

Santillana drinking water treatment plant

IN SERVICE SINCE

- 1972

BACKFITTING

- 1988
 - Automation, construction of facilities for the dosing of chlorine dioxide, potassium permanganate, powdered activated carbon and ozonisation system
- 1999
 - Updating of the IT system and automation
 - Improvement of the filtering capacity by 16%
 - Modification of the ozonisation points
- 2007
 - Algae elimination pretreatment by means of a screen system
- 2007/08
 - Backfitting of the settling facilities, extension of the sludge dewatering facility and new ozone dosing system based on liquid oxygen.
 - Construction of granular activated charcoal filters

PROJECTED FACILITIES

- Advanced oxidation facility by means of hydrogen peroxide dosing

WATER SOURCE

- Manzanares river (Santillana reservoir)

TREATMENT CAPACITY

- 4 m³/s

WATER TREATMENT

STAGES OF THE PROCESS

- Sieving of algae
- Preoxidation-prechlorination
- Coagulation-flocculation
- Settling
- Fast sand filtering
- Intermediate ozonisation
- Filtering on granular carbon
- pH adjustment
- Disinfection

REAGENTS USED

- Chlorine and chlorine dioxide for preoxidation and prechlorination
- Ozone and potassium permanganate for preoxidation
- Aluminium salts in the coagulation stage
- Powdered activated carbon in the coagulation stage
- Flocculation aid in the flocculation stage



- Intermediate ozone
- Calcium hydroxide in the final pH adjustment stage
- Chloramines during the final disinfection stage

RELEVANT TECHNICAL DATA

- Four 36.5 x 36 m pulsed bed settlers
- 14 sand filters with a unit surface of 125 m² for a total of 1,750 m²
- 12 charcoal filters with a unit surface of 107.25 m² for a total of 1,287 m²

TREATED WATER TRANSPORT CHANNEL

- Santillana channel

SLUDGE TREATMENT

TREATMENT CAPACITY

- 12,000 m³/day:
 - 3,400 m³/day from the filter washing
 - 8,600 m³/day from the settler blowdown

STAGES OF THE PROCESS

- Mixing in two 800 m³ equalisation tanks
- Thickening by subsidence and flotation
- Mechanical dewatering (centrifuges)
- Storage in three silos with a unit capacity of 50 m³

RELEVANT TECHNICAL DATA

- Two circular gravity settlers with a diameter of 15.35 m and an operational unit capacity of 100 m³/h
- Two circular floats with a diameter of 11.35 m and a unit capacity of 160 m³/h
- Three centrifuges capable of treating a maximum unit flow of 25 m³/h of sludge

FINAL SLUDGE DRYNESS

- 15-20%

