PICO™ Cleaning Instructions
How to clean PICO piezoelectric metering valves

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1. Exterior cleaning

The outside of the valve should be cleaned only with a soft cotton or cellulose cloth. The cloth can be moistened with alcohol when pollution is excessive.

⚠️ CAUTION!

**Warning:** Do not use very wet cloths, and never spill solvent, alcohol, water or other liquids directly onto the valve. Do not submerge the valve in cleaning agent. The drive could be destroyed if liquid penetrates it.

2. Interior cleaning

The Pico metering valve is a high-precision valve for metering miniscule amounts of liquids. Because of its intended use, the Pico metering valve can have a very small opening slit due to the small stroke. The slit can be clogged by even the finest impurities or can jam when closing, which would impact the metering results.

Symptoms of a polluted valve include:

- Imprecise metering
- Material escapes after closing, forming a film or drops of liquid on the outside of the nozzle
- Metering stops because the drop cannot detach itself from the nozzle
- Metering and purging are not possible when the nozzle or slit is clogged.

Metering that does not function properly does not necessarily indicate a polluted valve. First check the following:

- Is the valve connected properly? Check the cable connections valve – control unit CON/DCON – PDA – PLC or other controls and verify that voltage is supplied. Is the PDA display on? Is the ON LED illuminated on the CON?
- Is material being supplied to the valve? Check the material quantity. Check the compressed air supply.
- Are the parameters set correctly? Check the metering parameters, the set temperature on the valve and the feeding pressure.
- Does the control unit indicate an error? Observe the LED on the CON.
- Does the valve work when metering is activated? Mechanical opening and closing can usually be detected audibly. (This may not always be possible, depending on the material and ambient noise)

If these steps were able to confirm that there were no other faults, the valve should be cleaned.
2.1 Purging the valve

– First an attempt should be made to flush out the impurity. On the PDA/DCON, select the menu item "Cleaning," then select the valve and leave it open until the material flows out in a clean stream. The pressure applied may need to be increased for some applications. Then wipe off the outside of the nozzle plate and activate metering again.

If this is not successful, the valve can be purged with solvent in the next step:

⚠️ **CAUTION!**

**Warning:** Consult the manufacturer of the material to be metered to find out the suitable cleaning solvent.

– Depressurize the system and open it. Replace the metering material with a suitable cleaning agent. Use an appropriate container to collect the cleaning agent to prevent an unnecessary mess!

– Pressurize the pressure tank as the case may be material container.

– Leave the valve open until cleaning agent flows out.

⚠️ **CAUTION!**

**Warning:** The valve may not be triggered without liquid material! Without liquid material, the nozzle plate can be damaged, leading to leakage. Then precise metering is no longer possible.

– To best clean the valve, allow the cleaning agent to soak for approx. five minutes with the valve closed.

– Then leave the valve open again and purge out the cleaning fluid.

⚠️ **CAUTION!**

**Warning:** When there is no more cleaning agent in the pressure container, compressed air will flow out. This can cause pollution of the space. Hold a rag in front of the orifice!

– Depending on the metering material, purging may need to be repeated several times to completely rinse out the material. In many cases the following applies: The higher the material viscosity, the longer purging is required.

– Depressurize the system.

– Exchange the container of solvent for a new container of metering material.

If metering still does function as it should, the valve must be cleaned manually.
2.2 Manual valve cleaning

- Purge the valve with solvent as described above to flush the metering material out of the valve.
- Depressurize the system.
- Remove the container of cleaning agent.
- Switch off the CON/DCON control unit.
- Remove the valve.
- Unscrew the nozzle plate (and, when appropriate, the needle adapter) and soak in solvent.

**CAUTION!**

**Warning:** Do not use tools to detach the nozzle plate; this could cause damage!

After releasing the screws, pull the nozzle plate down vertically to prevent the shut-off needle from bending. If the nozzle plate cannot be removed effortlessly by hand, insert the three M2.5 screws of the nozzle plate into the M2.5 threads of the needle adapter to push it off the valve body. This allows the nozzle to be lifted straight off.
Cleaning the fluid channel:

⚠️ CAUTION!

**Warning:** When the valve is cleaned while the nozzle plate is detached, it is essential to handle the exposed needle with sealing ball carefully! If the needle is deformed, the valve may leak!

- Clean the valve with lint-free brushes and solvent. The Pico cleaning set contains brushes for the material channel connecting thread, the material channel and the front section of the shut-off needle.
– Purge the material channel thoroughly with solvent and blow off with compressed air.

– Use a magnifying glass, or when available a microscope, to check for any remaining impurities. There should be no fuzz, particles, hardened material residue or other impurities in the valve.
Example images from the inner valve chamber:
The area around the closure needle in a new or cleaned condition

Area around the closure needle that is insufficiently cleaned
Closure needle bent during cleaning. Inspection of the straightness with the PICO CONTROL PLATE.
Cleaning the nozzle plate:

- Clean the nozzle plate with cotton swabs and solvent.necting thread, the material channel and the front section of the shut-off needle.

- Use the mini-reamer from the Pico cleaning set to carefully free the nozzle if it is blocked.
– Purge the nozzle plate with solvent and dry it with compressed air.

– Use a magnifying glass, or when available a microscope, to check for any remaining impurities. There should be no fuzz, particles, hardened material residue or other impurities in the nozzle plate.
Example images from the interior of the nozzle plate:

The interior of the nozzle plate in a new or cleaned condition

![Image of a clean nozzle plate with labeled parts: Nozzle plate, Valve seat ceramic (white), Nozzle bore.]

Interior of the nozzle plate that is insufficiently cleaned.

![Image of an insufficiently cleaned nozzle plate with labeled parts: Valve seat ceramic largely covered with remnants of adhesive, Particle deposits on the valve seat ceramic.]
Assembly:
Carefully put the nozzle plate into place and fasten with screws.

⚠️ CAUTION!
Warning: Handle the shut-off needle carefully. It may not be bent!

⚠️ CAUTION!
Warning: Each valve is allocated to a corresponding nozzle plate. To prevent mixup, the nozzle plate is labeled with the same serial number as the cover.

Other cleaning tasks:
To prevent impurities entering the valve, the connecting lines, fittings, etc. must be cleaned thoroughly, too. With needle metering, the needle adapter and the metering needle must also be cleaned.

Note: The effort required for cleaning depends on the metering material. The higher the viscosity and the higher the solubility, the more cleaning agent and time will be required.
3. Removing bubbles from the metering needle

– With needle metering, bubbles in the needle can causes a poor metering result.

Metering needles with a Luer-Lock needle connection have small cavities where air can be trapped even when the needle is purged normally.

This is why it is important, after filling the valve, to attach the metering needle without air pockets.

– The needle cone on the valve must point down.

– When the needle is detached:
  To flush remaining air out of the valve select on the PDA/DCON the menu item "Cleaning," then select the valve and leave it open until the material flows out in a clean stream. The pressure applied may need to be increased for some applications. No crackling should be heard when purging. (Crackling during purging is a sign of bubbles in the material).

– At low pressure, allow material to flow out of the needle and form a liquid drop on the needle cone tip.

– Insert the needle in the tube nut as for assembly, purge with solvent and then fill.

– Place the needle filled with solvent on the needle cone and fasten with the tube nut.

– Leave the valve open for purging until the solvent is rinsed out of the needle and the metering material flows out undiluted.

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