



**BF SERIES**

# **THERMAL BALANCE TANKS**

**BALANCES THE SYSTEM, BOOSTS THE PERFORMANCE!**





## General Features

This tank is specifically designed and manufactured to increase the system's water volume in all chilled water applications that require additional water capacity.

It is available in various capacities from 100 liters to 5000 liters for the use of our customers.

To prevent thermal stratification and provide homogeneous heat distribution, the tank contains a suitable number of baffle plates according to its volume. This allows air in the water to separate easily and be vented from the top of the tank.

It is delivered perfectly insulated to minimize energy loss, and its outer surface is protected against corrosion with double-layer anti-rust coating.

It comes with flange connections sized according to the tank volume, ready to be mounted into the system. It also has connection outlets for an air vent valve and a drain valve.

**Before being delivered to the customer, each tank is tested under pressure 1.5 times higher than the operating pressure.**

## Key Features

- ✓ **Wide Capacity Options:** Different capacity options ranging from 100 liters to 5000 liters.
- ✓ **Superior Thermal Insulation:** Advanced insulation minimizing energy loss.
- ✓ **Durable Construction:** Double-layer anti-rust protection and highly durable outer coating.
- ✓ **Easy Installation:** Flanged connections compatible with all types of systems.
- ✓ **Precise Temperature Control:** Ideal for process and climate control applications.



# Why to Use a Thermal Balance?

For a comfort or industrial cooling system to operate smoothly and efficiently, the total water volume in the system must exceed a certain level. This level varies depending on the system capacity and the desired precision of temperature control. If the system's total water volume is below this limit, a TANPERA-BF Series Thermal Balance Tank should be added to the system to increase thermal capacity.

The average water temperature in cooling systems changes depending on variations in cooling load. If the instantaneous load is lower than the cooling capacity, the average temperature drops; if the load is higher, the temperature rises. However, in many applications, operators aim to minimize fluctuations in the water temperature supplied to the system and keep it within certain limits.

## This is because;

**Air Conditioning Systems:** Temperature fluctuations make it difficult to control room temperatures and achieve the desired level of comfort.

**Industrial Cooling Systems:** Large fluctuations in systems requiring precise temperature control can cause significant material damage and losses.

In applications where the total cooling load fluctuates, controlling the cooling capacity can help reduce fluctuations in the average water temperature. This control is typically achieved by adjusting system capacity proportionally or in stages according to the instantaneous load. However, proportional or staged control is applicable to certain types of systems and provides limited benefits. The number of compressor starts is technically limited to a few per hour.

On the other hand, the total volume of circulating water in the system determines the system's thermal capacity. The more water there is, the more heat energy can be stored. As a result, the impact of load variations on the system's average temperature decreases. With sufficient water volume, fluctuations in the inlet-outlet temperature of the evaporator are prevented, and excessive compressor cycling is avoided.



# Areas of Applications

BF Series Buffer Tanks are the ideal solution for increasing water volume and controlling temperature fluctuations in a variety of industrial and commercial refrigeration applications.



**Industrial Cooling Applications**  
For cooling needs in production processes, factory environments, and other industrial facilities.

**Machine Cooling Applications**  
Used in machine cooling processes requiring precise temperature control.



**Air Conditioning Cooling Applications**  
Suitable for central cooling systems in high-rise buildings, residential buildings, business centers and hotels.

**Cooled Buildings in Winter**  
Shopping malls, factories and other large commercial buildings that require year-round cooling.



**Systems Need to be Separated by Heat Exchanger:**  
For large-scale cooling systems that require optimized water distribution to different zones.



# Capacity Determination Features

The BF Series Thermal Balance (Buffer) Tanks support the efficient operation of chilled water systems by providing the necessary water volume. Correct capacity selection is critical for system performance. The following methods will help you determine the most suitable TANPERA-BF Series Thermal Balance Tank volume for your needs:

## Required Minimum Water Volume (l) Calculation Formula:

Required Minimum Water Volume (l) = Total Cooling Capacity (kW) x B (l/kW) B Coefficient (B):

For General Comfort Applications: B = 6 l/kW

For Applications Requiring Precise Temperature Control: B = 10 l/kW

## Water Volume in System:

Determine the active water volume circulating in your system. This calculation includes the water volume in the cooling system's piping, evaporator, and other components. Devices bypassed during low-load conditions and zones excluded from circulation should not be included in this calculation.

## Thermal Balance Tank Volume (l) Calculation Formula:

Thermal Balance Tank Volume (l) =

Required Minimum Water Volume - System Active Water Volume

## Calculation Example:

In a system with a total cooling capacity of 700 kW, precise temperature control is needed in the process. A total of 550 meters of steel piping is used in the system, with 150 meters of 6", 100 meters of 4", and 200 meters of 3" pipes that are not bypassed by automatic valves.

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

## System Active Water Volume:

150 m x 18.8 l/m = 2820 liters

100 m x 8.3 l/m = 830 liters

200 m x 4.8 l/m = 960 liters

Total System Active Water Volume = 4610 liters

Thermal Balance Tank Volume = 7000 liters - 4610 liters = 2390 liters

In this case, a TANPERA-BF 2500/10-V type thermal balance tank with a capacity of 2500 liters is recommended.

## Recommendations:

If the calculated requirement exceeds 5000 liters or if there are installation constraints, the use of multiple tanks may be appropriate.

Precise calculator of the water volume in the system's pipes ensures a safe solution. The water capacities for steel pipes used in mechanical installations are provided per meter.

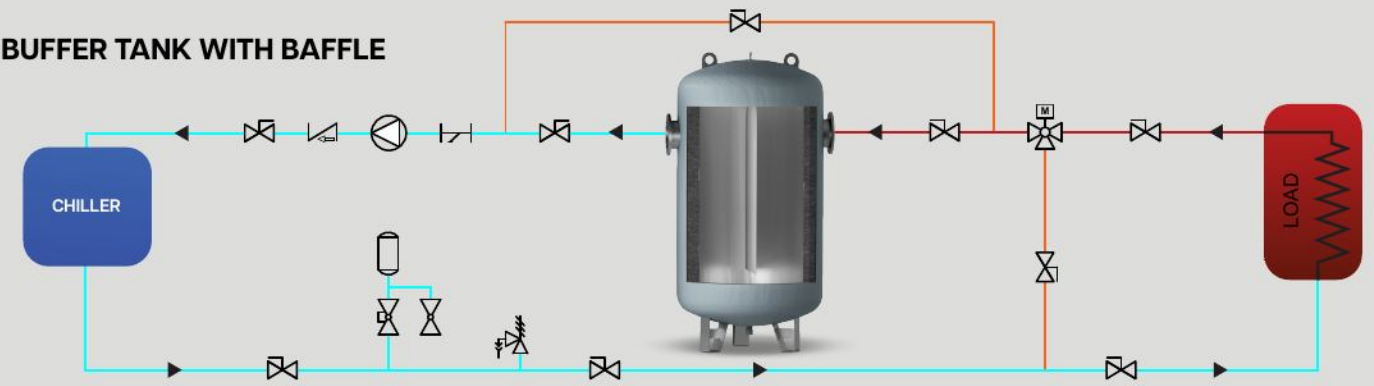
| Application Type                                   | B                   |
|----------------------------------------------------|---------------------|
| General Comfort Applications                       | 6                   |
| Precise Temperature Control Applications Requiring | 10                  |
| Pipe Diameter                                      | Water Capacity (m3) |
| 1/2"                                               | 0,2                 |
| 3/4"                                               | 0,3                 |
| 1"                                                 | 0,5                 |
| 1 1/4"                                             | 0,8                 |
| 1 1/2"                                             | 1,3                 |
| 2"                                                 | 2,1                 |
| 2 1/2"                                             | 3,1                 |
| 3"                                                 | 4,8                 |
| 4"                                                 | 8,3                 |
| 5"                                                 | 5"                  |
| 6"                                                 | 6"                  |
| 8"                                                 | 8"                  |
| 10"                                                | 10"                 |
| 12"                                                | 12"                 |

# Project Design Recommendations

TANPERA-BF Series Thermal Balance Tanks are designed to prevent the excessive cycling of the cooling unit's compressor and minimize fluctuations in the water temperature supplied to the system. Therefore, the placement of the tank within the chilled water circuit should be determined according to the system's need.

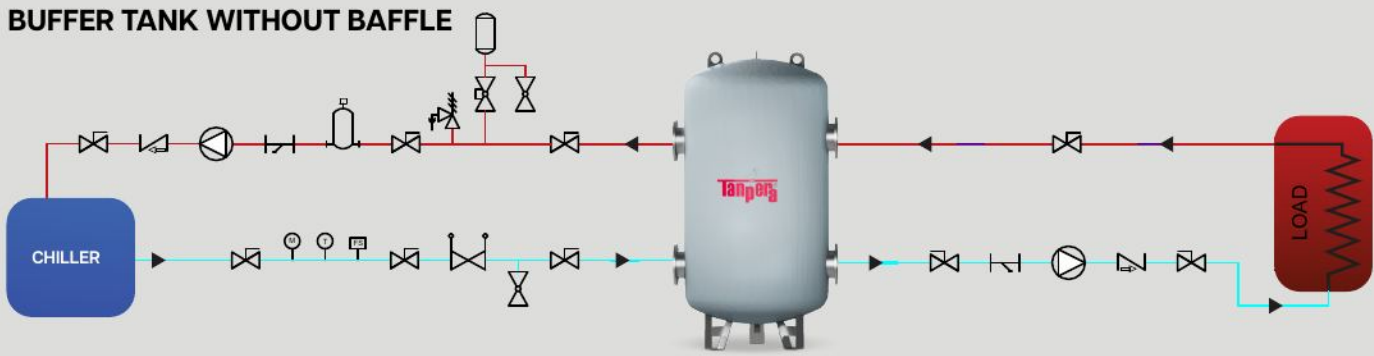
## Comfort Applications:

In order to prevent excessive switching of the compressor, it is recommended to place the thermal balance tank in front of the chiller. This arrangement facilitates the control of space temperatures by preventing temperature fluctuations in comfort air conditioning systems.



## Industrial Cooling Systems:

In industrial refrigeration systems where the temperature of the flow water needs to be controlled more precisely, it would be more beneficial to place the thermal balance tank after the chiller and before the system. This arrangement allows the processes to operate under more stable temperature conditions.



## Important Note:

If more than one tank is to be used in the system, it is recommended that these tanks are connected in series, not in parallel, to ensure good circulation without short circuits.



# BUFFER TANK



## Operating Principle

The BF Series Thermal Balance (Buffer) Tanks help increase the water volume in cooling systems and keep temperature fluctuations under control. The tanks ensure the even distribution of water and balance the temperature. This process prevents thermal stratification and improves overall system efficiency.

## Advantages

- **Energy Efficiency:**  
Minimizes energy loss with advanced insulation, reducing operating costs.
- **Durability:**  
Provides maximum protection against corrosion with double-layer anti-rust coating, ensuring long-lasting use.
- **Precise Temperature Control:**  
Controls temperature fluctuations, ensuring reliable performance, especially in sensitive processes.
- **Easy Installation:**  
Offers quick and easy installation with flange connections, saving time.
- **System Protection:**  
Prevents overloads, extending the life of cooling system components and reducing maintenance needs.
- **Product Coding:**  
TANPERA-BF 1000 / 10 - EV
  - Position; V: Vertical, H: Horizontal
  - Nominal Operating Pressure (Bar)
  - Total Storage Capacity (Liters)
  - Thermal Balance Tank Type Code

## Technical Specifications and Installation Dimensions

The BF Series Thermal Balance (Buffer) Tanks offer excellent compatibility with your cooling systems, featuring a wide capacity range and high durability. The complete technical specifications of the products are listed below:

## Technical Parameters

- **Capacity:**  
Various options ranging from 100 liters to 5000 liters.
- **Nominal Pressure:**  
10 bar operating pressure.
- **Operating Temperature:**  
Suitable for use with hot water not exceeding a maximum of 90°C.
- **Installation Position:**  
Vertical installation (horizontal installation available as an option).
- **Coating:**  
The exterior is coated with double-layer anti-rust paint, providing high corrosion resistance.
- **Thermal Insulation:**  
50 mm rigid polyurethane for values between 100 and 500, and 80 mm open-cell soft polyurethane for values above 500.
- **Protective Case:**  
PE casing for 100-500 range,  
Vinyl casing for above 500

## Connection Types

- **Flanged Connection Ports:**  
Ready for system installation with appropriately sized flanged connection ports.
- **Air Vent Valve and Drain Valve:**  
The tank is equipped with connection ports for an air vent valve at the top and a drain valve at the bottom.
- **Test Pressure:**  
All tanks are pressure tested at 1.5 times the operating pressure before delivery to the customer.



# Installation and Maintenance Information

## Assembly Instructions

The installation of BF Series Thermal Balance Tanks must be carried out carefully to ensure the safe and efficient operation of your system. The following guidelines provide the steps to be followed for the proper installation of the tank.

## Determining the Installation Position:

The tank should preferably be installed in a vertical position. When horizontal installation is required, tanks specifically designed for this option should be used. The installation surface should be flat and strong enough to support the weight of the tank.

## Making the Connections:

Flanged connection ports must be securely connected to the system's pipelines. Air vent and drain valve connections should be properly installed in the designated locations to ensure correct tank operation. Ensure all connections are tight and free of leaks.

## Testing and Inspection:

After installation, all connections and valves should be tested for leaks. The tank should be pressure-tested at 1.5 times the system's operating pressure to ensure safety.

## Periodic Inspections

Regularly inspect the tank's exterior for signs of corrosion or damage. Flanged connections, air vent valve, and drain valve components should be periodically checked for leaks.

## Periodic Inspections:

Regularly inspect the tank's exterior for signs of corrosion or damage. Flanged connections, air vent valve, and drain valve components should be periodically checked for leaks.

## Cleaning

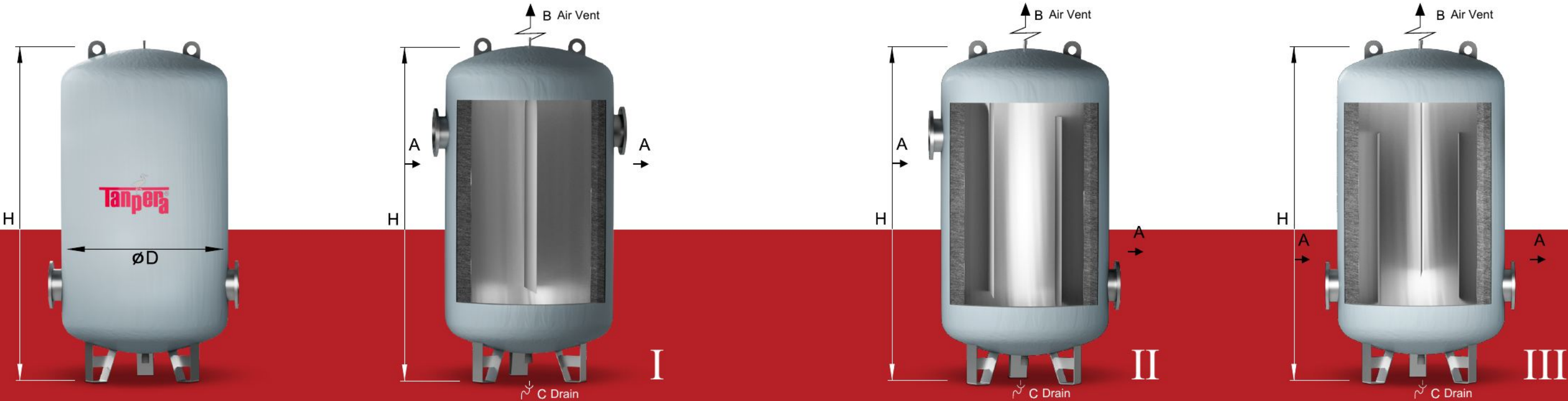
The interior of the tank should be cleaned periodically, and appropriate chemical treatments applied to maintain water quality. The exterior surface should be wiped with a clean cloth to remove dust and dirt.

## Service and Part Replacement

If any parts are worn or damaged, they should be replaced in a timely manner. Only original replacement parts should be used. It is recommended that a professional service perform general maintenance at least once a year.

# Installation Dimensions

| Device Type  | Building Group | Capacity Liters | ø D mm | H mm | Connection Ports |      |        | Empty Weight KG |
|--------------|----------------|-----------------|--------|------|------------------|------|--------|-----------------|
|              |                |                 |        |      | A                | B    | C      |                 |
| BF-100/10-V  | I              | 100             | 486    | 1100 | 1 1/4"           | 1/2" | 3/4"   | 62              |
| BF-160/10-V  |                | 200             | 586    | 1300 | 1 1/4"           | 1/2" | 3/4"   | 82              |
| BF-200/10-V  |                | 350             | 756    | 1320 | 2"               | 1/2" | 3/4"   | 108             |
| BF-350/10-V  |                | 500             | 756    | 1770 | 2 1/2"           | 1/2" | 1"     | 143             |
| BF-500/10-V  |                | 600             | 756    | 2020 | 2 1/2"           | 1/2" | 1"     | 162             |
| BF-800/10-V  | II             | 800             | 910    | 2150 | 3"               | 1/2" | 1"     | 235             |
| BF-1000/10-V |                | 1000            | 1010   | 2180 | 3"               | 3/4" | 1 1/4" | 302             |
| BF-1500/10-V |                | 1500            | 1120   | 2470 | 4"               | 3/4" | 1 1/2" | 350             |
| BF-2000/10-V |                | 2000            | 1260   | 2500 | 4"               | 3/4" | 1 1/2" | 470             |
| BF-2500/10-V |                | 2500            | 1460   | 2350 | 5"               | 3/4" | 2"     | 540             |
| BF-3000/10-V | III            | 3000            | 1460   | 2750 | 5"               | 3/4" | 2"     | 640             |
| BF-4000/10-V |                | 4000            | 1660   | 2480 | 6"               | 3/4" | 2"     | 950             |
| BF-5000/10-V |                | 5000            | 1660   | 2980 | 6"               | 3/4" | 2"     | 1100            |





By effective heat transfer between the blood coming from its heart at 40°C and the blood returning from its feet at 1°C, it can stay in cold water for a long time without freezing. Using these natural principles, we design our engineering marvel heat exchangers.



#### Tanpera Türkiye

+90 850 308 01 14

Şeyhli Mh. Ankara Cd. No: 380/C,  
34906, Pendik, İstanbul, Türkiye

info@tanpera.com

www.tanpera.com

#### Tanpera GmbH

+49 1590 4138428

Hermann-Essig-Str. 36 71701  
Schwieberdingen, Stuttgart, Germany

info@tanpera.de

www.tanpera.de

Tanpera - [www.tanpera.com](http://www.tanpera.com) - [info@tanpera.com](mailto:info@tanpera.com) - +90 850 308 01 14

Tanpera assumes no responsibility for errors or omissions that may appear in catalogs, brochures, or other written/digital materials. Tanpera reserves the right to make changes to its products and technical specifications without prior notice. These changes may also apply to products that have already been ordered. All trademarks mentioned in this document are the property of their respective companies. Tanpera and the Tanpera logo are registered trademarks of Tanpera A.Ş. All rights reserved.

© 2025 | Tanpera A.Ş. | TAN-BF-BRO/01 | 2025.12

