grind platinum, titanium and stainless steel: 6-12 hours
- The machine will switch off automatically after the time set has expired.
- Unload the work-container completely and separate the blue chips from the work-pieces.
- Fill the work-container with the white cones KX 10.

- Select the processing time by turning the timer clockwise. The machine will now start.
    - Processing time to grind gold and silver: 1-3 hours
    - Processing time to grind platinum, titanium and stainless steel: 3-6 hours
- The machine will switch off automatically after the time set has expired.
- Unload the work-container completely and separate the white chips from the work-pieces.
- Clean the work-pieces in an ultrasonic bath for about 2-3 min. If you than want to process them immediately in a dry polishing process like in the ***Eco-mini „dry“***, they do not have to be dried.

7.4.2. How to process emerypaper-treated jewelry

When you want to process cast emerypaper-treated jewelry or chains, the wet-grinding needs to be done in only one processing-step:

- Fill approximately 1,5 liters white plastic chips KX 10 and PX 10 (cones and pyramids mixed 1:1) into the work-container.
- Only use cones KX 10 when grinding jewelry with soft precious stones.
- Select the processing time by turning the timer clockwise. The machine will now start.
    - Processing time to grind gold and silver: 3-5 hours
    - Processing time to grind platinum, titanium and stainless steel: 4-12 hours

- The machine will switch off automatically after the time set has expired.
- Unload the work-container completely and separate the white chips from the work-pieces.
- Clean the work-pieces with an ultrasonic bath for about 2-3 min. If you want to process them straight afterwards in a dry polishing process like in the ***Eco-mini „dry“***, they don't have to be dried.

7.5. Suitable OTEC media

Otec recommends the following media:

- Plastic chips:

PX 10 / KX 10 (white); PO 10 / KO 10 (blue)

- Ceramic chips:

DS 6/6; ZSP 3/5

When the chips have worn down to less than 3 mm, they have to be separated from the bigger ones and be removed from the machine!

Keep the media out of the reach of children !

7.6. Suitable work-pieces

The Eco-mini „wet“ is especially suitable for following work-pieces.

- Rings, even with cubic zirconia or precious stones like for e.g. brilliants or sapphires, etc.
- Earrings
- Brooches
- Pendants
- Chains (when they are bigger than 4 mm!)

Please note:

- Rings bigger than 8 grams should be processed single.
- Bigger work-pieces which might touch or get entangled in the machine and therefore get damaged, should be processed on their own (individually).
- Be cautious with thin, small chains (smaller than 4 mm). They might end up in knots.

Important information!

The following work-pieces are unsuitable for the *Eco-mini „wet“:*

- Necklaces
- Chains thinner than (smaller than 4 mm)
- Hollow chains

Please observe the following:

We recommend you check the work-pieces for their suitability for processing in the *Eco-mini „wet“* and other Eco-machines.

For work-pieces with weak spots or a high risk of breaking or being damaged, the manufacturer Otec Präzisionsfinish, can not give any guarantee.

Well set, precious stones, usually do not work loose or fall out of the jewelry. Set stones, which get loose or fall out of jewelry, can not be guaranteed by the manufacturer, Otec Präzisions-finish.

Generally, precious stones up to a hardness of 8.5 (Mohs) can be processed without damage in the ***Eco-mini „wet“***.

8. Problems while processing and remedy

Problem: A very thick foam which does not disappear is in the waste-water container.
Cause: There is too little compound in the water or rather the compound is used up.
Remedy: Increase the concentration of the compound.

Problem: After polishing you can see little “pimples” on the surface of the work-piece.
Cause: The water/compound mixture is too dirty or the casting quality of the work-piece is poor. (Is there silicon in the surface of the casting?)
Remedy: Exchange (refresh) the water/compound mixture and/or improve the quality of the casting.

Problem: cubic zirconia , Sapphire is damaged.
Cause: You might have used the wrong chips or too little foam.
Remedy: Use plastic-chips KX 10 and check the water/compound mixture.

Problem: After dry polishing there is a lot of the, so called “orange skin” on flat work-pieces.
Cause: The grinding-chips are too abrasive (rough), therefore the dry polishing media can not flatten the surface sufficiently.
Remedy: Grind once more with KX 10 or dry-grind in the ***Eco-mini „dry“*** afterwards using H/1-100 walnut granule.

9. Technical problems and remedy

Problem: Machine makes squeaking noises.
Cause: The grinding chips are too small (small ones were not removed) or work-pieces are getting underneath the disc.

Remedy: Remove the disc by removing the screw which holds the disc in place, with an allan key size 3. Remove the disc to clean underneath and replace the disc. Always sieve out the chips smaller than 3 mm.

Problem: The water/compound mixture does not completely drain from the work-container.
Cause: The waste-water hose is blocked.
Remedy: Remove the disc as described above and check if the waste-water hose is blocked. Clean it if necessary.

Problem: The disc jams.
Cause: The gap between the disc and the work-container is too narrow, the disc is badly worn or there are chips/work-pieces jammed in underneath.
Remedy: Remove the chips or the work-pieces and check the disc wear. If necessary, replace the disc.

Problem: There is water leaking out of a hole in the work-container. (see picture)

Do not use the machine any further until the problem is solved. Otherwise there is the potential danger of water entering the motor!
Cause: A seal is defective.
Remedy: Give the machine for repair to your dealer or direct to Otec Präzisionsfinish.

10. Warranty

The warranty is valid for a period of 6 months from the date of purchase.
There will be a warranty on the condition that you show the invoice giving the place and date of purchase. Also the machine number are marked.

The warranty will not be valid, if:

- grinding-chips or compounds, other than those recommended by Otec Präzisionsfinish, have been used.
- the machine was not used as described in the operating instructions.
- media smaller than 3 mm has been used.
- the machine was not equipped with an earth leakage circuit breaker (ELCB, FI).

11. Fast aid

If you have any questions for the operation of the machine or the processing of your work-pieces, do not hesitate to contact your dealer.
Further information and answers to the frequently asked questions you also can find in the internet under:
www.eco-mini.com

12. Manufacturer

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