

**SINUS**  
VERTEILER



# Custom buffer tanks

heating & cooling systems



## From heating manifolds to custom tanks

Sinusverteiler is a market leader in the manufacture of heating manifolds and compact hydraulic distribution systems. For some years now, we have been successfully developing an additional segment – tank construction – with a clear focus on custom tank manufacture. Entering this segment is a forward-looking idea, particularly given the highly varied customer preferences and industry requirements in plant construction.

The constantly changing requirements for tank and vessel technology demand a high degree of flexibility and manufacturing expertise. That is why we have procured the necessary resources and trained employees at our headquarters in Wettingen as well as at our international production sites.

**The result: high-quality one-off and special-purpose products with unbeatable delivery times! Put us to the test!**

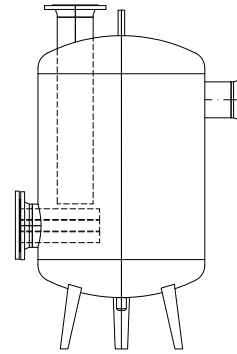
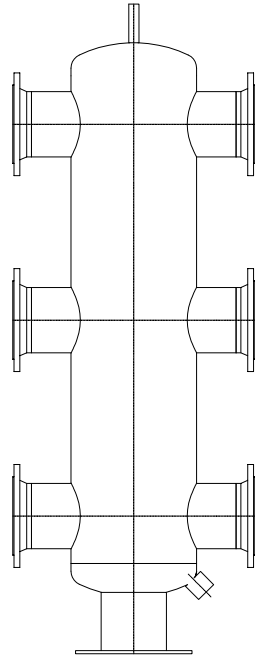
### Your advantages at a glance

- Custom tank solutions for your specific requirements
- Buffer tanks up to 25,000 litres
- Designed in accordance with Pressure Equipment Directive and optionally with AD 2000 regulations or a company standard
- For hot- and cold-water systems
- From DN 450 to DN 2400
- Connections according to your requirements
- Optionally with bends, nozzle pipes or mixing and stratifying plates
- Hand hole or manhole closures
- Additional custom fixtures as required
- Also available in stainless steel up to 5,000 litres

# Vessel-construction professionals

## MultiFlow Expert

Makes use of the different temperature levels in multivalent systems, lowers the return temperature and increases the efficiency of condensing boiler systems.

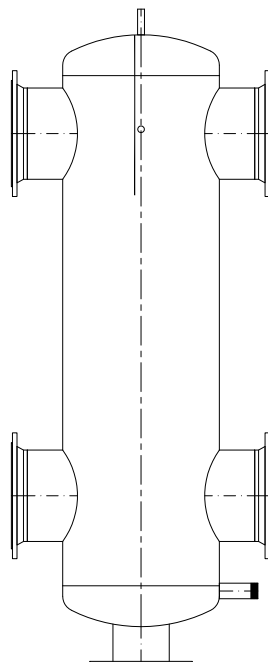


## Sludge removal tank

This separates sediments in ongoing operation, thereby reducing sludge accumulation in heating or cooling systems. As an option, the tank can also be equipped with magnetite filter cartridges for magnetite separation.

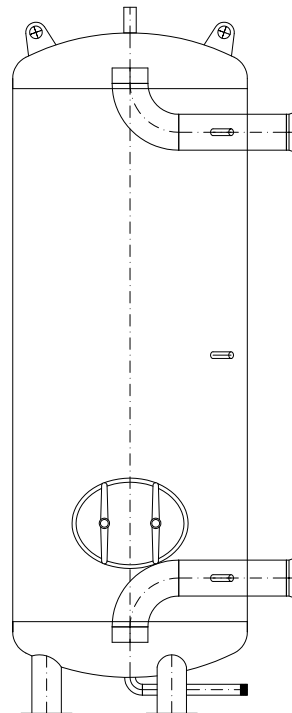
## Hydraulic separator

Disconnects the primary side from the secondary side in double- or multiple-pump systems, thereby preventing the different volume flows from affecting each other.



## Buffer tank

Optimal for storing varying quantities of water, thereby increasing the operating and idle times of hot- and cold-water generators.



## Elements to be installed or attached



### Flanged nozzles

For connecting pipeline continuations.  
You are free to choose the number and  
position of the flanged nozzles.



### Bends

Increase the optimal utilisation of the  
height of a tank and avoid  
unused dead spaces.



### Hand holes

Necessary service openings for small  
tanks. (100 x 150 mm)



### Manholes

Necessary service openings for large  
tanks. (320 x 420 mm)





### Nozzle pipes

Conduct the main volume flow without generating turbulence in the vessel.



### Diffuser bends

Reduce the inflow and outflow speeds of the fluid in the tank.



### Bushings

Used to connect measuring instruments such as thermometers and pressure gauges.



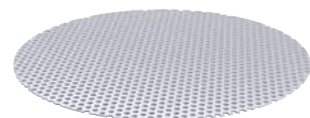
### Threaded nozzles

For connecting pipeline continuations with a threaded transition. You are free to choose the number and position of the flanged nozzles.



### Perforated / stratifying sheets

Enable necessary stratification within a tank.



# Production

## **You and us: a good team from start to finish.**

At Sinusverteiler, project support starts with the creation of a quote and extends through the right selection of components to production and finally to delivery of your vessel. Throughout the period of the job, we stay in close contact with you and keep you informed about each step in the process.



## **1. Quote**

We create a quote for you tailored to your specific preferences and requirements.

## **2. Order**

As soon as you decide to collaborate with us, our engineers work in close coordination with you to develop the basis for your vessel.

## **3. Release**

If our proposal matches your idea, you give us the go-ahead for production.

## **4. Production**

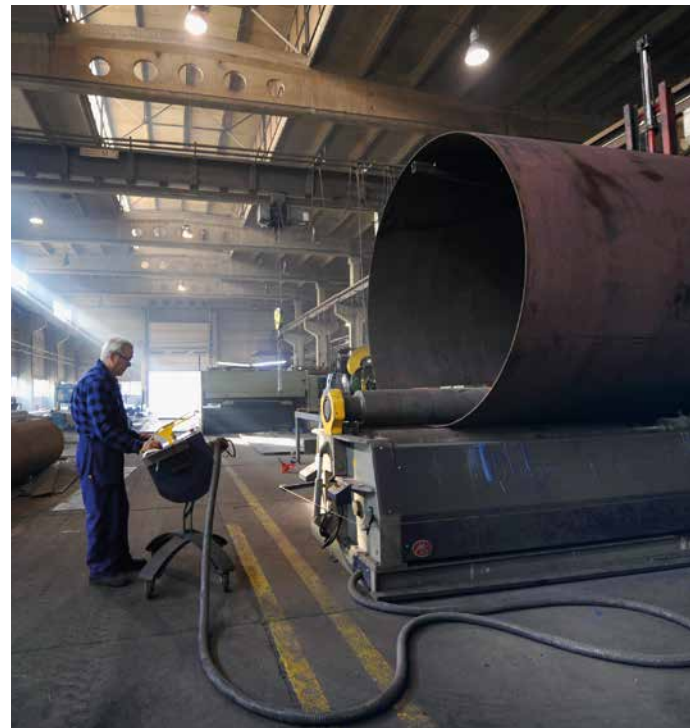
We use state-of-the-art technology and high-quality components to manufacture your vessel in next to no time.

## **5. Notification**

We coordinate with you when the goods will leave our warehouse and be delivered to you, so that you can make the perfect plan.

## **6. Delivery**

You receive your top-quality product as requested, in next to no time.



## CAD planning

### **We leave nothing to chance.**

Ensuring the top quality of our products is our number one priority, so we use state-of-the-art CAD software to plan and design our special-purpose vessels.

#### **4 steps for planning your vessel as requested:**

1. A custom CAD drawing is created
2. Consultation on custom design requirements
3. Plausibility check
4. Final release by the customer

## Insulation

### **The right insulation for every application.**

Sinus provides you with custom insulation for heating systems, made of soft foam or fleece material. For all cooling systems, we offer a diffusion-tight material based on rubber.



## Certificates

### **Reliable is reliable.**

Your trust is a highly valuable commodity. This is why we guarantee compliance with all necessary quality requirements for plant-manufacturing companies. As an HPO-certified welding specialist, our company also produces special-purpose vessels designed in accordance with the Pressure Equipment Directive 2014/68/EU, with pressures over 10 bar and temperatures over 110°C, and with individual TÜV acceptance as required.

- Manufacturer certification
- HPO certificate
- TÜV acceptance as required



**Sinusverteiler –  
quality certified to  
DIN EN ISO 9001**

## Lead time

### **Highly customised and yet fast.**

Thanks to highly qualified employees and state-of-the-art technology, we are able to create even customised tank solutions in a short amount of time. The most important factor in this is the interaction between you and us.

#### **Note:**

Sinusverteiler also manufactures special-purpose solutions for pressure tanks and pipelines that will be operated in accordance with EC Directive 2014/68/EU (Pressure Equipment Directive) with maximum allowable design pressures over 0.5 bar or with design temperatures of over 110°C.

These can be:

- Steam separators
- Steam storage vessels
- Compressed-air storage vessels





# Problem solving

## When considering your product, we think laterally.

As opposed to static, ready-made solutions and series production of standard storage vessels, custom vessel construction involves custom planning and implementation of installed and attached elements.

Specifically, this could mean nozzle pipes for improved in-flow, which would also optimise the function of the tank's hydraulic separator. Or it could mean the use of mixing or stratifying plates, designed and custom-installed according to the customer's wishes, to conduct the fluid exactly as needed. We can also install bends to maximise tank volume utilisation, as well as lance tubes to reduce flow speed. Lower speeds result in less turbulence and thus better stratification inside the storage vessel.

Perfection, from consultation to delivery: The engineers at Sinusverteiler are at your side to advise you during the design phase, making it possible to create virtually any tank that a technical planner could want in a system.

Most of the buffer vessels produced by Sinusverteiler are used in heating and cooling networks, but we can also produce vessels with higher pressure and temperature requirements. In addition to our range of steel tanks, we also manufacture custom stainless-steel buffer storage vessels in either 1.4301 or 1.4571.

High standards down to the smallest detail: Before delivery, every vessel is given a strength calculation. This special service is made possible by the technical expertise of our engineers.



# Dimensioning of a buffer storage vessel

Should neither the customer nor their technical planner provide a direct specification, the necessary volume can be calculated based on a few parameters. The only factors needed here are the thermal output (heating or cooling output), the storage time and the temperature difference between the feed and return. This information is plugged into the following formula:

$$V_{st} = \frac{P \times t}{c \times \Delta T}$$

$V_{st}$  = Storage volume in  $m^3$

$P$  = Heating/cooling rating in kW

$t$  = Storage time in h

$c$  = Heat capacity of the carrier fluid,  
in this case  $1.163 \text{ kWh}/(m^3 \times K)$

$\Delta T$  = Temperature difference in K

Example: The minimum rating of a water chiller of 50 kW at a temperature difference of 5 kelvin between feed and return is intended to be stored for a period of 20 minutes (cycle frequency).

$$V_{st} = \frac{P \times t}{c \times \Delta T}$$

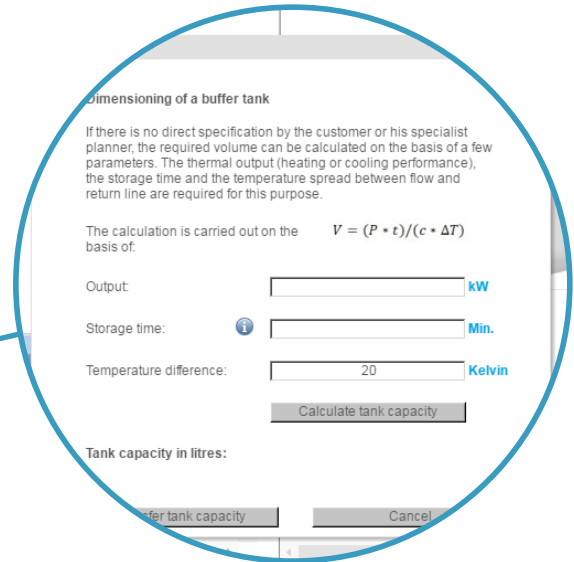
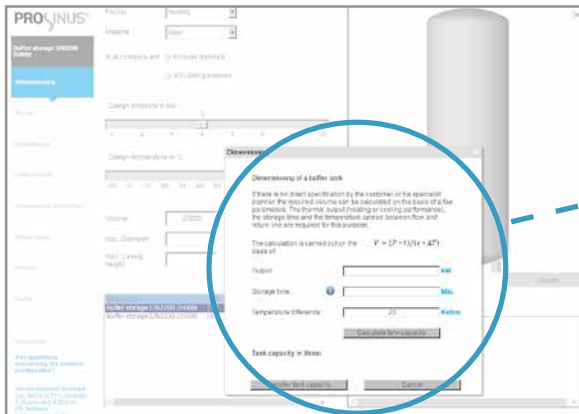
$$V_{st} = \frac{50 \text{ kW} \times 1/3 \text{ h}}{1.163 \text{ kWh}/(m^3 \times K) \times 5 \text{ K}}$$

$$V_{st} = 2.87 \text{ m}^3$$

Therefore, the storage volume required here is  $2.87 \text{ m}^3$ , or 2,870 litres.

# Storage volume calculation

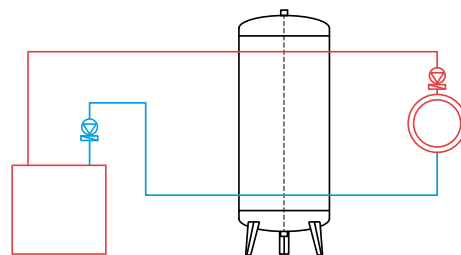
Our online product configurator allows you to calculate volumes quickly and easily ([www.konfigurator.sinusverteiler.com](http://www.konfigurator.sinusverteiler.com)).



## Hydraulic integration of buffer storage vessels

### Separator circuit

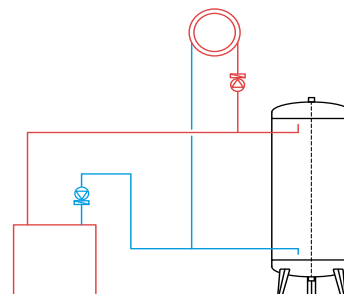
The buffer tank is usually connected by means of four connection nozzles, which separate the primary and secondary circuits from one another. These connections are often linked with nozzle pipes to avoid turbulence. With this system, it is only the difference in water volume is passed to the vessel, filling or emptying it.



### Cascade circuit

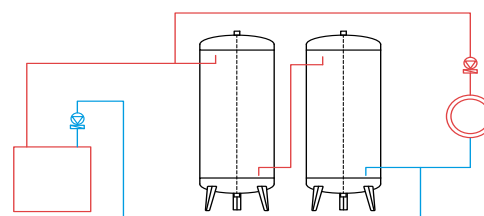
To optimise the running period of a hot or cold water generator, a buffer storage vessel is connected in parallel with the primary and secondary circuits and thus functions simultaneously as a hydraulic separator.

The greater water storage enables the efficient operation of a solid-fuel boiler or reduces the cycle frequency of a water chiller.



### Series circuit

Each storage vessel is provided with two connection nozzles. The filling and emptying system is based on the same principle as the storage circuit, except that here two or more tanks can be connected in series. The advantage of such a series circuit is ideal stratification with a relatively large storage volume.



# MultiFlow Center

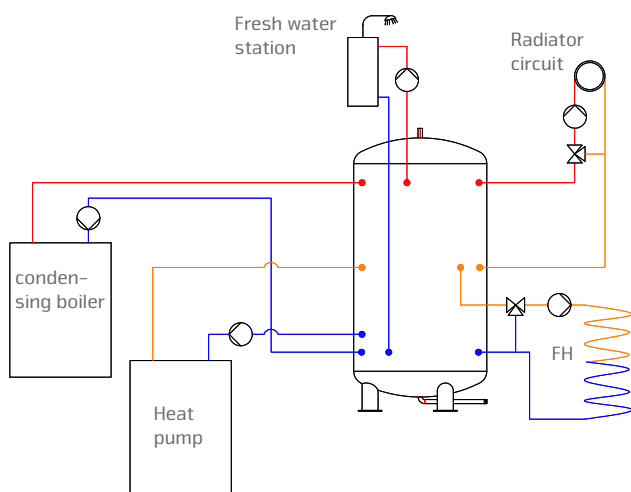
The trend toward increasingly efficient hot- and cold-water systems is also leading to numerous innovations in storage technology.

One idea that has been around for some time is to plumb plant systems with different temperature levels into the overall system.

A relatively widespread approach for this is to use a multilayer tank (MultiFlow Center). In this case, a buffer storage vessel is divided into different temperature zones by means of a special inner design. The individual generator and consumer circuits are then assigned to the respective temperature zones and connected to the tank.

The buffer storage vessel then takes on the roles not only of an energy store, but also of a hydraulic separator, providing for the reliable hydraulic separation of the individual circuits.

In addition to the respective heat generators, the return flow of a heated consumer circuit can serve as a further infeed for a low-temperature heating circuit (see figure). In condensing-boiler systems in particular, this can help lower the return temperature in order to make the most of the condensing effect and thus increase energy efficiency.



Integration of the MultiFlow Center into a multivalent heating system.



**SINUSVERTEILER GmbH**

Dieselweg 2  
D-48493 Wettringen

Phone: +49 (0) 2557 / 93 93 - 0  
Fax: +49 (0) 2557 / 93 93 - 30  
Email: [info@sinusverteiler.com](mailto:info@sinusverteiler.com)

Member of the Winkelmann Group