Nurturing Life with F&P Neopuff™

Fisher & Paykel Healthcare is dedicated to improving patient care and outcomes. With over 20 years of worldwide use and acceptance involving millions of successful resuscitations, the F&P Neopuff™ Infant T-Piece Resuscitator has recently been updated to further enhance functionality and usability while providing optimal resuscitation.

T-Piece Resuscitation with Optimal Humidity can be delivered with the F&P Neopuff Infant T-Piece Resuscitator System.

Fine Settings

The F&P Neopuff allows for fine setting of exact pressures and incorporates a medical quality manometer which measures and displays accurate pressures on an easy-to-read dial.

Connecting Gas Supply

Connection to oxygen or blended oxygen/air supply can be made easily by using the green gas supply line that is included with every F&P Neopuff.

Dual Feedback

Dual feedback control of the MR850 humidifier ensures consistent temperature and humidity level is delivered with minimal input from caregivers.

Comfort

The Infant Resuscitation Masks are specially designed with soft and pliable edges to conform comfortably to an infant's face facilitating a seal around the infant's mouth and nose.

F&P Neopuff Infant T-Piece Resuscitation with Optimal Humidity is the only humidified resuscitation system available. If you are humidifying with all other respiratory therapies... why not with the first vital breaths?

DELIVERING T-PIECE RESUSCITATION

F&P Neopuff™

PLATFORM

RESUSCITATOR
RD900 Series

SERIES HUMIDIFIER
MR850

DELIVERY SYSTEM

HUMIDIFICATION CHAMBER
MR290/MR225

BREATHING CIRCUIT
RD Series

INTERFACE

INFANT RESUSCITATION MASK
RD Series

Superior science and care

F&P Infant Respiratory Care Continuum™

Precious new life deserves the best possible start. From the first breath, the F&P Infant Respiratory Care Continuum facilitates the evolution from immature and supported lung function to respiratory independence.

At every point of the Care Continuum, humidified solutions help to emulate the natural physiological balance in healthy, mature lungs. As an infant's needs change, so does the configuration of the therapy system. As a result caregivers can nurture life, confident they are using the best therapy solutions, delivered in the most efficient ways.

REFERENCES

1. Roehr CC, Kelm M, Fischer HS, et al. Manual ventilation devices in neonatal resuscitation: Tidal volume and positive pressure-provision. Resuscitation. 2010 Feb;81(2):202-5. Epub 2009 Nov 17.
2. Te Pas AB, Walther FJ. Ventilation of very preterm infants in the delivery room. Current Pediatric Reviews. 2006;2(3):187-197.
3. Hussey SG, Ryan CA, Murphy BP. Comparison of three manual ventilation devices using an intubated mannequin. Arch Dis Child Fetal Neonatal Ed. Nov 2004;89(6):F490-493.
4. Roehr CC, Kelm M, Proquitte H, et al. Equipment and Operator Training Denote Manual Ventilation Performance in Neonatal Resuscitation. Am J Perinatol. 2010 Oct;27(9):753-8. Epub 2010 May 10.
5. Kattwinkel J, Perlman JM, Aziz K, et al. Part 15: Neonatal Resuscitation. Circulation. November 2, 2010;122(18 suppl 3):S909-S919.
6. Te Pas AB, Walther FJ. A randomized, controlled trial of delivery-room respiratory management in very preterm infants. Pediatrics. Aug 2007;120(2):322-329.
7. Lista G, Fontana P, Castoldi F, et al. Does Sustained Lung Inflation at Birth Improve Outcome of Preterm Infants at Risk for Respiratory Distress Syndrome? Neonatology. Jul 9 2010;99(1):45-50.
8. Lindner W, Hogel J, Pohlandt F. Sustained pressure-controlled inflation or intermittent mandatory ventilation in preterm infants in the delivery room? A randomized, controlled trial on initial respiratory support via nasopharyngeal tube. Acta Paediatr. Mar 2005;94(3):303-309.
9. Lindner W, Vofsbeck S, Hummler H, et al. Delivery Room Management of Extremely Low Birth Weight Infants: Spontaneous Breathing of Intubation. Pediatrics. May 1999 1999;103(5):961-967.
10. Klingenberg C, Dawson JA, Gerber A, et al. Sustained Inflations: Comparing Three Neonatal Resuscitation Devices. Neonatology. Jan 26 2011;100(1):78-84.
11. Williams R, Rankin N, Smith T, et al. Relationship between the humidity and temperature of inspired gas and the function of the airway mucosa. Crit Care Med. 1996;24(11):1920-1929.
12. Te Pas AB, Lopriore E, Dito I, et al. Humidified and heated air during stabilization at birth improves temperature in preterm infants. Pediatrics. Jun;125(6):e1427-1432.
13. Dawson JA, Davis PG, Kamlin CO, et al. Free-flow oxygen delivery using a T-piece resuscitator. Arch Dis Child Fetal Neonatal Ed. Sep 2007;92(5):F421.
14. Te Pas AB, Siew M, Wallace MJ, et al. Establishing functional residual capacity at birth: the effect of sustained inflation and positive end-expiratory pressure in a preterm rabbit model. Pediatr Res. May 2009;65(5):537-541.
15. Finer NN, Rich WD. Neonatal resuscitation: raising the bar. Curr Opin Pediatr. Apr 2004;16(2):157-162.

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Fisher & Paykel HEALTHCARE

THERAPY SOLUTION

T-Piece Resuscitation

Optimal Resuscitation with F&P Neopuff™




Fisher & Paykel HEALTHCARE

Providing controlled pressures to stabilize an infant

Infant T-Piece Resuscitation is designed to provide consistent and optimal resuscitation for infants. It delivers inflation pressures while protecting the lungs from injury.

Optimal resuscitation is the application of positive pressure to inflate the lungs and achieve maximum alveolar recruitment without causing further damage (and while establishing Functional Residual Capacity (FRC)).

OPTIMAL HUMIDITY

Optimal resuscitation can make use of Optimal Humidity (37 ºC, 44 mg/L) by conditioning the gas flow to the natural level of humidity. This restores natural balance and provides a level of humidity found normally in the airways.

"Use of T-piece devices guarantee reliable and constant Vt and PIP provision, irrespective of individual, operator dependent variables." (Roehr et al. 2010)[1]

"Target inflation pressures and long inspiratory times are more consistently achieved in mechanical models when T-piece devices are used rather than bags."
(Neonatal Resuscitation: 2010 American Heart Association Guidelines)[5]

Protect with Controlled Pressures

Infant T-Piece Resuscitation has the benefit of providing controlled pressures[1] to help prevent lung over-distension that can result in further injury, such as barotrauma, which could lead to Bronchopulmonary Dysplasia (BPD). Such pressures are defined as controlled and precise Peak Inspiratory Pressure (PIP) along with consistent and precise Positive End Expiratory Pressure (PEEP).[2] These controlled pressures are delivered more accurately when compared with a self-inflating bag.[3, 4]

SUSTAINED LUNG INFLATION

What is a sustained inflation?

A sustained inflation is a lung inflation strategy performed immediately after birth, where PIP is delivered for a longer period e.g. up to 20 seconds.[6-9]

Why deliver a sustained inflation?

The aim of using a sustained inflation is to facilitate uniform lung aeration.

A sustained inflation can result in the avoidance of intubation, less need for surfactant and is associated with a reduction in BPD.[6, 7]

Which devices can deliver a sustained inflation?

The Infant T-piece Resuscitator delivers a consistent pressure during a sustained inflation.[10]

In comparison, a clinical study has shown that a flow inflating bag and a self-inflating bag can deliver variable pressures during a sustained inflation and furthermore it is difficult to achieve longer inflation times with a self-inflating bag.[10]

Infant T-Piece Resuscitation with Optimal Humidity

OPTIMAL HUMIDITY

An immature airway is reliant on a delicate balance of temperature and humidity. Medical gases used for infant resuscitation can be extremely cold and dry and can draw excessive heat and moisture from the airway.

There can be an additional complication in some resuscitations where an infant's upper airway may need to be bypassed with an endotracheal tube. This is where the majority of heat and moisture is normally added during inspiration.[11]

The delivery of heated and humidified gas during resuscitation has been found to reduce postnatal decrease in temperature and the incidence of hypothermia.[12]

"The use of heated and humidified air during respiratory support in very preterm infants just after birth reduced the postnatal decrease in temperature." (Te Pas et al. 2010)[12]

BENEFITS OF INFANT T-PIECE RESUSCITATION

INFANT	CLINICIAN
Inflates an infant's lungs with controlled pressures[1]	The operators; experience, training, concentration and fatigue level do not affect the pressures delivered.[3, 4] This is highly reassuring for the clinician
Oxygen concentrations from 21 to 100% can be delivered[13]	PEEP can be used during surfactant delivery
Infant T-Piece Resuscitation with Optimal Humidity can prevent airway drying[11]	Can provide consistent PEEP during transport or ventilator circuit change
Consistent PEEP can improve lung compliance and establish FRC[2, 14]	Initial sustained inflations can be delivered to establish lung volume[14]
	Can deliver ideal inspiratory versus expiratory ratio – allows for better gas exchange

PATIENT NEEDS AND OPTIMAL OUTCOMES

An infant requiring resuscitation has the essential need for oxygenation, however prematurity or diseases such as Respiratory Distress Syndrome (RDS) can make its requirements more complex. There is the need to protect an underdeveloped and/or compromised respiratory system.

To provide consistent and optimal resuscitation the infant requires six factors (all of which can be delivered by Infant T-Piece Resuscitation):

1. Controlled PIP

PIP is the maximum inspiratory pressure. The main objective in delivering PIP is to inflate and recruit alveoli to achieve gas exchange using the lowest possible pressure. The PIP level may vary from infant to infant depending on factors such as gestational age, body size and lung condition.

Controlled PIP can be consistently delivered by Infant T-Piece Resuscitation, as shown in the graph below. The square waveform has the advantage of longer time at controlled peak pressure that may open up the lungs, allowing adequate time for gas exchange to occur.

2. Consistent, precise PEEP

PEEP is the pressure in the lungs at the end of expiration. Consistent PEEP allows gas to remain inside the lungs after expiration to help establish FRC. The establishment of FRC can be an effective strategy to help protect the immature infant's lungs.[2]

3. Ideal breath rate

A rate of 40 to 60 breaths per minute is suggested by Neonatal Resuscitation Program (NRP), which can be delivered with a T-Piece Resuscitator.

4. Delivery of required O_2 (21 to 100%)

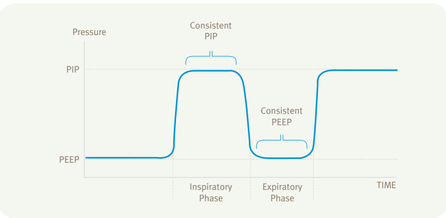
Infant T-Piece Resuscitation can deliver 21 to 100% oxygen during resuscitation.[13] The hospital protocol or guidelines will indicate appropriate requirements.

5. Ideal seal

Achieving an ideal seal for resuscitation is essential as too much leak will result in insufficient ventilation. T-Piece Resuscitation allows the clinician to achieve proper positioning by using one hand for delivering breaths and the other to hold the mask in place.

6. Surfactant with PEEP

Surfactant plays a major role in decreasing the surface tension in the lungs and reducing the tendency of the lungs to collapse. T-Piece Resuscitation allows the delivery of surfactant while providing PEEP.



"To evaluate the ability of our resuscitation teams to deliver prolonged inflations and CPAP/PEEP in the delivery room, we studied two anesthesia bags and compared them with a purpose-built T-piece-style resuscitator. Our results demonstrated that for all user groups, the resuscitator was easier to use, provided more consistent PEEP and peak inspiratory pressure, and was the only device that effectively delivered a consistent prolonged inflation." (Finer and Rich, 2004)[15]

"PEEP is likely to be beneficial and should be used if suitable equipment is available. PEEP can easily be given with a flow-inflating bag or T-piece resuscitator, but it cannot be given with a self inflating bag unless an optional PEEP valve is used. There is, however, some evidence that such valves often deliver inconsistent end-expiratory pressures."
(Neonatal Resuscitation: 2010 American Heart Association Guidelines)[5]