Turning your world

# APPLICATIONS
# HIGH PRESSURE COOLANT

# HIGH PRESSURE COOLANT SYSTEM

**High pressure** has become a trend in current machining technology due to its advantages for **better swarf breakage and tool life improvement.** Following that trend, **CMZ has fully developed a high-pressure coolant system** that can be mounted as an accessory in our TA, TD and TTL series. This system gives a pressure up to **70bar**, being able to select different pressures by M codes. It uses so called elementless filters that are a hybrid between centrifugal separators and liquid cyclones. This means that the system does **not use any paper** like other high-pressure systems and can filter up to **10µm.** The fact that the filter is "elementless" means that **it does not need any maintenance.**

The combination of **high-pressure** coolant and **low particle filtration** is key in some machining processes such as **drilling small holes** in difficult materials as it helps with the swarf breakage using through coolant tools.

If your processes do not require high pressure coolant CMZ can also offer 6, 15 and 35bar coolant options to suit your needs.

# BENEFITS OF USING HIGH-PRESSURE COOLANT

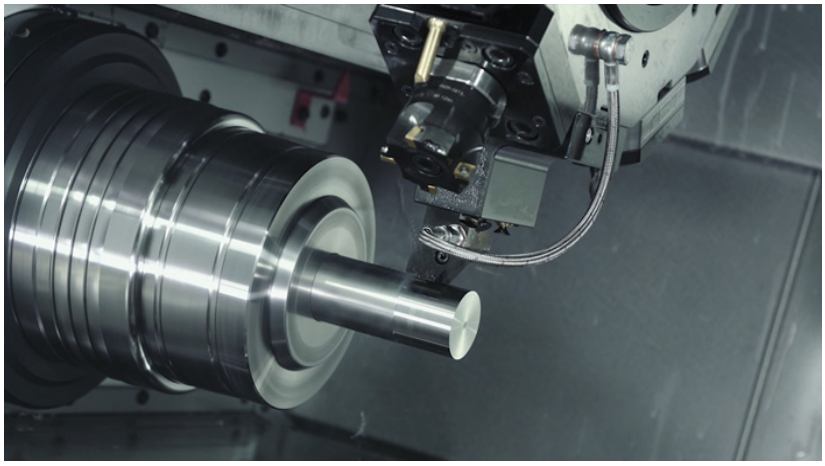
**High pressure coolant** has many **advantages.** Without it, some machining operations are not even possible. In this section we will explain how you can benefit if you decide to equip your CNC lathe with a high-pressure coolant unit.

When **drilling small holes** on hard material, through tool coolant is key to **avoid tool breakage.** In addition, the smaller the drill, the higher the pressure and smaller particle filtration is required by the tool manufacturers. The coolant pressure will help **to break the chips** when drilling and to extract them **backwards through the tool.**

*Example of small through coolant drill.*

Another example in drilling is when **long holes** need to be machined. With standard pressure coolant the chips cannot get out from the hole and get stuck finally breaking the tool. On the contrary, with high pressure coolant the **chips can exit the hole through the tool** and improve tool life.

In **turning,** if the coolant is correctly oriented to the insert with a jet stream, the **chips will break**. This will **improve tool life, surface finish** and will allow you **increase cutting** conditions. However, if coolant is not correctly oriented it does not help at all. To orient coolant to the inserts, special tools are offered in the market and flexible metallic tubes are connected from the turret to the tool.



*Example of directing coolant to the insert.*

# ELEMENTS OF THE HIGH-PRESSURE COOLANT SYSTEM

This system  is mounted external to the machine, meaning that additional floor space is required.
The reason is that a bigger tank is required in order to manage the coolant flow and pressure, the machine coolant tank is not sufficient.

The CMZ high pressure coolant systems is formed by the following elements.

**-Coolant tank:** the coolant tank, fully designed and manufactured by CMZ has a capacity of **330l.**

**-Pumps:** the number of pumps will depend on the number of turrets of the machine. One pump for TA and TD series and two pumps for TTL series. These pumps give a maximum of **70 bar** pressure.

**-Filters:** the so called **"elementless" filte**r is a unique design combining the centrifugal separator and the liquid cyclone. The filter does not have any element inside, it only uses the liquid to filter, therefore **no maintenance** is required. It substitutes the widely use paper filters. The capacity of **filtration** of this filter is up to **10µm.**

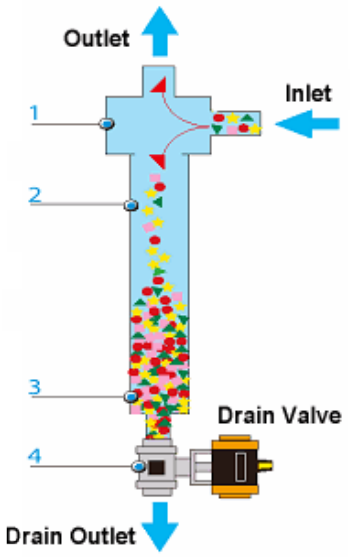
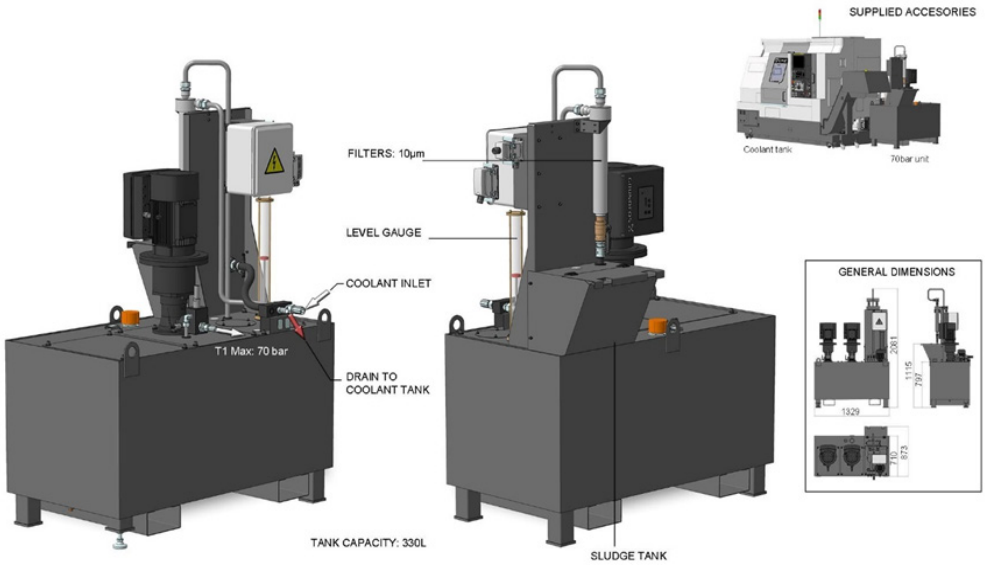


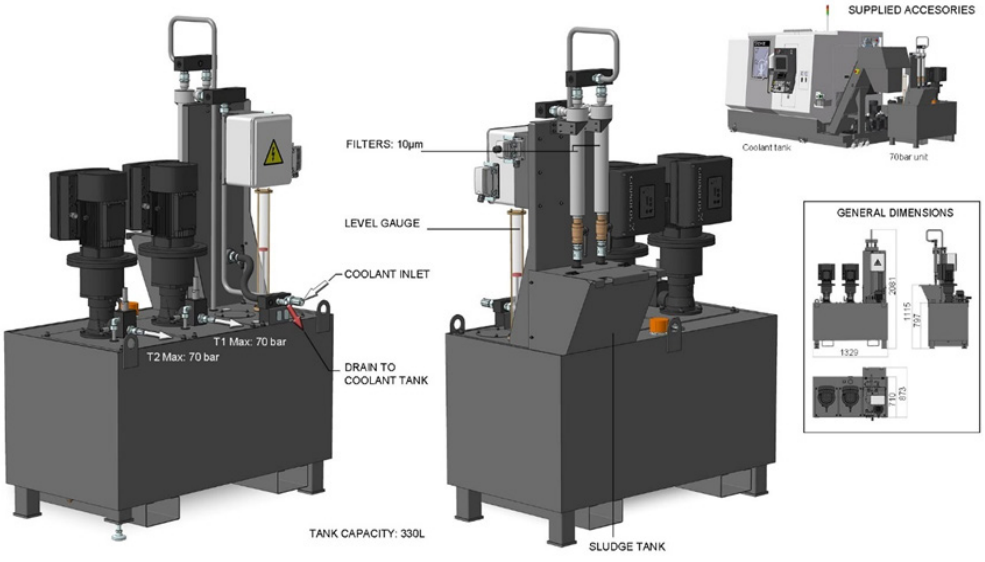

*Diagram of the "elementless filter"*

**-Level gauge:** it controls the overflow of the external coolant tank.

**-Sludge tank:** the chips and sludge after filtration end up in this container that has to be emptied.

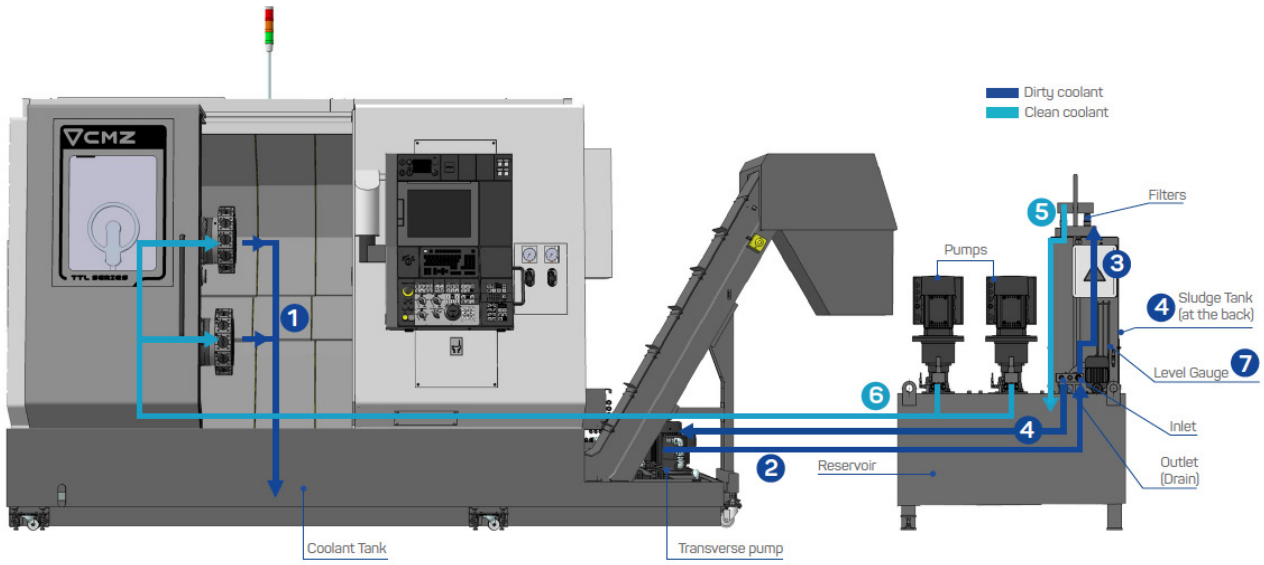



*High pressure coolant system for TA and TD series (single turret)*




*High pressure coolant system for TTL series (multi turret)*

# PRINCIPLE OF USE




**1.** Clean coolant gets out of the turret and fall into the coolant tank.

**2.** When the maximum level is reached in the coolant tank, the dirty coolant is pumped from the coolant tank to the high-pressure coolant.

**3.** The dirty coolant goes to the "elementless" filter. Its unique design makes the clean coolant to go up and dirt to go down.

**4.** Dirt goes down to the sludge tank and the remaining coolant goes back to the coolant tank through the drain.

**5.** Clean coolant goes to the 330l tank.

**6.** Coolant is repumped by the pumps to the turret.

**7.** When the maximum level is reached in the auxiliary tank the transverse pump will stop re-circulation and the coolant tank will continue to be filled until the cycle starts again.

# PROGRAMMING

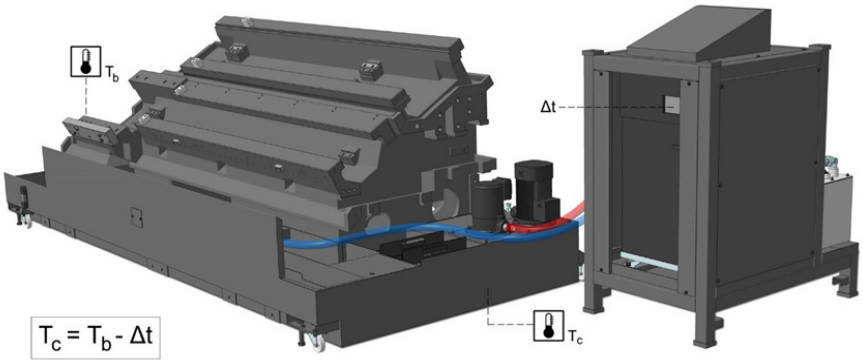
Programming is very simple different M codes will allow you to select the pressure you require.

| M CODE | PRESSURE |
|---|---|
| M401 | 10 BAR |
| M402 | 20 BAR |
| M403 | 30 BAR |
| M404 | 40 BAR |
| M405 | 50 BAR |
| M406 | 60 BAR |
| M407 | 70 BAR |
| M9 | Stop coolant |

# COOLANT CHILLER ACCESORY

When machining with high pressure continuously **coolant can start to heat.** That is why if high tolerances are required, high pressure coolant solutions are usually combined with the coolant chiller accessory.

In order **to keep coolant temperature constant,** CMZ can fit the lathe with a **coolant chiller unit,** fully design and manufactured by ourselves. The unit reads the temperature of the coolant (Tc) and the reference temperature (Tb) and cools the coolant down until the difference between them is a define value (ΔT). Machine default value is 0 so both temperatures are the same.




*Coolant chiller unit*
*Coolant chiller can be fitter also in lower pressure solutions and in all CMZ series.*

# OTHER COOLANT OPTIONS

If your machining process does not require high pressure coolant, CMZ also offers lower pressure solutions. These pumps are mounted in the machine coolant tank and no additional floor space is required.

- **6 bar** standard pump.
- **15 bar** additional pump.
- **35 bar** standalone pump with **pressure selection by M code 6-15-35bar.**

## ONE TURRET LATHES

### TA SERIES

Z400 MODEL

Z640 MODEL

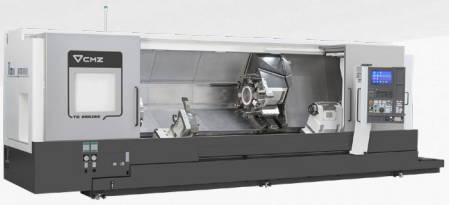
Z1100 MODEL

### TD SERIES

Z800 MODEL

Z1350 MODEL

Z2200 MODEL



Z3200 MODEL

## MULTI-TURRET LATHES

### TTL SERIES

TTL66 MODEL

TTL52 MODEL

VCMZ

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