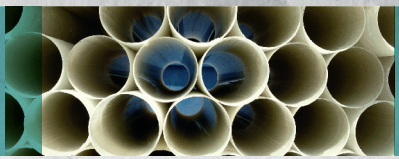
SEWAGE WATER TREATMENT

FOR ODORS ELIMINATION & INFRASTRUCTURE PROTECTION

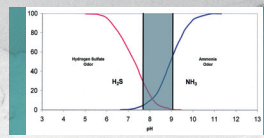


TREATMENT OF SEWAGE WATER

The problem of wastewater odors in sewage network is mainly attributed to H_2S evolution and less often to ammonia (depending on the pH of the wastewater). The main source of H_2S is the reduction of sulfates by anaerobic bacteria following the reactions:

$$SO^{2-}_4 + \text{organic matter} \xrightarrow[\text{bacteria}]{\text{anaerobic}} S^{2-} + H_2O + CO_2 \quad \text{[reaction 1]}$$

The presence of MgO provides the system with a buffer solution of 9-9,5 which, based on reaction [2], prohibits the formation of H_2S, which is a main odor creator. Independently of the S^{2-} concentration, from the moment the pH is set at 9-9,5 the odor problem, due to H_2S, seizes to exist. Also at these pH values, no ammonia (NH_3) evolution is performed [fig.1].



[fig.1] Solubility of H_2S and NH_3

$$S^{2-} \underset{OH^-}{\overset{H^+}{\rightleftharpoons}} HS^- \underset{OH^-}{\overset{H^+}{\rightleftharpoons}} H_2S$$

pH>9,5 pH=7-9,5 pH< 7

[reaction 2]

PROTECTION OF THE SEWAGE NETWORK AND COLLECTION TANKS

The corrosion of the sewage network and tanks is attributed to the formation of H_2SO_4 through the reaction [3].

The protection of cement with the aid of alkaline magnesium reagents is performed through two mechanisms: on one hand, they provide the system with OH^- groups which neutralize the H^+ groups and on the other hand they prevent the formation of H_2SO_4 since in values of pH <9-9,5 the ionised form of H_2S is created [reaction 2]. So the protection may be performed in two ways: either with continuous addition of $MgO/Mg(OH)_2$ in parts of the network for pH adjustment or through coating the free surface of the pipes with $Mg(OH)_2$ slurry.

$$H_2S + 2O_2 \xrightarrow{\text{Thiobacillus}} H_2SO_4$$

pH < 7 cement corrosion

[reaction 3]