



Two thermal storage tanks, each with a capacity of 2,200 m<sup>3</sup>, have been built at the Centrale Nord power plant site in Brescia, Italy

Source: Lipp

## Large Scale Thermal Storage Tanks Provide District Heating in Brescia

Lipp GmbH manufactures large-scale buffer tanks using a specialised welding technique that the company developed itself. The steel tanks are manufactured on site using the patented, automated Lipp welding technology. In Brescia, Italy, this has resulted in a heat storage tank with a volume of 5,200 m<sup>3</sup> that plays a strategic role in the city's heat supply.

The specialist for tank construction, which can look back on more than 60 years of experience, has developed two processes of its own: The Lipp double-seam system and the Lipp welding technology. For the latter, the company received, among other things, the Environmental Technology Award of the German federal state Baden-Wuerttemberg in the category „Material Efficiency“ and an EU grant from the „Horizon 2020“ programme. This was associated with the award of the European Commission's „Seal of Excellence“, which is awarded to trendsetting, medium-sized companies.

One Lipp product manufactured using Lipp welding technology is the large-scale thermal storage tank (figure 1), which efficiently

stores heat from biogas plants, biomass cogeneration plants, solar plants or other heat sources. The steel tanks are welded on site, allowing for a manufacturing process of tanks with a capacity of up to 7,000 m<sup>3</sup>, that is both highly flexible and adapted to the local space conditions.

The large-volume, above-ground storage tanks are designed with all the necessary operating and safety components. Upon customer request, additional, individual built-in and add-on components are taken into account. The insulation of the tank wall and roof is adapted to local conditions.

The large-scale thermal storage tank operates in the unpressurised range with an operating tempera-

ture of up to 95 °C and is designed for operation with heating water. A nitrogen device is not required.

### Practical example Lamarmora

A large-scale thermal storage built by Lipp is located in the city of Brescia, Italy. At the A2A Calore e Servizi's „Lamarmora“ power plant site, a heat storage facility with 5,200 m<sup>3</sup> for 220 MWh of heat capacity was completed in 2020 (figure 2). 60 construction workers and installation technicians were involved in the construction. The construction cost was €3 million.

The new heat buffer storage complements the two pressurised storage tanks (1,000 m<sup>3</sup> with a capacity

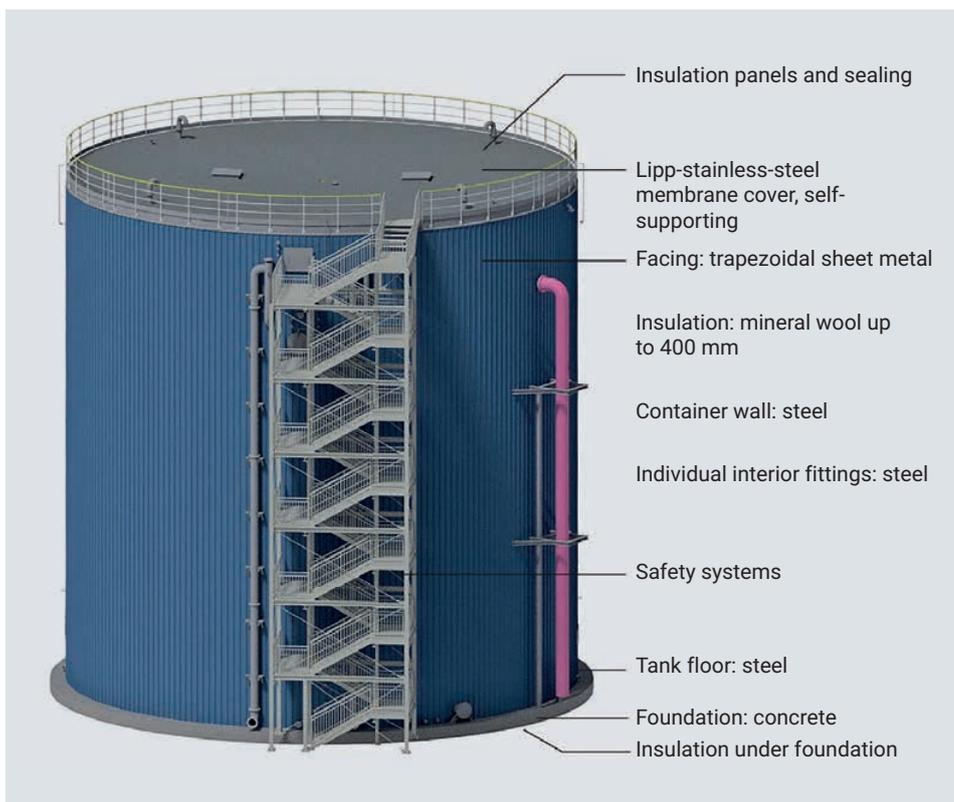


Figure 1. Structure of the Lipp-large-scale buffer storage tank

Source: Lipp

of 140 MWh) already existing at the Lamarmora plant, thus increasing the heat storage capacity of the entire district heating system. The district heating network is supplemented at the Centrale Nord power plant site with two additional Lipp storage tanks with 2,200 m<sup>3</sup> for 95 MWh each.

The total heat capacity is around 550 MWh, which means that the total heat contained in the Brescia heat storage tanks could supply a single family with heat for more than 50 years.

The new large-scale thermal storage tank Lamarmora has a diameter of 20 m and is 20 m high. The steel tank with atmospheric pressure is operated with water up to 95 °C. The walls are made of 8 mm thick steel, insulated with a 20 cm layer of mineral wool. It is capable of realising an output of 55 MW for 4 h.

### Stainless steel membrane roof

Another special feature is the stainless-steel membrane roof. The self-supporting, lightweight membrane construction made of stainless steel – with high mechanical strength and resistance to ageing – makes it possible to span tanks with diameters of up to 50 m. The stainless-steel material assumes a load-bearing and gas-tight sealing function at the same time and resists snow loads and strong winds (figure 3).

The Lipp stainless steel membrane cover is corrosion-resistant, gas- and vapour-diffusion-tight and provides reliable protection against UV radiation and mechanical damage. The lightweight construction of the membrane is ideally suited for covering volatile and explosive substances. Welding work at the installation site is eliminated due to the complete prefabrication of the membrane at the company's facto-



Figure 2. The project "Lamarmora" after completion

Source: Lipp

ry in Tannhausen/Germany. After being attached to the tank, the lightweight membrane construction is weighted down with a gravel fill. This ensures stability.

### Strategic role of the storage facilities

Lamarmora, together with a waste incineration plant and the „Centrale Nord“ plant, is one of the three energy generation plants in Brescia connected to the district heating network. It generates thermal energy and – like the waste incineration plant – electricity at the same time using efficient cogeneration.

The storage facilities built at the Lamarmora and Centrale Nord plants (figure 4) will play a strategic role in the city's district heating business in the future and make an important contribution to energy saving and environmental sustainability. The storage project at the Lamarmora power plant is part of A2A's broader plan to phase out coal and replace fossil fuels with „greener“ and more sustainable sources. The €105 million investment programme is expected to result in



Figure 3. The stainless-steel membrane cover is a self-supporting, lightweight construction with high mechanical strength that can withstand snow loads and strong winds. It is prefabricated in the factory, transported to the construction site, and installed on site

Source: Lipp

annual savings of 15,000 t of oil equivalent and over 400,000 t of CO<sub>2</sub> when fully operational. This corresponds to about 26,000 fewer cars on the roads.

Brescia is the city with the oldest and most extensive district heating network in Italy. It is a reference model in Europe, according to a recent study by the European Community for Efficiency and Environmental Protection. In short, the ideal framework for the construction of storage tanks, thermal stor-

age, and additional elements in line with climate protection and energy conservation.

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Figure 4. Lipp welding technology was used to construct two thermal storage tanks at the Centrale Nord power plant site

Source: Lipp