

# RESERVOIRS FOR ARTIFICIAL SNOW PLANT AT MONTE PORA

WATERPROOFING TWO RESERVOIRS IN A SKI RESORT WITH  
MAPEPLAN T WT FPO/TPO MEMBRANE BY POLYGLASS

The Monte Pora Ski Resort is located between upper Valserrana and Valle Camonica in Northern Italy.

It ranges from 1,380 m to 1,880 m above sea level and has always been one of the closest and preferred destinations of the inhabitants of Northern Italy.

The organisation that runs the resort has made significant investments to improve the quality of the facilities so that it may be used throughout the winter. The reservoirs used to feed the artificial snow plant are extremely important features of

the resort and were recently waterproofed with MAPEPLAN T WT FPO/TPO membrane made by Polyglass S.p.A., a subsidiary of the Mapei Group.

## **WATERPROOFING THE RESERVOIRS**

The smaller reservoir was reconditioned in the autumn of 2013. Made from reinforced concrete, it is around 4 m deep and has a capacity of around 10,000 m<sup>3</sup>. Its sides are made from precast concrete panels and they were found to have





serious seepage damages through the joints between the panels. Some of the panels were also unstable. After carrying out a structural restoration work on the damaged precast panels, the internal surfaces of the reservoir were waterproofed with a 2.0 mm thick FPO/TPO membrane: MAPEPLAN T WT.

The MAPEPLAN T WT waterproofing membrane was dry installed and mechanically fastened to the load-bearing structure using fasteners positioned underneath the overlaps in the membrane itself.

This particular installation technique, which leaves the membrane loose from the substrate, along with the high mechanical properties and flexibility of the membrane and the hot-air welded overlaps in the membrane, enabled a complete, seamless waterproofing layer to be installed in the reservoir which is highly functional, with a long service life in the more critical areas, such as the joints between the vertical panels and the joints between the sides and the bottom of the reservoir.

In the autumn of 2016 the reserve of water has been increased by building a second reservoir set into the ground with a capacity of around 30,000 m<sup>3</sup> and a water head of around 6 m. This reservoir was also waterproofed with MAPEPLAN T WT membrane, but in this case it was 2.3 mm thick.

After preparing and rolling the ground, the MAPEPLAN T WT membrane was installed between special geocomposites to provide protection and drainage, while the edges around the reservoir were covered with a layer of small and medium sized stones to help it blend into the surroundings.

The new reservoir for the artificial snow plant was inaugurated on Sunday, the 18<sup>th</sup> of December, 2016 and during the party a

human chain formed a group hug around the lake, with more than 500 people taking part in this special event.

Thanks to these two reservoirs, numerous kilometres of ski trails have been sprayed with artificial snow using a battery of modern snow cannons.

### MAPEPLAN T WT WATERPROOFING SYSTEM

The successful completion of the two reservoirs for the snow plant at the Monte Pora Ski Resort was also made possible thanks to the special characteristics of MAPEPLAN T WT, such as:

- Possibility to absorb differential movements and settling in the substrate;



**IN THE FACING PAGE.** The two reservoirs after completion of the works.

**PHOTO 1.** The reinforced concrete basin before the intervention.

**PHOTO 2.** Installing MAPEPLAN T WT in the reinforced concrete basin.

**PHOTO 3.** The reservoir after the installation of MAPEPLAN T WT.

**PHOTO 4.** The reservoir after being filled with water, ready to be used for artificial snow.



**PHOTOS 5 and 6.** Installing MAPEPLAN T WT onto the sides and bottom of the water reservoir.

**PHOTO 7.** Installing MAPEPLAN T WT in difficult weather conditions.

**PHOTO 8.** The new reservoir was inaugurated on Sunday, the 18<sup>th</sup> of December 2016, with a human chain forming a group hug around the lake.

- May be installed in extreme surroundings and during severe weather conditions;
- High mechanical strength;
- Rapid installation times;
- Withstands critical service conditions such as ice, low temperatures and rapid emptying;
- Limited maintenance required;
- Blends in with particularly beautiful natural surroundings;
- Possibility of monitoring the waterproofing system after commissioning;
- Long service life;
- Easy to repair if accidentally damaged;
- High dimensional stability and low coefficient of thermal expansion;
- Impermeable to water in pressure;
- Resistant to mechanical wear and loads;
- Resistant to UV rays and atmospheric agents;
- Resistant to plants, roots and microorganisms;
- Resistant to heat and freezing weather;
- Resistant to ageing;

- Non-toxic: MAPEPLAN T WT membranes comply with the requirements for contact with drinkable water;
- Waterproofing system tested and commissioned on site
- Complies with the requirements of the harmonised standards EN 13361 "Geosynthetic barriers. Characteristics required for use in the construction of reservoirs and dams" and EN 13362 "Geosynthetic barriers. Characteristics required for use in the construction of canals".
- Highly ecological with low impact on the environment, as confirmed by its certified EPD (Environmental Product Declaration) evaluation.

**TECHNICAL DATA**  
Reservoirs for artificial snow at Monte Pora Sky Resort, Castione della Presolana, Province of Bergamo (Italy)

**Years of intervention:** 2013 and 2016  
**Intervention by Polyglass:** supplying FPO/TPO membranes for waterproofing the reservoirs

**Client:** IRTA S.p.A.

**Design:** Tekn&co s.r.l.  
**Contractor:** IRTA S.p.A.  
**Waterproofing company:** Isoledil s.r.l.

**POLYGLASS PRODUCT**  
Waterproofing tank and basin: Mapeplan T WT

For further information on products see the websites [www.mapei.com](http://www.mapei.com) and [www.polyglass.com](http://www.polyglass.com)