F&P 850 System

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F&P 850 System

Optimal Humidity

Optimal Humidity is the condition to which our airways naturally heat and humidify inspired gas – normally reaching 37 °C and 44 mg/L H_2O (BTPS*).

Patients receiving invasive ventilation require Optimal Humidity to assist natural airway defense and promote efficient gas exchange and ventilation. Optimal Humidity is also required by patients receiving Optiflow™ nasal high flow therapy and noninvasive ventilation, however, delivered heat and humidity levels may be adjusted for patient compliance and comfort

*Body Temperature and Pressure, Saturated.

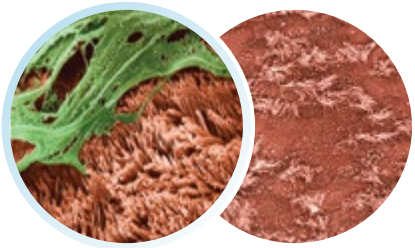
The importance of heat and humidity for respiratory care

The delivery of heated, humidified gas optimizes gas exchange, assists natural airway defense mechanisms, and supports patient comfort and therapy tolerance.

1

The upper airway heats and humidifies inspired gas

In a healthy airway, gas is heated and humidified by the upper airway during inspiration. When the gas reaches the lungs, it is at core body temperature and fully saturated with water vapor – typically 37 °C, 44 mg/L absolute humidity (AH).[1]



Healthy Ciliated Epithelium

Damaged Ciliated Epithelium

2

The mucociliary transport system requires heat and humidity to function

The role of the mucociliary transport system is to trap inhaled contaminants in mucus and transport them up and out of the airway. The efficiency of this system is reliant on the temperature and humidity of inspired gas.[1]

3

Upsetting natural humidification

During respiratory support, several factors can influence and interrupt the natural humidification functions of the upper airway:

1. A bypassed airway from an endotracheal tube or tracheostomy during invasive ventilation[2]
2. The delivery of cool, dry medical gas resulting from compression and storage requirements (≤ 15 °C, < 2% RH)[3]
3. Higher gas flows and volumes from noninvasive ventilation (NIV) and nasal high flow (NHF) may overwhelm the conditioning ability of the airway[4]

4

Heated humidification promotes efficient gas exchange and ventilation

Humidification is integral to secretion management in mechanically ventilated patients and assists with secretion mobilization and removal, helping to prevent airway occlusion and atelectasis.[5]

5

Heated humidification supports patient comfort and tolerance

The delivery of heated and humidified gas during invasive and noninvasive ventilation supports patient comfort and therapy tolerance.[6,7]

6

Inadequate humidity can cause complications

Clinical complications from inadequate humidity can include[2]:

- Artificial airway tube occlusion
- Atelectasis
- Thickened secretions
- Airway obstruction and bronchospasm
- Epithelial dessication

Humidification for neonates & infants

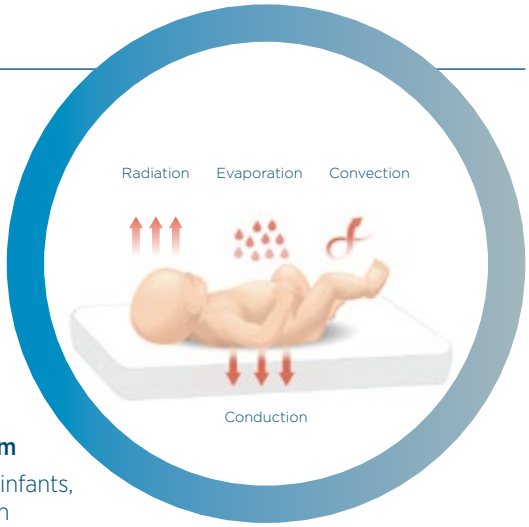
A newborn's respiratory system is reliant on humidity to maintain physiological balance, assist natural defense mechanisms, and conserve energy for growth and development.

Heated humidification promotes conservation of energy for growth and development

Delivering heated and humidified respiratory support is important to promote conservation of energy and aid thermoregulation for neonates and infants.[8] Inadequate humidity levels cause water vapor to be drawn from the airway mucosa until inspired gas reaches 37 °C, 44 mg/L.[9] Each gram of water removed from the mucosa uses 0.58 kCal of limited energy reserves.[10]

Inadequate humidity during respiratory support can cause increased water and heat loss and inflammation in the airway epithelium

These effects are amplified in preterm infants, where a few minutes of ventilation with insufficient humidification has been shown to increase airway resistance and reduce lung compliance.[11]



F&P 850 System: Features and benefits

The F&P 850 Humidification System balances the delivery of optimal humidity for the therapy being delivered, with clinical usability and reduction of mobile circuit condensation.

Fisher & Paykel Healthcare have pioneered respiratory humidification for over 50 years, and the F&P 850 System has been the global state of the art respiratory humidifier since 1998.

Clinically tested, clinically beneficial, clinically proven.

Robust

Designed to withstand daily hospital use

Reliable

Proven to consistently perform

Adaptable

One device supports multiple therapies for adult, pediatric and neonatal patients

Minimized Circuit Condensate

Using Evaqua™ 2 expiratory limb and MicroCell™ inspiratory limb circuit technology

Additional Features

- Flow sensor technology
- Built-in algorithms designed to reduce circuit condensate
- One touch therapy selection combined with dual temperature feedback systems

F&P 850 System: One solution

The F&P 850 System has been designed for use with adult, pediatric and neonatal patients, for invasive ventilation, noninvasive ventilation and Optiflow NHF therapy.

Humidifier

+

Breathing Circuit Kit

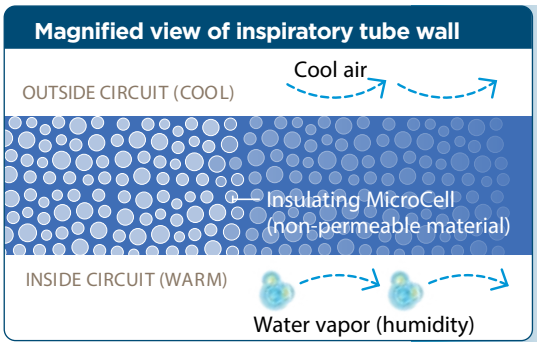
=

F&P 850 System

F&P Evaqua 2 Circuits: Less condensate, without compromise*

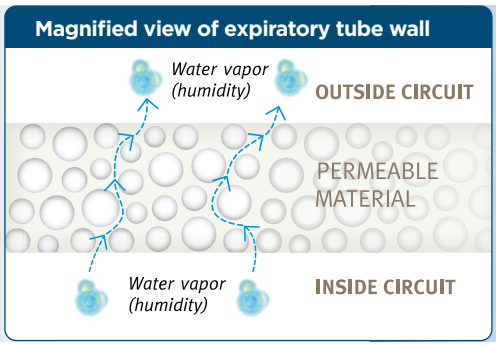
Evaqua is the world's first ventilator circuit technology that minimizes mobile condensate in the expiratory limb by allowing water vapor to diffuse through the tubing wall.

Inspiratory Benefits



- **Less condensate** due to insulating MicroCell technology
- **Protection** from cool drafts
- **MicroCell technology forms an insulation shield between the cool air outside and the water vapor inside.**

Expiratory Benefits

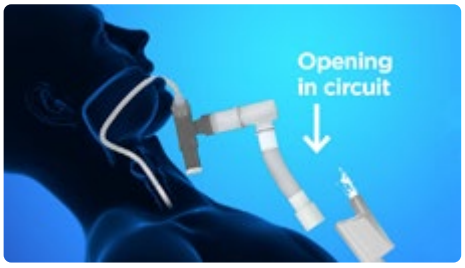


- **Less condensate** with permeable Evaqua technology
- **Protection** through a robust wall structure
- **Allows humidity to diffuse out of the breathing circuit freely.**

Evaqua 2 technology can reduce the need for circuit breaks, promoting a closed system.

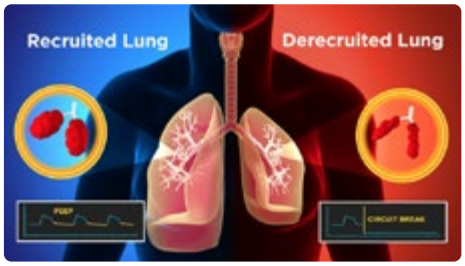
What are the risks of opening a ventilator circuit?

Infection risk



Drop in PEEP[12,13]

Reduced lung recruitment[14]



8 reasons to choose Evaqua 2

1. Minimizes inspiratory and expiratory limb condensate*
2. Reduces the need for clinician intervention to break open the ventilator circuit
3. Reduces ventilation issues (auto-PEEP and ventilator dyssynchrony) caused by mobile circuit condensate
4. No water traps to empty
5. Reduces condensate build-up in expiratory filters
6. Alleviates ventilator alarm issues caused by expiratory block condensate
7. Saves clinician time
8. Easy-to-use system, 14 days duration of use**

Less condensate, resulting in **Less maintenance,** promoting a closed system

* Compared to F&P RT200 dual heated conventional circuit during internal testing
** 14 day during of use for adult circuits. 7 day duration of use for infant circuits.

F&P 850 System: One solution for adults

Humidity delivery across the F&P Adult Respiratory Care Continuum

The F&P 850 Humidification System allows clinicians to heat and humidify respiratory gases to target 37 °C for invasive ventilation and nasal high flow therapies, and 31 °C for noninvasive ventilation.

Invasive Ventilation

A 37 °C temperature setting is recommended to compensate for the loss of humidity due to complete airway bypass from ETT's and tracheostomies.[1] This promotes improved gas exchange and ventilation.[7]

Noninvasive Ventilation

Humidity is required for the high gas flows, high tidal volumes and increased oxygen concentrations often delivered during NIV therapy.[7] A lower temperature of 31 °C is required to support patient comfort, and assist with patient compliance.[15]

Optiflow Nasal High Flow

Humidification enables the delivery of high flow rates of respiratory gas with the Optiflow range of nasal cannula. NHF has been shown to decrease the need for intubation and escalation of care compared to conventional oxygen therapy when used for primary respiratory support.[16]

Circuit

Dual limb circuits	RT380
	RT280
	RT481

Interface

Standard ETT or tracheostomy

Circuit

Single limb circuits	RT319
	RT219
Dual limb circuits	RT481
	RT380
	RT280

Interface

Nivairo™ NIV Mask

RT045X* (NV with AAV)

RT046X* (NV)

RT047X* (Vented with AAV)

*X denotes mask size – XS/S/M/L

Circuit

Single limb circuits	RT332
	RT232
	RT302
Dual limb circuits	RT481
	RT380

Interface

Optiflow+ Nasal Cannula

OPT942 (S)

OPT944 (M)

OPT946 (L)

OPT970 (Tracheostomy Adapter)

OPT980 (Mask Adapter)

The consumables recommended above are not an exhaustive list. Please contact your Fisher & Paykel Healthcare representative for a full range of consumable options available. Not all consumables are available in all countries.

F&P 850 System: One solution for infants

Humidity delivery across the F&P Infant Respiratory Care Continuum

A newborn's respiratory system is reliant on humidity to maintain physiological balance, assist natural defence mechanisms, and conserve energy for growth and development. At Fisher & Paykel Healthcare, we care for a range of patients, and offer a comprehensive humidified respiratory solution for all therapies across the infant Respiratory Care Continuum.

Neonatal Resuscitation

Newborn infants are exposed to heat loss immediately following birth. Delivery of heated and humidified gas during stabilization has been shown to increase rates of normothermia on NICU admission when compared to cold, dry gas.[8]

Invasive Ventilation

Delivering heated and humidified gas in invasive respiratory support is widely recommended and considered standard practice.[7] Insufficient humidification has been shown to increase airway resistance, reduce lung compliance and increase work of breathing.[11]

Continuous Positive Airway Pressure (CPAP)

CPAP is a well-established therapy in which the delivery of heated, humidified gas maintains the airway mucosa, reduces encrustation of secretions and supports patient comfort.[17,1]

Optiflow Junior Nasal High Flow

Delivering high flow rates characteristic of NHF with heated, humidified gas has been shown to improve respiratory effort, aid mucociliary function and promote airway hydration.[18]

Circuit

900RD110 Humidified T-Piece Circuit

Interface

Infant Resuscitation Mask

RD80X series

Circuit

RT265 (for flows above 4 L/min)

RT266 (for flows between 0.3 - 4 L/min)

RT267 (for SLE2000 vents - all SLE flow ranges)

RT268 (for SLE4000/5000 vents - all SLE flow ranges)

RT269 (for SLE6000 vents - all SLE flow ranges)

Interface

Standard ETT or tracheostomy

Circuit

BC161*	Bubble CPAP kit for F&P FlexiTrunk interface
BC151*	Bubble CPAP kit for Hudson CPAP interface
RT265	Dual Limb Circuit (for ventilator driven CPAP or NIV)

*BC163 & BC153 are available in USA only and are identical minus the chamber

Interface

Four components are required to make a CPAP interface

1	FlexiTrunk Infant Interface BC19X series		
2	Prongs BCXXXX series	or	Masks BC80X series
3	Bonnets BC30X series	or	Headgear BC32X series
4	Chinstrap BC35X		

Circuit

RT330 Blender Circuit (includes pressure manifold)

RT331 Ventilator Circuit

Interface

Optiflow Junior 2 Nasal Cannula

OJR410 (XS)

OJR412 (S)

OJR414 (M)

OJR416 (L)

OJR418 (XL)

OJR520 Optiflow Junior 2+ Nasal Cannula (XXL)

OJR4XXVT* Ventilator Transition Kits

OJR4XXB* Blender Transition Kits

XX denotes Optiflow Junior 2 nasal cannula size required

The consumables recommended above are not an exhaustive list. Please contact your Fisher & Paykel Healthcare representative for a full range of consumable options available. Not all consumables are available in all countries.

F&P 850 System: Accessories

Required accessories:

1. Temperature and Flow Probe
   - 900MR869
2. Heater-wire Adapter
   - 900MR805 (for dual heated breathing circuits) or
   - 900MR806 (for inspiratory heated breathing circuits)

Other Accessories:

- Humidifier mounting brackets
- Water pole holders
- Mobile stands

Temperature and Flow Probe

Heater-wire Adapter

Please contact your local Fisher & Paykel Healthcare representative for a comprehensive list of accessories

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