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MODELLING THE SOURCE TERM FOR POLLUTANTS GENERATED FROM GALVANIC CELLS

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Abstract

Being able to estimate the quantity of pollutants that can be spread in the environment is a factor of paramount importance in the industrial panorama. In order to accomplish such aim, a crucial step is the estimation of the so-called source term, that is the rate of generation (or release) of a substance in a generic process. A proper estimation requires to consider both the machinery and the unit operations present into the analysed system. For such reasons, ad hoc considerations and models should be developed for each specific process, in order to represent the reality in the most consistent way. In this paper, a process of the galvanic industry has been taken into account. Specifically, we propose a possible theoretical method for estimating the term of generation from a group of electrolytic deposition tanks. The model is based upon modelling the rupture of bubbles which are formed during the process. The model was applied in order to estimate the pollutants concentration inside the extraction line the and inside the facility. Results have been compared to experimental measurements. Particularly, it has been observed a good agreement between experimental and predicted concentrations for what concerns sulphuric acid and nickel; some deviations can be observed for compounds as nitric acid. This is mainly due to the particular nature of this substance. In fact, nitric acid is subjected to some decomposition reactions which have not be taken into account in the evaporation model. This aspect could be analyzed in future works.

Key words: electrolytic tanks, galvanic industry, generation term, harmful indoor emissions

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