WHAT IS CLAIMED IS:

1. A humidifier system useable in a gases supply system, the humidifier system comprising:

a humidifier;

a conduit comprising:

a first electrically conductive element; and

a second electrically conductive element;

a controller configured to monitor a signal using one or more of the first electrically conductive element and the second electrically conductive element to determine a value indicative of moisture in the conduit based at least in part on the signal.

2. The humidifier system of Claim 1, wherein the signal is indicative of a capacitance between the first electrically conductive element and the second electrically conductive element.

3. The humidifier system of Claim 1, wherein the signal is indicative of a change in capacitance between the first electrically conductive element and the second electrically conductive element.

~~4. The humidifier system of any of Claims 1-3, further comprising a signal generator.~~

~~5. The humidifier system of any of Claims 1-3, wherein the controller comprises a signal generator.~~

~~6. The humidifier system of any of Claims 1-5, wherein the controller comprises one or more hardware and/or software processors.~~

~~7.~~4. The humidifier system of any of Claims 1-~~6~~3, the first electrically conductive element and the second electrically conductive element are separated by a distance configured to allow for a capacitive charge to be sensed between the first electrically conductive element and the second electrically conductive element.

~~8.~~5. The humidifier system of any of Claims 1-1~~7~~4, further comprising a dielectric material located between the first electrically conductive element and the second electrically conductive element.

~~9.~~6. The humidifier system of Claim 5~~8~~5, wherein the dielectric material is vapor or liquid permeable.

~~10.~~7. The humidifier system of Claim ~~6~~9~~6~~, wherein the vapor permeable dielectric material allows evaporation of water to ambient air while inhibiting passage of liquid water and breathing gases to ambient air.

~~11.~~8. The humidifier system of any of Claims 1-~~7~~10~~7~~, wherein the controller is configured to determine the value indicative of moisture based on a comparison of a measurement of the first electrically conductive element and/or the second electrically conductive element with a pre-determined threshold.

~~12.~~9. The humidifier system of Claim ~~8~~11~~8~~, wherein the value indicative of moisture comprises a time constant or a change in time constant of a circuit comprising the first electrically conductive element or the second electrically conductive element in series with the reference resistor.

10. The humidifier system of Claim 1, wherein the signal is indicative of a time constant or change in a time constant of a circuit comprising the first electrically conductive element and/or the second electrically conductive element.

~~13.~~11. The humidifier system of Claim 1, wherein the signal is indicative of a ~~time constant or a~~ resonant frequency of a circuit comprising the first electrically conductive element and/or the second electrically conductive element.

~~14.~~12. The humidifier system of Claim 1, wherein the signal is indicative of a ~~change in a time constant or a~~ change in a resonant frequency of a circuit comprising the first electrically conductive element and/or the second electrically conductive element.

~~15. The humidifier system of any of Claims 1 or 13-14, wherein the value indicative of moisture in the conduit corresponds to an inductance of the conduit.~~

~~16. The humidifier system of any of Claims 1 or 13-14, wherein the value indicative of moisture in the conduit corresponds to a change in inductance of the conduit.~~

~~17.~~13. The humidifier system of any of Claims 1 or ~~13-16~~10-12, further comprising a resonant circuit wherein an inductive element is electrically connected in parallel with a capacitive element.

~~18.~~14. The humidifier system of Claim 1~~17~~13~~3~~, wherein the resonant circuit is electrically connected in parallel the circuit comprising the first electrically conductive element and/or the second electrically conductive element.

~~19. The humidifier system of any of Claims 13-18, further comprising a signal generator.~~

~~20. The humidifier system of any of Claims 13-18, wherein the controller comprises a signal generator.~~

~~21. The humidifier system of any of Claims 13-20, wherein the controller comprises one or more hardware and/or software processors.~~

~~22.~~15. The humidifier system of ~~any~~either of Claims ~~17-21~~13 or 14, wherein the resonant circuit is tuned to exhibit resonant behavior when sufficiently excited by the signal.

~~23.~~16. The humidifier system of any of Claims 1~~1713-21-115~~, wherein the resonant circuit is tuned to exhibit resonant behavior when excited by the signal, wherein the signal has been selected to excite the resonant circuit.

~~24. The humidifier system of Claim 1, wherein the controller is configured to apply additional power to the first electrically conductive element in conjunction with a normal control power.~~

~~25. The humidifier system of any of Claims 1 or 24, further comprising an AC power supply.~~

~~26. The humidifier system of any of Claims 1 or 24-25, further comprising a DC power supply.~~

~~27. The humidifier system of any of Claims 1 or 24-26, wherein the signal is indicative of a temperature of the first electrically conductive element or the second electrically conductive element.~~

~~28. The humidifier system of any of Claims 1 or 24-26, wherein the signal is indicative of a change in temperature of the first electrically conductive element or the second electrically conductive element.~~

~~29. The humidifier system of any of Claims 1 or 24-26, wherein the signal is indicative of a thermal conductivity of a medium between the first electrically conductive element and the second electrically conductive element, or the signal is indicative of a thermal conductivity of a medium proximal to the first electrically conductive element or the second electrically conductive element.~~

~~30. The humidifier system of any of Claims 1 or 24-26, wherein the signal is indicative of a change in thermal conductivity of a medium between the first electrically conductive element and the second electrically conductive element, or the signal is indicative of a change in thermal~~

~~conductivity of a medium proximal to the first electrically conductive element or the second electrically conductive element.~~

~~31. The humidifier system of any of Claims 1 or 24-26, wherein the signal is indicative of a temperature difference between the first electrically conductive element and the second electrically conductive element.~~

~~32. The humidifier system of any of Claims 1 or 24-31, wherein a change in temperature of the first electrically conductive element or the second electrically conductive element is substantially linear.~~

~~33. The humidifier system of any of Claims 1 or 24-32, wherein the first electrically conductive element measures the signal.~~

~~34. The humidifier system of any of Claims 1 or 24-32, wherein the second electrically conductive element measures the signal.~~

~~35. The humidifier system of any of Claims 1 or 24-34, wherein the signal corresponds to a resistance of the second electrically conductive element, the resistance of the second electrically conductive element varying with the temperature of the second electrically conductive element.~~

~~36. The humidifier system of any of Claims 1 or 24-35, wherein the first electrically conductive element or the second electrically conductive element further comprises a thermistor.~~

~~37. The humidifier system of any of Claims 1 or 24-36, wherein the first electrically conductive element or the second electrically conductive element further comprises a diode.~~

~~38. The humidifier system of Claim 37, wherein the diode is electrically connected in parallel with the thermistor.~~

~~39. The humidifier system of Claim 37, wherein the diode is electrically connected in parallel, and positioned substantially adjacent, with the thermistor.~~

~~40. The humidifier system of any of Claims 1 or 24-39, wherein the first electrically conductive element and the second electrically conductive element are adjacent to each other.~~

~~41. The humidifier system of any of Claims 1 or 24-39, wherein the first electrically conductive element and the second electrically conductive element are not adjacent to each other.~~

~~42. The humidifier system of any of Claims 1 or 24-41, wherein the first electrically conductive element and the second electrically conductive element are within a bead of the conduit.~~

~~43. The humidifier system of Claim 1, wherein the signal is indicative of a resistance of the first electrically conductive element or the second electrically conductive element.~~

~~44. The humidifier system of any of Claims 1 or 43, wherein the first electrically conductive element or the second electrically conductive element comprise at least two portions that are electrically disconnected from one another.~~

~~45. The humidifier system of Claim 44, wherein the at least two portions protrude into a lumen of the conduit.~~

~~46. The humidifier system of Claim 44, wherein the at least two portions are flush with an inner wall of the conduit.~~

~~47. The humidifier system of any of Claims 44-46, wherein the at least two portions are arranged within the tube wall and are pneumatically coupled with the lumen of the conduit.~~

~~48. The humidifier system of any of Claims 44-47, wherein the at least two portions are in series with one another.~~

~~49. The humidifier system of any of Claims 44-48, wherein the at least two portions are in parallel with one another.~~

~~50. The humidifier system of Claim 1, wherein the controller determines a value indicative of moisture in the conduit based at least in part on a magnitude and/or phase of the signal~~

~~51. The humidifier system of any of Claims 1 or 50, further comprising a signal generator.~~

~~52. The humidifier system of any of Claims 1 or 50-51, wherein the signal has a frequency between 30 Hz and 300 GHz.~~

~~53. The humidifier system of any of Claims 1 or 50-51, wherein the signal has a frequency between 1 MHz and 100 MHz.~~

~~54. The humidifier system of any of Claims 1 or 50-51, wherein the signal has a frequency of about 10 MHz.~~

~~55. The humidifier system of any of Claims 1 or 50-54, wherein the first electrically conductive element and/or the second electrically conductive element is a quarter of the wavelength of the signal.~~

~~56. The humidifier system of any of Claims 1 or 50-54, wherein the wavelength of the signal is four times larger than the length of the first electrically conductive element and/or the second electrically conductive element.~~

~~57. The humidifier system of any of Claims 51-56, wherein the signal generator injects the signal into the first electrically conductive element.~~

~~58. The humidifier system of any of Claims 1 or 50-57, wherein the first electrically conductive element is configured to be a transmitter.~~

~~59. The humidifier system of any of Claims 1 or 50-58, wherein the second electrically conductive element is configured to be a receiver to receive the signal transmitted by the first electrically conductive element.~~

~~60. The humidifier system of any of Claims 1 or 50-59, wherein the magnitude and/or phase of the signal is measured by a radio-frequency transducer.~~

~~61. The humidifier system of Claim 60, wherein the radio-frequency transducer can be an AM receiver, RF sampling ADC, or RF rectifier.~~

~~62. The humidifier system of any of Claims 1 or 50-61, further comprising a filter to filter the signal.~~

~~63. The humidifier system of Claim 62, wherein the filter comprises a high pass or bandpass filter.~~

~~64. The humidifier system of any of Claims 62-63, wherein the filter is configured to filter out the mains frequency.~~

~~65. The humidifier system of any of Claims 62-64, wherein the filter is configured to filter out frequencies between 50 – 60 Hz.~~

~~66. The humidifier system of any of Claims 58-65, wherein the transmitter comprises a loop antenna.~~

~~67. The humidifier system of any of Claims 58-66, wherein the transmitter comprises a monopole antenna.~~

~~68. The humidifier system of any of Claims 59-67, wherein the receiver comprises a loop antenna.~~

~~69. The humidifier system of any of Claims 59-68, wherein the receiver comprises a monopole antenna.~~

~~70. The humidifier system of any of Claims 1 or 50-69, wherein the first electrically conductive element is electrically coupled to a first switch.~~

~~71. The humidifier system of any of Claims 1 or 50-70, wherein the second electrically conductive element is electrically coupled to a second switch.~~

~~72. The humidifier system of Claim 71, wherein the first switch is configured to electrically disconnect one end of the first electrically conductive element.~~

~~73. The humidifier system of any of Claims 71-72, the second switch is configured to electrically disconnect one end of the second electrically conductive element.~~

~~74. The humidifier system of any of Claims 71-73, wherein the first switch and/or the second switch are located in any one of the following: a heater base, a sensor cartridge, the conduit, an external component, or an intermediate connector.~~

~~75.~~17. The humidifier system of any of Claims 1-~~74~~16, wherein the controller is configured to output an alarm if the value indicative of moisture falls below a first threshold value.

~~76.~~18. The humidifier system of any of Claims 1-~~175~~17, wherein the controller is configured to output an alarm if the value indicative of moisture exceeds a second threshold value.

~~77.~~19. The humidifier system of any of Claims 1-~~187~~18, wherein the alarm indicates an unacceptable level of moisture.

~~78.~~20. The humidifier system of any of Claims 1-~~197~~19, wherein the controller is configured to automatically reduce humidification of breathing or insufflation gases in response to the value indicative of moisture and/or humidity in the conduit.

~~79.~~21. The humidifier system of any of Claims 1-~~207~~20, wherein the reduction of humidity delivered to the conduit is achieved by a reduction in heater plate power.

~~80. The humidifier system of any of Claims 1-79, wherein the conduit is a composite conduit.~~

~~81. The humidifier system of any of Claims 1-80, wherein the conduit comprises a vapor and/or liquid permeable bead.~~

~~82. The humidifier system of Claim 81, wherein the permeable bead allows evaporation of water to ambient air while inhibiting passage of liquid water and breathing gases to ambient air.~~

~~83. The humidifier system of Claim 81, wherein the permeable bead is a one or more of an activated perfluorinated polymer material having extreme hydrophilic properties, hydrophilic thermoplastic, breathable thermoplastic copolyester, woven treated fabric exhibiting breathable characteristics, or a hydrophilic polyester block copolymer.~~

~~84.~~22. The humidifier system of any of Claims 1-~~83~~21, wherein the first electrically conductive element and the second electrically conductive element are spirally wound about at least a length of the conduit.

~~85.~~23. The humidifier system of any of Claims 1-22~~84~~22, wherein the first electrically conductive element and the second electrically conductive element are spirally wound within, through, or around the conduit.

~~86.~~24. The humidifier system of any of Claims 1-23~~85~~23, wherein the first electrically conductive element and the second electrically conductive element form part of the conduit walls.

~~87.~~25. The humidifier system of any of Claims 1-24~~86~~24, wherein the first electrically conductive element is a ~~sensing~~heater wire.

~~88. The humidifier system of any of Claims 1-87, wherein the first electrically conductive element is a heater wire.~~

~~89.~~26. The humidifier system of any of Claims 1-25~~88~~25, wherein the second electrically conductive element is a sensing wire.

~~90. The humidifier system of any of Claims 1-89, wherein the second electrically conductive element is a heater wire.~~