[Ultrasonic adiabatic humidifier: humiSonic Direct]

1. **GENERAL**
    a. **DESCRIPTION**
        i. Ultrasonic adiabatic humidifier for releasing moisture directly into a room. Consists of a stand-alone unit with an electrical panel built into the appliance for power supply and control.
    b. **WORK REQUIRED**
        i. Installation according to the Manufacturer's specifications, performed by technical personnel *[selected by the Customer].*
        ii. System commissioning performed by *[Manufacturer's technical personnel, or technical personnel authorised by the Manufacturer].*
    c. **DOCUMENTATION**
        i. Technical manual for installation, instructions on safety, configuration and operation, complete with dimensions, technical specifications, performance, water circuit and wiring diagrams, standards and specifications for safe installation, guide for commissioning and operation, diagnostics, list and identification of spare parts.
    d. **QUALITY**
        i. The ultrasonic humidifier is certified in accordance with the requirements of the following regulations:
            - EC (EMC: EN 61000-6-2, EN 61000-6-3; EN 61000-3-2; EN 61000-3-3; LVD: EN 60335-1; EN 60335-2-88)
            - UL 998
            - EAC
            - WaterMark WMTS 101
            - ISO 9001:2015 - ISO 14001:2015 - ISO 45001:2018 (manufacturer)
2. **PRODUCT**
    a. **[generic definition of the apparatus, technology]**
        Ultrasonic adiabatic humidifier consisting of a stand-alone unit.
    b. **[general features and construction]**
        Adiabatic humidifier consisting of the following main components:
            - Removable painted steel housing
            - AISI 304 stainless steel loading tank
            - Ultrasonic units consisting of oscillating circuits and piezoelectric transducers
            - Multiple diffusers with anti-drip tips
            - Level sensor to detect how much water is in the tank
            - 24 Vdc 50-60Hz electronically activated filling valve for automatically managing the level of the loading tank
            - 24 Vdc 50-60Hz electronically activated drainage valve for automatic drain and wash cycle management
            - Rear outlet fans operating at a steady speed to introduce humidified air into the room
            - "Air barrier" at the front generated by anterior fans to support misting and improve mist absorption
            - External switch for turning the appliance on, with flashing led to signal appliance status and alarms
            - Built-in compact humidity probe within the housing

- Built-in auxiliary control board for managing external proportional signals, active probe connections, display and installation of multiple appliances in primary/secondary mode
- The appliance's built-in electrical panel includes:
    a. electronic control board with built-in management software
    b. 48 V power supply
    c. 24 V transformer

c. [models, capacities and variants]

i. model capacities:
- 2, 4, 6, 8 kg/h.

d. [feedwater and drain water]

The humidifier must only use demineralised drinking water (0.054 - 50 µS/cm).

e. [power supply specifications]

The humidifier must be powered by
- Voltage 110 V, 60 Hz;
- Voltage 230 V, 50 Hz.

f. [control, characteristics]

The humidifier's following main functions are managed by its built-in software:
- RS485 serial communication for supervisory systems based on CAREL and MODBUS protocols
- Managing of up to 4 devices in series in PRIMARY/SECONDARY mode
- Setting-up automatic wash cycles at every start-up and at set intervals
- Modulating transducer activity in series and in parallel
- Hourly usage meter
- Programmable maintenance warning

g. [safety, protection and hygiene devices]

No biocides need to be added to the water.

h. [communication interfaces, display, connectivity]

RS485 serial port to communicate with CAREL devices or via Modbus® RTU, without requiring an additional gateway.

i. [accessories]

The following optional accessories are also available:
- remote LCD display for setting parameters and displaying alerts
- active temperature and humidity probes (4-20 mA or 0-10 V)

j. The type of apparatus shall be the CAREL [humiSonic Direct]

k. Approved manufacturers: Carel Industries SpA

3. EXECUTION

a. Installation in compliance with the Manufacturer's specifications

b. Installation in compliance with applicable local laws and regulations

c. Water quality as per Manufacturer's specifications, under the responsibility of the User