

Biological Denitrification Project in Formiche Alto (Teruel, Spain)



Figure 1: BIOBOX Nitrate Biofiltration Plant with 88 GPM Capacity

Technical Summary of the Article::

- **Influent:** Well water
- **Technology:** BIOBOX Nitrate
- **Flow rate:** 88 GPM / 20m³/h
- **Influent N-NO₃:** 20 mg/L / (**NO₃** 90 mg/L)
- **Effluent N-NO₃:** <5 mg/L / (**NO₃** <25 mg/L)
- **Plant Features:**
 - Biological denitrification via biofilter to remove nitrates
 - Physical filtration to eliminate possible suspended solids
 - Chlorine disinfection to remove microbiological contaminants, as in any water treatment plant (ETAP).

The biological denitrification project in Formiche Alto aims to guarantee a high-quality **drinking water** supply for the local population, addressing the problem of elevated nitrate levels in the well water. The plant uses BIOBOX Nitrates technology, which efficiently removes nitrates from the water, converting them into nitrogen gas (N₂) and reducing their concentration from 20 mg/L to less than 5 mg/L of nitrate nitrogen.

With a design flow rate of 88 GPM, the plant is designed to treat the water effectively, eliminating up to 80% of the nitrates present. The installation features an automated system that optimizes filtration, washing, and backwashing processes, ensuring efficient operation and reducing operational costs.

Table 1: Treatment Results

Parameter	Influent	Treated effluent
Flow rate (GPM)	88	
Flow rate (m ³ / h)	5	
N-NO ₃ (mg/L)	20	<5
NO ₃ (mg/L)	90	<25
COD (mg/L)	-	<3
Microbiology* (CFU/mL)	-	0

*Aerobic bacteria at 22°C, *Escherichia coli*, total coliforms, enterococci, *Clostridium perfringens*