Mueller Pipe Cooler

OWNER'S MANUAL

SINGLE

TWIN

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1. PREFACE

This manual provides information and instructions for the correct and safe use of the Mueller Pipe Cooler. Read this manual carefully before starting to work with the Pipe Cooler.

The Mueller Pipe Cooler is designed for cooling raw milk using water or food-grade glycol, both in a milking parlor and a milking robot. The raw milk is pumped through the Pipe Cooler through the milking pump of a milking parlor or milking robot. The water flows from the water supply network or through a pump system through the Pipe Cooler. The cold glycol circulates through the Pipe Cooler by the circulation pump in the chiller.

The product specifications are indicated on the product by a nameplate. This type plate may not be removed or changed and must always be clearly visible.

Exclusions:

- The Mueller Pipe Cooler is intended and designed for the use described above, within the specifications as described in appendix A and shown on the nameplate affixed to the product. All other use, outside this description, is not within the responsibility of Mueller.
- The product specifications are indicated on the product by a nameplate. This type plate must not be removed or changed and must always be clearly visible.
- Only personnel authorized by Mueller may work on the Pipe Cooler.
- No changes may be made to the product or nameplate unless with Mueller's written approval. Failure to do so will void any warranty or other responsibility of Mueller.

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2. DESCRIPTION AND OPERATION

2.1 COOLING

The Mueller Pipe Cooler is designed for cooling raw milk using water or food-safe glycol. By allowing the cold water / glycol to flow past the warm milk in the exchanger, the water takes over the heat from the milk, causing the milk to cool down. The water flows in the opposite direction to the milk (counterflow principle). The cooling to be achieved depends on the temperatures of both mediums and on the flow rate of both. Optimal cooling is achieved by making the flow rate of the water / glycol at least twice that of the milk.

The milk flow is supplied by the milk pump of a milking parlor or milking robot.

A milk filter must always be placed in front of the Mueller Pipe Cooler in the milk flow to prevent contamination of the Mueller Pipe Cooler.

Cooling with water: The water flow comes from the water supply network, well pump system or a water circulation system. The water flow is usually switched by a solenoid valve, controlled by the milk pump, but flow can also be continuously present during milking. By allowing the water flow to continue for 15 seconds after the milk pump has been switched off, an additional cooling effect is obtained because the amount of milk in the Pipe Cooler is additionally cooled.

Cooling with glycol: The glycol is cooled and circulates by using a Mueller Chiller. Several coolers can be connected in parallel, with the solenoid valve controlling the glycol flow per pipe cooler.

2.2 CLEANING

The Pipe Cooler must be periodically cleaned on the milk side. When milking in batches (milking parlor), this must be done after each batch, with a continuously milking process (milking robots) at least 3 times per day. The Pipe Cooler is part of the cleaning process of the milking machine. With this, the milking machine must ensure the correct cleaning conditions of the Mueller Pipe Cooler.

Overall, the following criteria are important:

- Cleaning water temperature> = 40 ° C for 5 minutes. Or a different temperature if specified by the detergent supplier. This temperature is often higher with a milking robot.
- Sufficient concentration of cleaning agent. Cleaning agent suitable for cleaning milking installations
- Sufficient mechanical operation, that means sufficient pump speed and turbulence.
- Sufficient draining at milk-side before the start and between the separate cleaning cycles:
    - For vertical installation, or at an angle down to 45 °, this can be done by deflating it
    - When placed horizontally, or at an angle up to 45 °, it must be blown out by clean, oil-free compressed air. Use of outgoing cooling water:

Cleaning can be performed in two ways:

1. With filled cooling water chamber; The flow of water / glycol through the pipe cooler must always be shut off so that the cooling medium is stationary. Sufficient heat must be supplied from the milk-side cleaning to heat up part of the cooling water / glycol, to achieve sufficient heating of the milk-side material (figures 1 and 3)

2. With drained cooling water chamber; By draining the Pipe Cooler on the water side, the cooling water does not need to be heated during the milk-side cleaning, so that the required material temperature is achieved more simply and reliably (Figures 2 and 4).

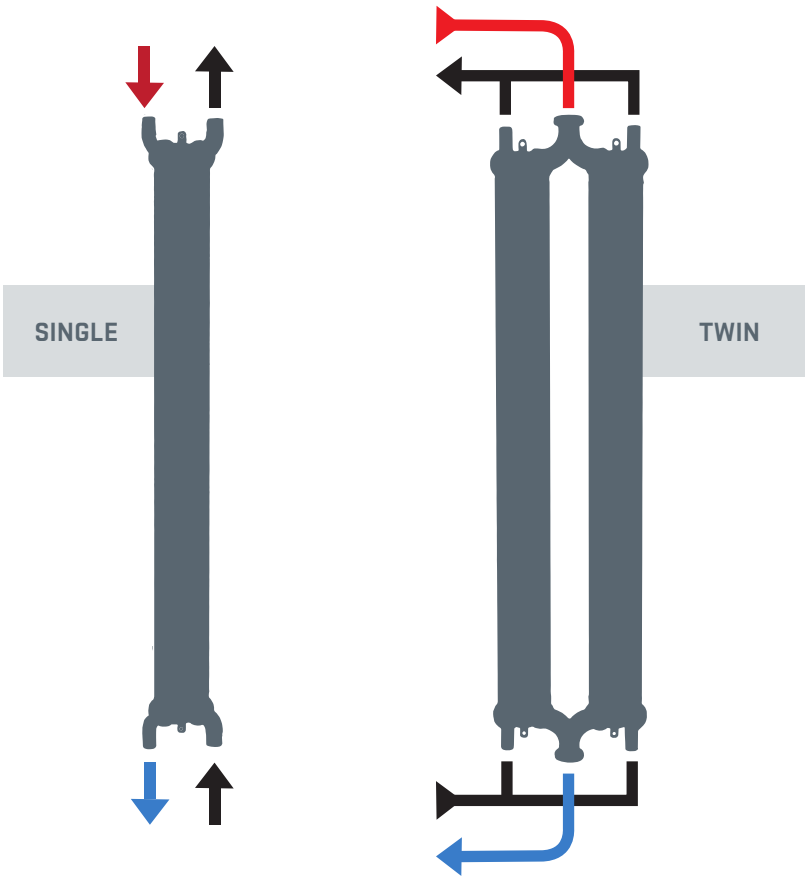
Mueller recommends draining the water chamber before cleaning, because this generates the best condition for good milking cleaning. See figures 2 and 4.

The different valves can be controlled electrically (solenoid valve) or pneumatically. Pneumatically is a common use at milking robot systems.

All water that is approved for livestock drinking water, may be used for cooling in the Pipe Cooler.

2.3 VERSIONS

- The Pipe Cooler has a **single** and a **twin** version.
- Milk connection is 25mm or 40mm at the **single** version, and 50mm at the **twin** version.



2.4 USE OF OUTGOING COOLING WATER

The outgoing cooling water can be dumped into the drain, but is often used as cattle drinking water (if suitable). Please note: water that has stagnated in the cooler for more than 24 hours may not be used as livestock drinking water.

There are several options:

- Dumping of leaving cooling water. Please observe the local regulations for the dumping of heated water.
- Store leaving cooling water in a storage vessel, and use it for livestockdrinking water, as admixture of the standard drinking water supply (Figures 1 and 2)

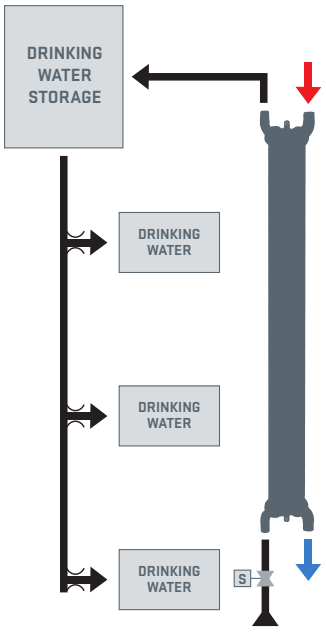


Figure 1: *Drawing water used for drinking water using a water storage bin, without drain function*

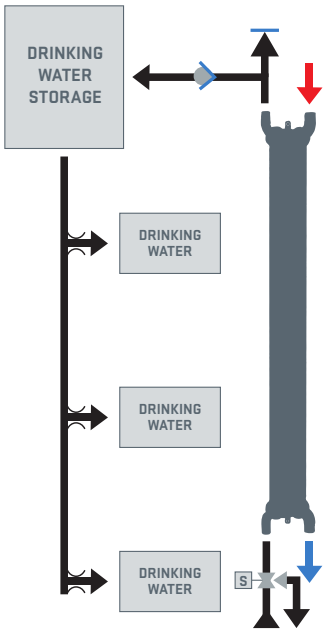


Figure 2: *Drawing water used for drinking water using a water storage bin, including drain function*

- Mix in a circulating drinking water system (Figures 3 and 4)

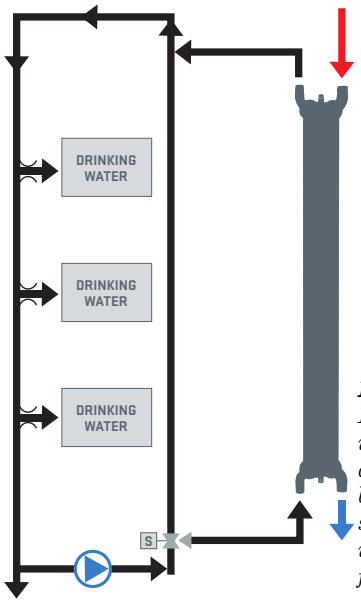


Figure 3: *Drawing water used for drinking water by a circulating system, without drain function*

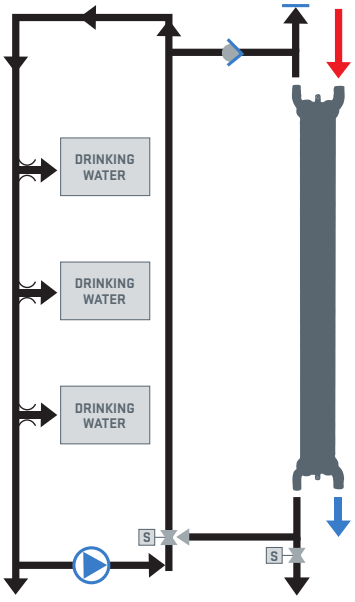


Figure 4: *Drawing water used for drinking water by a circulating system, including drain function*

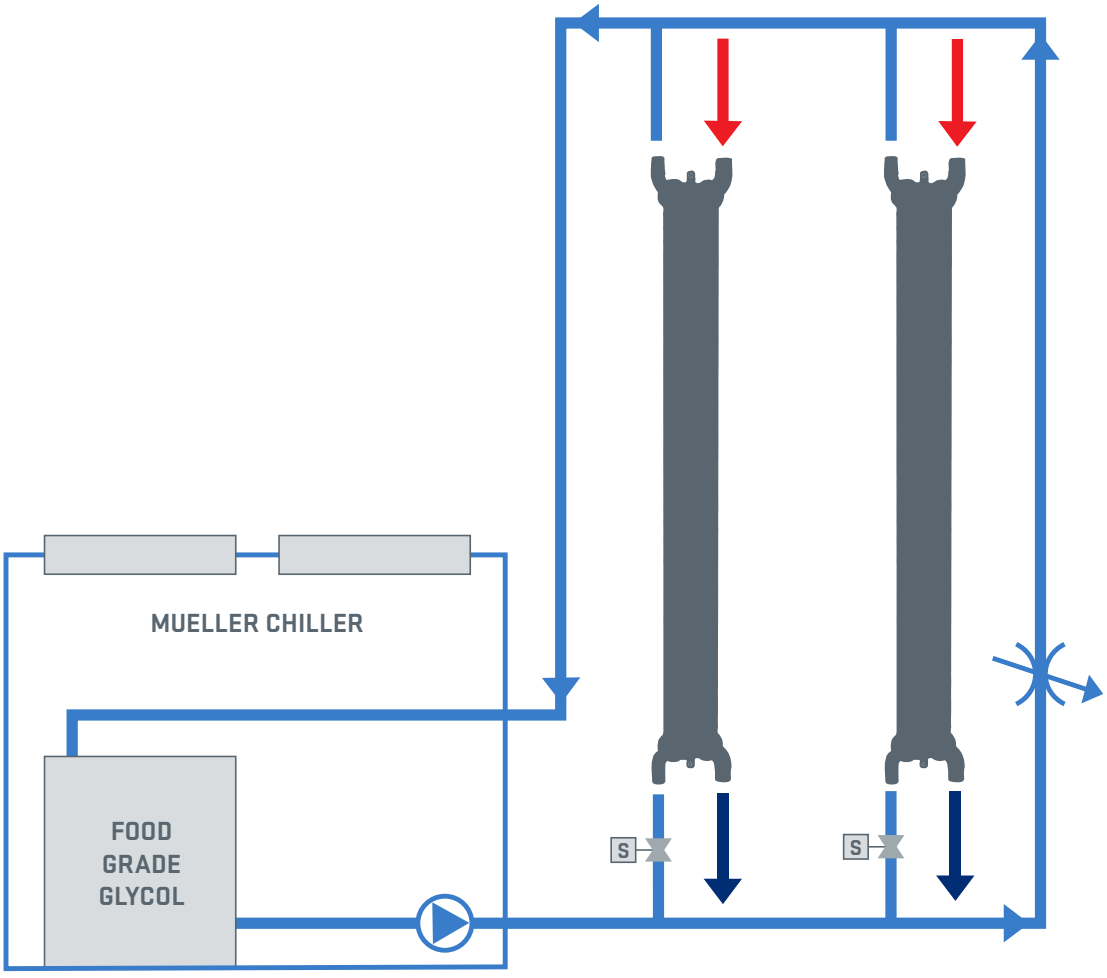
2.5 USE IN COMBINATION WITH THE MUELLER CHILLER:

Cooling is performed using food-grade glycol, in a closed circuit. Because there is no air contact with the glycol in a closed circuit, the glycol itself requires no maintenance. In this situation t is not possible to drain the glycol chamber during cleaning.

The combination of the Mueller pipe cooler with a Mueller Chiller may only be used with the use of food grade glycol. See Appendix A for specifications

During cleaning, the flow of water / glycol through the pipe cooler must be cut off (Cleaning option 1). The Mueller Chiller must always maintain sufficient circulation of cold glycol, even if the supply of glycol to one, several or all pipe coolers is closed. This requires a pressure-controlled bypass, which maintains a pressure difference of about 0.5 bar, and which has sufficient capacity to allow the entire chiller glycol-flow to pass

The supply temperature of the glycol to the pipe cooler must never be colder than 0.5 ° C to prevent the Mueller Pipe Cooler for freezing.



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3. TRANSPORT AND STORAGE

The Mueller Tubular Cooler must be stored / stored under the following conditions:

- Relative humidity: 10 to 90%
- Air temperature: 5 - 40 ° C
- Free from corrosive components
- Good ventilation with outside air

Upon arrival of the pipe cooler, check for transport damage. If transport damage is found, contact Mueller before starting to work with the product.

4. ASSEMBLY AND INSTALLATION

4.1 SETUP

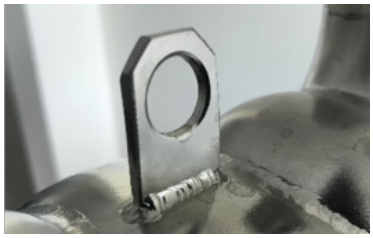
Place the unit in a room that meets the following requirements:

- Inside, protected from weather influences such as rain and wind.
- Neat, well-kept space
- Vibration-free floor / wall.
- With the following conditions:
    - Relative humidity: 10 to 90%
    - Air temperature: 5 - 40 ° C
    - Free from corrosive components
    - Good ventilation with outside air

4.2 MOUNTING

- Determine the position of the tube exchanger:Neat, well-kept space
    - Vertical or up to 45 ° from vertical: no special facilities required.ir
    - Horizontal or up to 45 ° to horizontal: A provision must be made for forced draining of the milk before cleaning. This is best done by pressurize it by clean, oil-free compressed air. Note the maximum allowable pressure (Appendix A). Please note that you can also exercise on the water side.

- Mount the pipe cooler on the wall, by:
    - Fix it to the wall with two supplied rubber pipe clamps (e.g. Walraven type 2S)
    - or hang it (vertically) on the suspension point.



- When connecting, ensure the opposite flow direction of the milk and water.
- Choose connection according to option 1, 2, 3 or 4 (H2)

- Connect the milk pipelines. This can be done with stainless steel (roller or welded connection), with flanges, or with a milk press hose.
- Connect the water pipes / glycol pipes.
- For the pipe connection, note the following:
    - Make sure that the pipes are connected in such a way that no vibrations can be transferred from a connecting pipe during both starting and continuous operation. Make sure that all pipes are connected stress-free, so that no tension is created on the internal part.
    - Avoid contact between the stainless-steel water connection and brass couplings / taps. Always place a PP nipple of plastic / plastic / PVC between a brass coupling / tap and the stainless-steel connection.
    - When making connections, avoid excessive moments and forces on the connections. Too high forces can damage the connection to the jacket. The correct gasket material must be used to seal the connection. When there is a threaded connection, Teflon tape can be used if the temperature allows.
- Connect the water valves / glycol valves to the control of the milk pump and / or the cleaning signal of the milking machine / milking robot.
- Ensure good electrical grounding of the Pipe Cooler, on the Pipe Cooler itself, or through the pipework.

4.3 MUELLER CHILLER:

Install the Mueller chiller according to the supplied installation instructions.

5. PUT INTO OPERATION

Check:

- Whether a milk filter is placed in the milk pipe in front of the pipe cooler.
- That the pipe cooler connections are free from leaks.
- That the pressures and volume flows remain within specifications (see appendix A)
- Whether the solenoid- or pneumatic valves work properly and seal properly.
- Whether the Pipe Cooler drains well on the water side during the drain function.
- Whether the temperature of the outgoing cleaning water is sufficient. Check this in collaboration with the supplier of the milking machine / milking robot.
- With chiller application: whether the supplied glycol temperature never drops below 0.5 ° C.

Perform a complete milk line cleaning before putting the pipe cooler into operation.

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6. MAINTENANCE

#	ACTIVITY	FREQUENCY	
		Monthly	Yearly
		User	Licensed Mueller Dealer
1.1	Check pipework and connections for leaks. Call your Mueller dealer in case of leaks.	X	
1.2	Clean the Pipe Cooler on the outside with a damp cloth, provided with water and a friendly, non-corrosive cleaning agent. Rinse with running water, do not use a high-pressure cleaner.	X	
2.1	Check the proper functioning of the valves, aerator, and the drain system.		X

7. DISPOSE

After disassembly, dispose the discarded parts in accordance with locally applicable regulations, as applicable at the time of disposal for the relevant materials.

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8. ATTACHMENT A: SPECIFICATIONS (FOR EACH PIPE COOLER)

PIPE COOLER		
Material	Stainless 316L	
Connections	Milk	Single: 25 or 40mm pipe
		Twin: 50mm pipe
	Water	1" BSP-OD
Performance	Milk temperature out will be 6°C above incoming water temperature (at flowrate water: milk = 2:1)	
Cooling Surface	4m2	
Internal Composition	app 60m pipe with internal diameter= 8mm.	
Pressure Loss	Milk	0,063 bar (70 l/min and 5.0 barg)
	Water	0.033 bar (170 l/min and 5.0 barg)
Max Flow	Milk	70 l/min
	Water	170 l/min
Measurements	Length	1,61m
	Diameter	0,14m
Weight	Empty	34 kg
	In Use	52 kg
Content	Milk	± 4 liter
	Water	± 10 liter
Pressure	Milk	max 16 barg
	Water	max 16 barg
Max Temperature	250°C	
Water Quality	Cattle drinking water quality	
Standardization	Produced in according with PED 2014/68/EU Sound Engineering Practice	

CHILLER-GLYCOL	
Type	Food grade glycol (FDA-approved category HT1) (Heat Transfer Floods with incidental food contact)
Freezing Point	<= -15°C
Recommended glycol	Part# 518114, Brenntag Zitrec F -20°C ready for use Refractive index (20°C): 1,372 – 1,380

9. ATTACHMENT B: PARTS

PART NUMBER	DESCRIPTION
600631	Pipe cooler 25mm
600629	Pipe cooler 40mm
600630	Pipe cooler Twin 50mm
506325	Solenoid valve 2-way 1" 400Vac
506326	Solenoid valve 2-way 1" 230Vac

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