

a total storage capacity of over 20 000 tonnes of components. Similar to the silos in the gravel processing plant, the grit silos are equipped with a static dewatering and air blasters as a discharging aid. Discharge from the open-air silos is likewise fully automatic in response to the demand of the truck driver. The loading unit of the silos in the gravel processing plant and open-air silo installation is equipped with an automatic humidity measurement unit which records the moisture content of the components directly on the delivery note.

#### Water treatment

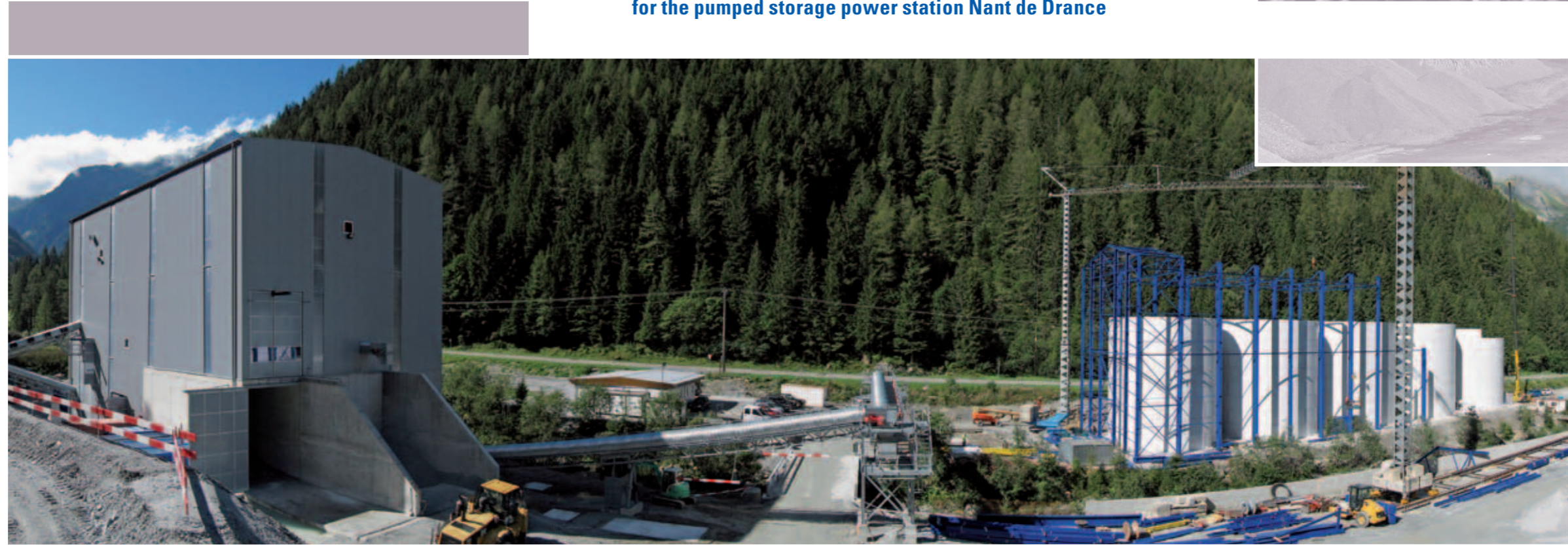
The installation has a closed water supply circuit. All contaminated water from the washing process is treated with a flocculating agent and fed into a static vertical clarifier. Here the solid particles settle and the clarified water overflows into the process water tank, which in turn feeds the water consumers in the washing process. The deposited sludge is conveyed to a sludge buffer tank or sludge mixing tank and then dewatered in a chamber filter press.

#### Control unit

A control system with several touch panels permits fully automatic operation of the plant. Raw materials are delivered and components drawn off automatically by means of a card reader on the truck weighbridge and control panel of the loading unit.

## Marti Technics Ltd.

Plant Engineering Stone & Earthworks  
Gravel processing plant and open-air silo installation at Trient  
for the pumped storage power station Nant de Drance



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# Gravel processing plant and open-air silo installation at Trient for the pumped storage power station Nant de Drance

Client Nant de Drance SA, CH-1925 Finhaut  
 Contractor Marti Technics Ltd.  
 Plant Engineering Stone & Earthworks  
 Drawn up 2009/2010



## Services provided by Marti Technics Ltd. Plant Engineering Stone & Earthworks

Design, planning and execution of the overall plant for processing tunnel excavation material.

## The plant consists of the following main components

- Feeding and pre-crushing unit
- Sizing and grit processing
- Crusher and return conduit for ungraded grit
- Loading unit and open-air silo installation
- Water treatment
- Control unit

## Technical Data

### Gravel processing plant

■ Plant charging capacity	150 t/h
■ Grit processing	55 t/h
■ Water cycle	150 m <sup>3</sup> /h
■ Storage capacity of gravel processing plant silos	2400 t
■ Storage capacity of open-air silo installation	20600 t
■ Total installed capacity	2400 kW

### Control system and electrical installation

- Fully automatic control system from feeding to loading unit (dosage and loading system)
- Automatic recording of deliveries and feeding incl. weighbridge
- Supply of medium voltage from own transformer stations with medium voltage installation, low voltage main distribution board and reactive current compensators
- Complete substations incl. SPS and advanced drive technology in air-conditioned control containers

## Plant description

### Feeding and pre-crushing unit

The tunnel excavation material is conveyed by truck to the gravel processing plant at Trient and tipped directly into a heavy feeding silo. An apron conveyor carries the material via pre-separation to the impact crusher which reduces all material to a maximum grit size of 200 mm. A downstream overbelt magnet and metal detector protect the installation from foreign bodies. The feed belt now transports the pre-crushed excavated material to the gravel plant building. On a heavy-duty sieving machine the material is separated before the initial crushing stage. All material < 32 mm goes directly to sizing, material > 32 mm is conveyed to the first crushing stage, a cone crusher. The crushed material is then returned to the feed unit.

### Sizing and grit processing

Sizing starts with the first elliptical sieving machine, in which the 0–4 mm grit is screened off. The grit-water mixture is collected in a pump vessel and conveyed to the grit sizer via a solids pump and cyclone. In the grit sizer the grit is mixed as desired from the individual stations and passed over a dewatering screen. Subsequently the grit is bunkered in the two grit silos in the gravel processing plant and statically dewatered once again. The excess/ungraded grit is likewise taken from the grit sizer, dewatered and transported by conveyor belt to the open-air heap.

The components > 4 mm are sized in two consecutive sieving machines. At the first machine the oversized grit > 16 mm is extracted and passed on to the crusher, where it is separated to 8 mm. On the bottom deck the 4–8 mm components are re-graded and dewatered. The 4–8 mm and 8–16 mm components are subsequently conveyed via bucket elevator to the component silos in the gravel processing plant.

### Crusher and return conduit for ungraded grit

In the second crushing stage material > 16 mm is reduced to grit and components. This takes place in a vertical impact crusher which can be adapted to the required final components by frequency control. In addition, the 4–8 mm and 8–16 mm components can be returned directly to the crusher instead of the component silos. It is also possible to return the volume already bunkered in the component silos to the crusher for maximum flexibility in terms of component requirements.

The accumulated ungraded grit can be returned to the third crushing stage via an exterior feeding unit. A grit mill or smooth roll crusher is available for the purpose. Here ungraded grit (mainly of 2–4 mm grain sizes) is crushed again to 0–2 mm. Furthermore, the 4–8 mm component can be crushed to grit in this crusher.

### Loading unit and open-air silo installation

The components can be extracted fully automatically from the silos in the gravel processing plant via the loading unit. Instead of the loading unit, the components can also be conveyed to the open-air silo installation. Here a total of five large silos are available with