[High pressure adiabatic humidifier: humiSonic Ventilation]

1. **GENERAL**
    a. **DESCRIPTION**
        i. Ultrasonic adiabatic humidifier for humidifying in ducts or in air handling units. Consists of a humidity distribution unit and a separate electrical panel 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:
            - Moisture distribution unit
            - Electrical panel for power supply and control
    b. **[general features and construction]**
        Adiabatic humidity distribution system consisting of the following main components:
            - Removable side and cover panels in steel with lifting handles
            - Accompanying laminar air grille
            - AISI 304 stainless steel loading tank
            - Ultrasonic units consisting of oscillating circuits and piezoelectric transducers
            - Multiple diffusers
            - 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
            - Electronic control board with built-in management software
            - Built-in auxiliary control board for installing multiple appliances in primary/secondary mode

The humidifier must be coupled to a PRIMARY or SECONDARY external electrical panel.

The PRIMARY electrical panel includes:

- Painted steel structure with lockable door cover
- Backlit LCD display with buttons
- Electronic control board with built-in software
- ON/OFF switch
- Fan for forced ventilation
- 48 V power supply
- 24 V transformer
- Alarm relay output
- Status relay output
- Option of installing a control board for RS485 serial communication

The SECONDARY electrical panel includes:

- Painted steel structure with removable cover
- ON/OFF switch
- Double Led signalling (Alarm/Power)
- Fan for forced ventilation
- 48 V power supply
- 24 V transformer

i.

c. [models, capacities and variants]

i. model capacities:

- 2.4, 4.8, 7.2, 9.6, 14.4, 18.0 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 electrical panel for PRIMARY and SECONDARY power supply is available in the following models:

- Powering the humidifier system with 110 V to the switchboard.
- Powering the humidifier system with 230 V to the switchboard.

f. [control, characteristics]

The system must operate in PRIMARY/SECONDARY mode using up to 3 SECONDARY distribution systems controlled by a single PRIMARY one (4 distribution systems in total).

The PRIMARY Electrical Panel powers the unit and provides the following controls:

- ON/OFF control
- Proportional control over production by choosing among the following modes:
  - rH% probe,
  - rH% probe + rH% limit,
  - temperature probe,
  - temperature probe + rH% limit,
  - external signal with or without rH% limit,
  - preheating temperature probe
- Probe calibration functions
- Weekly hourly schedule
- 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

The SECONDARY Electrical Panel powers the unit and provides the following controls:

- ON/OFF switch
- visual indication of the Alarm/Power status via LEDs

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

j. 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