

REMINERALIZATION AND POTABILIZATION OF DESALINATED WATER

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The water produced by distillation does not conform to the standards of potability generally admitted and especially to those dictated by the World Health Organization (WHO).

In order to bring such water up to standards a specific post-treatment is required. The subject of this poster- address is to describe the type of potabilization treatment with a capacity of 4,000 m³/h currently implemented at the distillation plant site of the Dubai Electricity Company.

The desalination plant consists of 3 multflash distillation units, each having a daily output capacity of 26,208 m³. The purpose of this plant is twofold :

- to provide the 3 x 75 MW thermic power station with steam
- to supply drinking water to the distribution network of the Dubai water supply.

The characteristics of the desalinated water produced by the distillation plant are given in table no 1.

DESALINATED WATER COMPOSITION

TDS	10	ppm
Total Iron	0,04	ppm
Total Chloride	5	ppm
pH	6,8 - 7,5	

TABLE 1

Sidorenko (1981), as well as other researchers, has investigated into the problem of possible harmful physiological consequences that the consumption of such a water could entail.

Besides, it is well understood that water meant for public distribution should not be aggressive and must feature a given scaling capacity (positive Langelier Saturation Index).

According to these requirements, the quality of water to be obtained by post-treatment has been fixed by the user (see data in table no 2).

REQUIRED TREATED WATER QUALITY

pH	7.0 - 8.5
Phenolphthalein Alkalinity	Nil
Methylorange Alkalinity (as CaCO ₃)	75 - 85 ppm
Temporary Hardness (as CaCO ₃)	75 - 85 ppm
Permanent Hardness (as CaCO ₃)	65 - 75 ppm
Total hardness (as CaCO ₃)	140 - 160 ppm
Conductivity	800 - 1600 μ S/cm
Chloride (as Cl ⁻)	180 - 250 ppm
Free carbon dioxide (as CO ₂)	Less than 10 ppm
Langelier Saturation Index	positive

TABLE 2

The way to bring the desalinated water characteristics in accordance with these determined values has been chosen taking into consideration two local operation conditions :

- the availability of large quantities of carbon dioxide from the degasification of the distillation chambers,
- the proximity of a quarry of limestone (calcium carbonate).

As a whole, the solution chosen consists in injecting a carefully controlled quantity of carbon dioxide into the water to be treated before it passes through the remineralization material basically consisting of calcium carbonate. This process is meant to adjust accurately the water hardness. The next step is to add a given quantity of seawater, chlorinated, and filtered beforehand, into the remineralized water in order to make it meet the other potability standards.

The core of the system consists in 3 batteries of 8 dissolvers grouped in parallel. Each of the 24 dissolvers has a diameter of 2,500 mm, filtering surface of 4.9 m² and a mineral capacity of about 11,000 kg.

Studies are now being carried out with the purpose of making such processes accessible to distillation installations that do not produce enough carbon dioxide and also to bring into general use the application of these processes for the treatment of naturally low mineralized waters and for neutralization of acid waters.