

Dm Plant

DM (demineralised) water plants are systems used to carry out industrial water treatment. To be more precise, the DM plant remove dissolved solids or minerals from process streams and feed water. These plants remove minerals using any one of the following procedures:

- Deionisation
- Distillation
- Electrodialysis
- Membrane filtration (nanofiltration or reverse osmosis)



Demineralised water or deionised water is water devoid of its mineral ions. Water in its natural form typically contains mineral ions like anions (sulphate, chloride, nitrate, etc.) and cations (iron, calcium, sodium, copper, etc.).

The main purpose for which a DM plant is used is preventing metal oxidation and scale formation.

Dm Plant Process

As mentioned above, the salts and minerals present in water carry negatively charged ions called anions and positively charged ions called cations. Both these types get attracted by their counterions i.e. ions carrying the opposite charge.

These plants feature an IX column containing resins that consist of plastic beads. During the process of demineralisation, the ionic functional group gets attached to these beads. These are functional groups that work by holding the ions carrying the opposite charge loosely through a process called mutual electrostatic attraction.

When an ion-exchange cycle is underway, water containing dissolved ions comes in contact with the resin. Ions present in the solution exchange their place with those present on the beads. These ions remain attached to the functional groups of the resins even when the resulting liquid gets drained away. Ion exchange occurs when an ion possesses a greater

affinity towards a functional group than the ions the group already carries. The type of ionic contaminants found in the group will decide whether the process would need cationic resins or anionic resins.

In most ion-exchange reactions, the exchange replaces the contaminant ions with less objectionable ions. For instance, the ion exchange sodium softening process is carried out to eliminate hardness ions like Mg^{2+} or Ca^{2+} from the solution and replace them with less harmful sodium ions or Na^{+} . Once the process is over, the solution will have little or no hardness but will have a higher concentration of Na^{+} .

The above changes are acceptable for certain applications. However, some procedures require almost 100% removal of the dissolved solids. This makes DM plants such important additions to facilities requiring complete removal of these unwanted solids. A DM plant exchanges cations in feed water with hydrogen ions and anions get exchanged with hydroxyl ions. This results in the formation of water. Most plants come with a mixed bed or two-bed configuration. Read on to know about them.

Two-Bed Ion Exchange:

A dual bed or two-bed ion exchanger use two (or more) ion-exchange columns or resin beds for treating a stream. Each of these beds contains a different ion exchange resin. During two-bed demineralisation, a SAC or strong acid cation resin is used for treating a stream. This helps in capturing the cations dissolved in the water and enables the release of hydrogen ions.

The mineral acid solution you will get as a result will automatically get directed towards the SBA or strong base anion resin bed. When treated in the second resin bed, the DM plant will remove all the anionic contaminants present in the solution and result in the release of hydroxide ions. The combination of these hydroxide ions and the existing hydrogen ions will result in the formation of water.

The TDS of the stream thus forms will become low. What's more, the water will also have an almost neutral pH. However, there's one issue you must be careful about; dual bed units usually result in sodium leakage, which may affect the water quality. You should be extra cautious when demineralising streams with low pH and/or high TDS.

Mixed-Bed Ion Exchange:

The water quality offered by mixed-bed ion exchangers is much higher than the dual-bed units. The biggest highlight of these units is that they use a mix of multiple ion exchange resins. This mixture is kept in a single ion-exchange column. When the unit is used to treat a stream, the anion and cation exchange reactions occur simultaneously. This unique working procedure of the DM water plant addresses the issue of sodium leakage effectively.

Here, you must note that while DM plants equipped with mixed-bed ion exchangers produce water of extremely high quality, they also use a more complex resin generation procedure.

Aquashakti Water Solution is the most trusted DM plant manufacturer operating at the moment. They make DM plants of the highest quality. The company manufactures all kinds of DM plants that are currently in use. The biggest highlights of these products by Aquashakti include their affordable price and the lifelong service guarantee offered by the company. Another great thing about these units is that they require minimum maintenance.

Principle

Every DM plant works based on a common principle. They work to remove minerals and other contaminants from water using the ion exchange method. The purity of water would depend on the kind of DM water plant you are using.

Application of Dm Plants

More and more industries have started to use DM plants to prepare a hefty resource of demineralised water. However, some industries have been using these units since their discovery. These are industries that need a high level of water purity. Here are some examples:

- Industries that require the use of makeup water or feed for operating high-pressure boilers
- Food & beverage industries (they prepare rinse water using these plants)
- Electronic goods manufacturers

Dm Plant Specifications

Some of the most notable specifications of top DM plant models include:

- Automatic time-based regeneration
- DM resin of the highest quality
- The user-friendly inline configuration that enables easy installation and upkeep
- A combination of bottom collection and top distribution systems crafted out of laser-cut strainers embedded on strainer plates lined with rubber

Advantages of Dm Plants

If you use a unit made by a top DM plant manufacturer, you will enjoy the following benefits:

- The water produced by these units is of much higher quality than the regular distilled water we use.

- You will get to choose from DM plants of different sizes and boasting different specifications. There will be units designed and manufactured to be used in labs as well as units produced for large, medium, and small-scale industries.
- The purification process doesn't involve the use of any chemical. Additionally, the process also doesn't produce any dangerous waste products.
- Most modern-day units will not need much space for storage.
- Using DM plants to demineralise water has been found to reduce the overall product cost at industrial manufacturing units.

Frequently Asked Questions

What is the DM plant?

DM plants are systems used for removing minerals and other solid contaminants from water.

How does a DM plant work?

These units produce mineral-free water using a method like ion-exchange, polishing, or degasification. During the process, cations are exchanged with hydrogen ions, while anions are exchanged with hydroxyl ions.

What is the difference between RO plant and DM plant?

DM plants perform demineralisation to eliminate all minerals and contaminants from water. RO (reverse osmosis), on the other hand, is a procedure that removes minerals from water by passing it through a semipermeable membrane under immense pressure. As the membrane is semipermeable, it allows certain minerals to pass through.

What is the pH of DM water?

The pH of DM water is 7.0.