

Section 01. Innovations in Engineering

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Techniques to Produce Sodium Chloride and Purify it

Formation of sodium chloride brines is possible only in the context of regular water sprinkling and gradual ablation of underground chambers within sodium chloride seam.

Moreover, more perfect desalinization technique is applied. The technique is as follows: cased-off wells where diameter is 150 to 250mm are tubed with a pipe with fewer diameter (75 to 100mm). One of the pipes is used to supply water to sodium chloride seam using high-pressure rotary pump. The water solubilizes sodium chloride; in the form of brine it squeezes out to a surface using another pipe.

A chamber being formed within the sodium chloride seam in the process of its ablation through a well step by step assumes a shape close to a shape of inverted cone. Thus, its edge becomes flatter and barren rock covers it preventing further desalinization. As a result, intensity of brine formation drops and the well operation should be handed off when cone generatrix approaches 30-40°.

Ablation of seam by water and pumpdown of brine can also be done using different wells. In the context of such group operation system efficiency of salt extraction experiences significant increase if mining takes place in terms of successive down-dip order; moreover, sinkholes formed as a result of desalinization should be used. That makes it possible to reduce the number of intake wells and increase volumes of water being fed significantly.

If salt has been mined with the help of a technique of underground desalinization, the brines are purified from calcium salts and magnesium salts. The procedure is performed in workshops with specific equipment. In terms of salt works the technique is called vacuum one. More simply it is as follows: fresh water is discharged under pressure into underground deposited salt. The salt is dissolved in it; as a result, brine is pumped out to the surface. First of all, the brine is purified; then it is delivered to chambers where low pressure (that is vacuum) is produced. If the pressure is lower than atmospheric one then the brine starts boiling at temperature being lower to compare with standard one and experiences active vaporization. Salt crystals precipitate. They are separated from liquid with the help of centrifugal apparatus. Manufacturers produce salt of very fine grinding. If it is required, specific sprays are used to add iodine component and free flowing components.