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Extraction of water from air —an alternative solution for water supply

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Abstract

One square kilometer of atmospheric air contains, in most regions around the globe, 10,000 to 30,000 m³ of pure water. The extraction of water from air (EWA) patented technology, based on the extraction of air humidity into water stream, was developed for large-scale water supply, up to 1,000 m³/d. Such as desalination, using the unlimited free source of salty water, the EWA technology makes use of air humidity. The EWA technology could serve as an alternative solution for water supply, where neither salty water, nor infrastructure is available. The EWA technology extracts the air humidity by a three stage process: absorption of humidity on a solid desiccant, desorption of the water to vapor at moderate heat (65–85°C) and condensation with passive condenser connected to a heat pump. The moderate heating enables the utilization of environmentally friendly and low cost heat energy, such as solar or waste heat. The combination of moderate heat, passive condenser and heat pump allows producing water with low energy consumption of 100–150 kcal/l. The EWA technology is based on a multi-cycle regime, each cycle lasts about 90 min with absorption/desorption ratio of 2:1. The EWA technology is made of modular cassettes enabling a design of a device for any required capacity — up to 1,000 m³/d. The EWA technology could be operated at ambient temperature range between 5–45°C and at relative humidity of 20% and more, while at relative humidity of 60% the system achieves its maximal capacity. The EWA technology may provide a reasonable solution for water supply in dry regions, including South Mediterranean countries, as well as countries suffering from polluted water, including tropical countries, and far from the seashores where long-pipe systems are not available, the EWA technology would present the excellent solution for fresh water.

Keywords: Extraction of water from air (EWA); Water supply

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