



Microlubrication which is also named **minimum quantity lubrication (MQL)** is a means to bring **accurate quantity of liquid** in a process.

Microlubrication principles

Difference between microlubrication and spraying

These two technologies are able to spray liquids. Means to adjust the liquid flow are different:

	Microlubrication systems		Spray systems: liquids are sprayed by a gas		Spray systems: liquids are sprayed without a gas	
	with coaxial tubes	with single tubes	a pump feeds the nozzles with liquid	Nozzles suck the liquid up		
Liquid flow production	Each nozzle is fed by a micropump		A pump feeds all the nozzles.	The nozzles suck the liquid up with a gas.	Each nozzle is fitted with a pump	
Flow adjustment	- by changing capacities of micropumps - by changing working rates of micropumps		by adjustable jets		With nozzles: - by changing capacities of integrated pumps - by changing working rates of integrated pumps	
Nozzles are fed with	- liquid - gas	a mist made up near the micropump	- liquid - gas	a gas which sucks the liquid up from another intake.	something from which the pump sucks the liquid up	
Spraying thinness	is adjustable by: - the nozzles - the gas flow	Nozzles throw a mist	is adjustable by: - the nozzles - the gas flow	Nozzles generate a mist.	Is adjustable by: - the flow - the pressure	
Advantages	It is easy to manage each thinness each little flows.	A micropump can feed several nozzles.	It is easy to manage the thinness.	It is cheap.	- It does not require gas. - The strength of the jet	
Drawbacks	Each nozzle requires a micropump.	- the mist - the distribution between the nozzles fed by a micropump - the liquid flow management	the cost	- the mist - the liquid flow management	results when the liquid flow is low	
Devices	Instantaneous lubrication systems without a cabinet	Continuous lubrication systems without a cabinet	 <p style="text-align: center;">Spraying nozzles</p>			
	in a cabinet	in a cabinet				

Some nozzles may be used with microlubrication systems or spray system.

Microlubrication system components

	Essential components		Optional components
for all systems		a tank	a cabinet
			an attachment magnet under the system
	one or several	micropump	attachment magnet for nozzle
		single or coaxial tube nozzle or connector	quick coupling
for continuous systems		a sequencer	a tap
			a solenoid valve
for instantaneous systems		a solenoid valve	

When a system is fitted with several micropumps, switches may be provided to select working micropumps.

Management of micropumps

Adjustment of capacities

Most micropumps are fitted with a device to adjust their capacities. It may be a screw or spacers.

The driving

As microlubrication micropumps are volumetric using a piston, they push an amount of liquid each time they are activated. So it is necessary to distinguish two cases:

The need	one amount of liquid	a continuous flow
Constraint	The capacities of micropumps must suit the need. The operating cycle must allow a correct functioning.	It is necessary: <ul style="list-style-type: none"> • to run regularly micropumps • to smooth the flow
System type	Instantaneous microlubrication system	Continuous microlubrication system
Devices	<p style="text-align: center;">without a cabinet</p> 	<p style="text-align: center;">without a cabinet</p> 
	<p style="text-align: center;">in a cabinet</p> 	<p style="text-align: center;">in a cabinet</p> 

Nozzles

There are several kinds of nozzles:

- nozzles which spray the liquid on a circular area
- nozzles which focus the liquid
- nozzles which produce a flat jet
- nozzles for specific processes

Differences between microlubrication systems

Two microlubrication systems with the same characteristics may not give the same results because:

- there are differences between micropumps
- each manufacturer produces its nozzles
- the cabinets are different
- and so on.

These differences involve that:

- nozzles do not focus or spray the liquid with the same efficiency
- the liquid flow regularity is not the same
- all microlubrication systems cannot process all liquids