

Immersed electrode humidifiers



The operation of the immersed electrode humidifier is based on a very simple physical principle.

As common drinking water contains a certain quantity of dissolved mineral salts, and is consequently slightly conductive, applying a voltage to metal electrodes immersed in the water creates an electric current that heats the water until producing steam (Joule effect).

The quantity of steam produced is proportional to the electric current, which is in turn proportional to the level of water. This electric current is measured by a current transformer: by varying the level of water using a fill and drain electrovalve, the current, and consequently the steam production, can be precisely modulated. Due to evaporation, the level of water decreases and must therefore be topped up. As the steam does not carry the mineral salts, the salt concentration in the water and therefore the conductivity increases, meaning that the water has to be periodically diluted by draining part of it using the drain solenoid valve or drain pump and replacing it with new water. In addition, lime scale is deposited over time and covers part of the cylinder, which must be replaced or cleaned.

The principle is simple, however the development of an immersed electrode humidifier that ensures safe operation and reliability over time requires careful analysis and extended testing.

Compared to the complementary immersed element heater or gas humidifiers, immersed electrode humidifiers:

- are less expensive to purchase;
- operate with drinking water (not completely demineralised or softened);
- require the periodical replacement (or cleaning) of the cylinder;
- feature modulation suitable for comfort or industrial applications, without extreme requirements.

CAREL has been manufacturing immersed electrode humidifiers since the 1970s and can draw benefit from its know-how in the field of electronic controllers: precision control, reliable electronics and sophisticated and complete control software.

The CAREL solutions for the immersed electrode humidifiers are humiSteam and compactSteam.