

## Optimum design of an RO membrane by using simulation techniques

N. Afrasiabi<sup>a\*</sup>, M. Ehteshami<sup>b</sup>, R. Ardakanian<sup>c</sup>

<sup>a</sup>Department of Research and Development, Hampa Engineering Corporation, Tehran, Iran

<sup>b</sup>KNTU University, Tehran, Iran

<sup>c</sup>Sharif University of Technology, Tehran, Iran

email: nima.afraziabi@gmail.com, ehteshami@kntu.ac.ir, ardakanian@sharif.edu

Received 15 September 2008; Accepted 8 November 2008

---

### ABSTRACT

Increasing demand of fresh water, and limitation water resources, with respect to world economic growth brings up the importance of utilization of saline water. At the current research the sensitivity analysis of ROSA was conducted. For this analysis, a single stage reverse osmosis is designed for well water specification in southern Tehran under the following conditions: feed flow 40 m<sup>3</sup>/h and membrane element: BW30–400 FR. The sensitivity analyses for all chemical elements of base water were performed. As a result of sensitivity analysis the shortest sensitivity gap belongs to boron, and the longest sensitivity gap belongs to calcium, which reflects, under the same conditions the least element to be eliminated ion is boron and the most eliminated ion is calcium, in fact the order of omitting is from lowest to the highest interval is the following: boron, ammonia, nitrate, potassium, sodium, bicarbonate, fluoride, chloride, silica, strontium, barium, sulfate, magnesium, calcium. The optimum element which could result proper membrane selection achieved.

*Keywords:* Water treatment; Saline water; Reverse osmosis; ROSA; Sensitivity analysis

---

\* Corresponding author.