BF.. SERIES
BUFFER TANKS
FOR COOLING SYSTEMS
All chilled water applications where system water volume should be increased...

**Industrial cooling**
Machine cooling systems
All process cooling applications requiring precise temperature control

**HVAC cooling**
High-rise buildings - housing, office buildings, hotels
Buildings that require cooling in winter – shopping malls, factories
All cooling systems that should be separated by a heat exchanger...

**Tanpera Buffer Tanks**

- at various capacities from 100 liters to 5000 liters
- easy to install
- with baffle plates
- self insulated

We reserve the right to make changes in technical information.
Specially designed and manufactured to increase water volume in all chilled water applications where additional water volume is needed.

**Presented for our customers in various capacities from 100 liters to 5000 liters.**

In order to prevent temperature stratification and provide a homogeneous heat distribution, there are a number of baffle plates within the tank. By this way, the air in the water can easily be separated and discharged from the top of the tank.

**Delivered as perfectly insulated to minimize energy loss.**

The outer surface is protected against corrosion by double layer anticorrosive.

**Ready to be installed in the system, with flanged connections sized according to tank volume.**

Having accessory connection ports for air vent valve and discharge valve.

**Before delivery, tested under pressure 1,5 times higher than the operating pressure.**
In order for a comfort or industrial purpose cooling system to operate properly and efficiently, the total volume of water in the circulation must be above a certain amount. This amount is determined by the system capacity and the desired control accuracy. If the total water volume of the system is below this amount, the thermal capacity should be increased, by installing a TANPERA-BF Series Buffer Tank to the system.

The average water temperature in the cooling systems varies with the variation in the load, depending on the rate at which the instantaneous load is met by the cooling capacity. If the instantaneous load is lower than the cooling capacity the average temperature decreases and increases for the opposite case.

But, in many applications, the operator does not want to fluctuate the water temperature sent to the system and tries to keep it between certain limit values. Because the large fluctuations in the average water temperature and, in parallel, the temperature of the water going to the system;
- makes it difficult to control the room temperatures in the HVAC systems and thus to achieve the desired comfort level;
- may lead to major damages and losses, especially in industrial cooling systems that require precise temperature control.

In applications where the total cooling load varies, it may be possible to limit the fluctuations in the average water temperature to some extent by controlling the cooling capacity. This control is usually achieved by changing the chiller capacity proportionally or stepwise with respect to the instantaneous load, or by switching on/off the compressor according to the need. Proportional or stepwise control is only possible for chillers with certain characteristics, and the benefits they provide are also limited. The number of switching for the compressor, also, can not exceed several times per hour due to technical limitations.

On the other hand, the total volume of water circulating in the system also determines the thermal capacity of the system. Since increasing the water volume means also increasing the heat energy it can contain, the effect of changes in system load on the mean water temperature level also decrease at same proportion. Depending on the size of this thermal capacity, the need to instantaneously control the cooling group capacity to prevent fluctuation of the evaporator water inlet/outlet temperature is also reduced, and the compressor is prevented from over switching.
Whether there is a need for a buffer tank in a chilled water system, if there is a need, the capacity of the TANPERA-BF Series Buffer Tank that should be used, may be calculated by the following method.

**Required Minimum Water Volume (l) = Total Cooling Load (kW) x B (l/kW)**

The coefficients on the table recommended by the chiller manufacturers can be used to calculate the Minimum Water Volume required for the system.

After that, System Active Water Volume should be calculated. Here the volume that the account needs to participate in, is the volume of the water involved in circulation in the evaporator even in the lowest load case. Water volumes of devices bypassed by automatic valves (or zones left out of circulation) should not be part of this account when working with low loads, since most of them are not in active volume. In practice it will be a safe solution to include only the water volumes of the pipes in the system. On the table, water volumes per meter are given for steel pipes used in mechanical installation systems.

The Volume of the Buffer Tank is determined by subtracting the system water volume from the calculated water volume.

**Volume of the Buffer Tank (l) = Required Minimum Water Volume – System Active Water Volume**

If this calculation results in a positive value, it would be appropriate to use a buffer tank and select the higher capacity closest to the found value. More than one tank can be used in the system if the calculated volume exceeds 5000 liters or there are restrictions on the installation.

**Sample Calculation**

In a process cooling system with a total cooling capacity of 700 kW and requiring precise temperature control, there are total 550 m steel pipes which are not bypassed by automatic valves. 150 meters of these pipes are 6”, 100 meters 4”, 200 meters 3”. Let’s find out if a buffer tank is needed in this system.

**Required Minimum Water Volume** = 700 kW x 10 l/kW = 7000 l

**System Active Water Volume** = (150 x 18,8) + (100 x 8,3) + (200 x 4,8) = 4610 l

**Volume of the Buffer Tank** = 7000 l – 4610 l = 2390 l

**Result:** A TANPERA-BF 2500/10-V type buffer tank at the capacity of 2500 l should be used.
Function of the TANPERA-BF Series Buffer Tank is to prevent over-switching of the compressor and also to prevent excessive fluctuations in the water temperature going to the system. For this reason, the position of the tank on the chilled water circuit should also be suitable for the purpose of use in the system.

In typical comfort applications, where the main purpose is to prevent over-switching of the compressor, it is advisable to put the buffer tank before the chiller.

If the tank is used in an industrial cooling system, it would be more beneficial to place the tank after the chiller and before the system, since the main purpose here is a more precise control of the water temperature.

Important Note: If more than one tank is used in the system, it is advisable to connect these tanks in series rather than in parallel, to ensure good circulation without short circuit.
BF.. Series Buffer Tanks

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TECHNICAL SPECIFICATIONS and INSTALLATION DIMENSIONS

Technical Specifications

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Designated use</th>
<th>Operating pressure</th>
<th>Mounting position</th>
<th>Coating</th>
<th>Insulation</th>
<th>Protective sleeve</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 – 5000 liter</td>
<td>Hot water not exceeding 90°C</td>
<td>10 bar</td>
<td>Vertical (optionally: Horizontal)</td>
<td>Two layers of anticorrosion paint on the outside</td>
<td>80 mm thick open cell soft polyurethane</td>
<td>Vinyl sheath</td>
</tr>
</tbody>
</table>

Mounting Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Structural Group</th>
<th>Capacity</th>
<th>(\varnothing \text{ D} )</th>
<th>(H)</th>
<th>Connection Ports</th>
<th>Empty Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF-100/10-V</td>
<td>I</td>
<td>100</td>
<td>550</td>
<td>1150</td>
<td>DN32 1/2” 3/4”</td>
<td>60</td>
</tr>
<tr>
<td>BF-300/10-V</td>
<td>I</td>
<td>300</td>
<td>750</td>
<td>1300</td>
<td>DN50 1/2” 3/4”</td>
<td>105</td>
</tr>
<tr>
<td>BF-500/10-V</td>
<td>I</td>
<td>500</td>
<td>900</td>
<td>1550</td>
<td>DN65 1/2” 1”</td>
<td>180</td>
</tr>
<tr>
<td>BF-800/10-V</td>
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<td>800</td>
<td>900</td>
<td>2150</td>
<td>DN80 1/2” 1”</td>
<td>230</td>
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<tr>
<td>BF-1000/10-V</td>
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<td>1000</td>
<td>1000</td>
<td>2110</td>
<td>DN100 3/4” 1 1/4”</td>
<td>310</td>
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<td>BF-1500/10-V</td>
<td>II</td>
<td>1500</td>
<td>1150</td>
<td>2450</td>
<td>DN125 3/4” 1 1/2”</td>
<td>480</td>
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<tr>
<td>BF-2000/10-V</td>
<td>II</td>
<td>2000</td>
<td>1250</td>
<td>2350</td>
<td>DN125 3/4” 1 1/2”</td>
<td>580</td>
</tr>
<tr>
<td>BF-2500/10-V</td>
<td>II</td>
<td>2500</td>
<td>1450</td>
<td>2300</td>
<td>DN150 3/4” 2”</td>
<td>670</td>
</tr>
<tr>
<td>BF-3000/10-V</td>
<td>II</td>
<td>3000</td>
<td>1450</td>
<td>2700</td>
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<td>BF-4000/10-V</td>
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<td>5000</td>
<td>1700</td>
<td>3100</td>
<td>DN200 3/4” 2”</td>
<td>1410</td>
</tr>
</tbody>
</table>

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The great white heron can stand for a long time in the cold water as it can perform an effective heat exchange between the blood coming from the heart at 40°C and the blood returning from the feet at 1°C.