



ACTINA™

*Reducing water hardness
with pellet softening*

 **VEOLIA**
WATER

Solutions & Technologies



ACTINA™

Pellet softening for drinking water treatment

The daily use of hard water (or scale-forming water), loaded with calcium ions, results in whitish limestone deposits most noticeable on glassware and shower systems.

These deposits progressively clog hot water pipes and affect proper operation of household appliances and water heaters. Chemical additives such as detergents, sequestering agents and regenerating agents can be used but overtime, the efficiency of the devices decreases, resulting in higher energy consumption.

For hard water above 30°F of HT (Hardness Titration), it is recommended to treat the problem as upstream as possible.

To soften hard water, Veolia Water Solutions & Technologies has developed **Actina™**, a pellet reactor process tailored to central drinking water softening. By reducing calcium hardness, Actina™ allows municipalities and industries to enhance the asset management of their distribution network while preventing some negative impact on the end users. For consumers, this solution also allows a significant reduction of the water bill when compared to individual treatment devices.



ADVANTAGES

- ▶ Veolia's more than **35 years of expertise** in pellet softening;
- ▶ **Compactness, simplicity and reliability** of operation;
- ▶ **Robustness and additional barriers** towards iron, manganese and metals;
- ▶ **No limit on calcium hardness removal**;
- ▶ **Energy savings**
→ unlike an electric carbonate removal system;
- ▶ **No associated sludge treatment needed.**



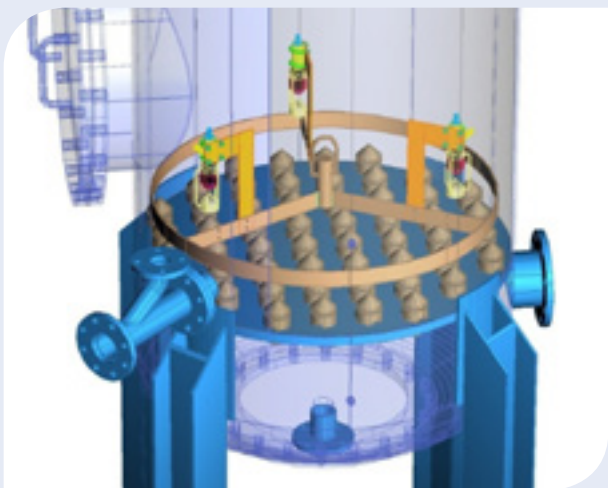
ACTINA™: Operating principle

The Actina™ process is based on the pellet softening principle, which consists in modifying the calcium-carbon equilibrium in the water to be treated. Soda or lime injection is used, causing limestone crystallization on the sand.

Actina™ is composed of a vertical reactor in which a bed of sand is maintained in fluidization, thanks to the pumping of water to be softened. This very fine sand is used as a crystallization seed for the pellet softening reaction, that is to say the calcium carbonate's precipitation on the surface of grains of sand. The highly basic pH enabling crystallization is obtained by alkaline reagent (soda or lime) addition to the reactor base.

The calcium carbonate thereby removed occurs as beads of a few millimeters in diameter, easily storable, transportable and recoverable.

The use of a fluidized bed allows Actina™ **to run with high rising rates**, around 80 to 100 m/h and confers it a **small footprint**.



► Veolia strength: the soda or lime injection system in the lower part of the reactor

The injection system is paramount, as it must mix basic reagent at the heart of the reactor while avoiding local calcium carbonate deposits on the injection orifice.

The injection device, patented by Veolia, ensures **the reagent's online dilution with softened water and the protection of injection nozzles**. It is a **liftable system, easily accessible to the operator**.



► Calcium carbonate beads: a reusable final product

Beads are extracted at the reactor base when their size reaches a few millimeters.

Once extracted, the calcium carbonate beads are stored in filtering bins for small capacities, or in draining silos. Following drainage, their **water content is lower than 5%**.

The beads are **easily transportable**, and **can be recycled** as road embankment material, pipeline trench sublayers or cement raw material.



MORE THAN 50 PELLET SOFTENING REFERENCES IN EUROPE

- Rouessé-Fontaine, France, (2015), 200 m³/h
- Mandelieu-La Napoule, France, (2014), 1,500 m³/h
- Montsoulst, France, (2014), 280 m³/h
- Bruz, France, (2013), 275 m³/h
- Montry, Marne et Morin, France, (2012), 490 m³/h
- Puchay, France, (2011), 130 m³/h
- Bouil de Chambon, France, (2011), 500 m³/h
- Courcelles-la-Forêt, France, (2010), 160 m³/h
- Cluses, France, (2009), 250 m³/h
- Sète, France, (2008), 1,200 m³/h
- Emmerin-Arbrisseau, France, (2007), 1,250 m³/h
- Torcy, France, (2003), 375 m³/h
- Beaune, France, (2003), 500 m³/h
- Ijzeren Kuilen, Netherlands, (2000), 2,280 m³/h
- Malmö, Sweden, (1999), 5,400 m³/h
- Val-de-Reuil, France, (1994), 900 m³/h
- Leiduin, Netherlands, (1987), 12,500 m³/h



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