

Q Series QTube™

Bilumen Design Advanced Breathing Circuit



CLINICAL ADVANTAGES OF THE QTube

The QTube is a circle circuit, accommodating all of your needs, including low and ultra low flow anaesthesia. The streamlined design minimizes the clutter of a two limb circle circuit with these important additional benefits:

- The QTube is an Adult to Paediatric circle circuit that has been reduced down to a single limb.
- The resistance of the inner septum is much lower than a normal corrugated circuit; this allows the overall circuit diameter to be reduced.
- The QTube is not a co-axial circuit
- The QTube can be used with ultra low flows; this reduces costs by decreasing volatile agent required
- QTube can be used on Paediatrics down to 3kg
- The QTube can be used for a whole list by changing the filter and mask between cases
- The QTube is the lightest weight circuit available which reduces drag on the patient. Total weight including connectors is 166g / 201g
- QTube has a smooth, very low resistance Inner Septum to separate the inspiratory and expiratory flow chambers.
- Due to the inner septum, the QTube benefits from very low compliance which is 7 times LESS than a coaxial circuit, meaning that more of the targeted inspired volume reaches the patient on each breath.
- The inspiratory/expiratory flow levels are near identical, which means the QTube circuit can be safely connected either way on the anaesthetic machine.
- The septum increases crush strength, yet the QTube retains very good flexibility in the horizontal direction, which is important when placing the circuit.
- QTube septum allows heat to be transferred from the expiratory limb to the inspiratory limb which helps to reduce rain out.
- QTube has a lower total circuit volume resulting in significantly quicker wash-in/wash-out times - important with low and ultra low flow anaesthesia
- QTube inner septum has very low inspiratory and expiratory resistance. This is particularly important with work of breathing using laryngeal masks.
- QTube is available in a wide range of sizes and configurations including 1.5m, 1.8m, 2.4m, 2.7m and 3m with optional connectors, rebreathing limbs, bags and elbow with or without a CO₂ port.
- The materials used to construct the circuit are Polyethylene for all tubing and septum, polypropylene for all connectors.
- QTube uses a silicone sealing band for extra patency with a mechanical joint that requires over 120+Newton to separate. This greatly reduces the risk of a major patient disconnect.
- QTube is reduced to CO₂, H₂O and carbon ash under high temperature incineration.

IN THE OPERATING ROOM

- Lightweight reduces torque on the LMA or ET tube
- Less plastic in manufacture means less waste in disposal
- Lumen size enables both Adult and Paediatric use, reducing stock levels



**LATEX
FREE**



QTube WITH INTEGRATED ANAESTHETIC GAS SAMPLING LINE

- The QTube has an optional Integrated Sampling Line (IGS) which can improve the gas sampling response with a low respiratory output patient e.g. after IV propofol at induction or when monitoring small children and infants.
- The IGS is positioned in the centre of the tidal flow, which is where the best flow is found when tidal volumes are minimal, providing a better response when compared to using a sample port on a filter.
- The QTube IGS enables more efficient workflow by eliminating the need to transfer a CO₂ line for new patients, reducing the risk of pinching or occlusion and someone forgetting to attach the gas sampling line for the next patient.
- The IGS is permanently in-situ to provide instant gas sampling, which saves time and significantly reduces the costs of using separate sampling lines.

LESS WEIGHT

QTube is 30% lighter than traditional two limb circuits reducing torque on the airway

LESS STOCK

QTube reduces stock levels because the lumen size enables both adult AND paediatric use

LESS COMPLIANCE

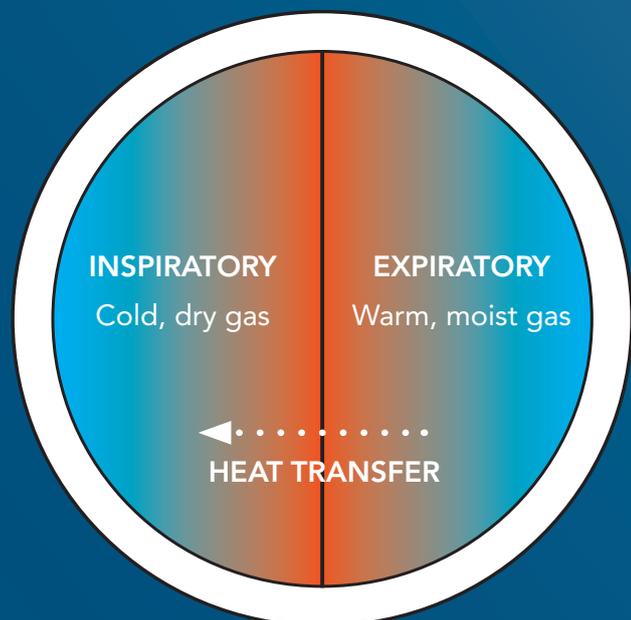
QTube's very low compliance tubing means delivery of a more accurate tidal volume

LESS HEAT LOSS

QTube common wall/septum separating the inspiratory and expiratory gases allows heat transfer from warm exhaled gas.



Cold Ambient Air



Cold Ambient Air

THERMALLY EFFICIENT:

Bench testing suggests the transfer of heat from the expiratory to inspiratory limb of 7.1°C in 15min at a flow of 4lt/min.

LIGHTWEIGHT

Less plastic means less weight and torque on the patients' airway management system. QTube weighs 40% less than a co-axial circuit and 30% less than traditional circle circuits.

LOWER COMPLIANCE

The QTube septum decreases compliance in the circuit to significantly increase delivered volume without affecting drupe.

QTube ADULT TO PAEDIATRIC ADVANCED BREATHING CIRCUIT

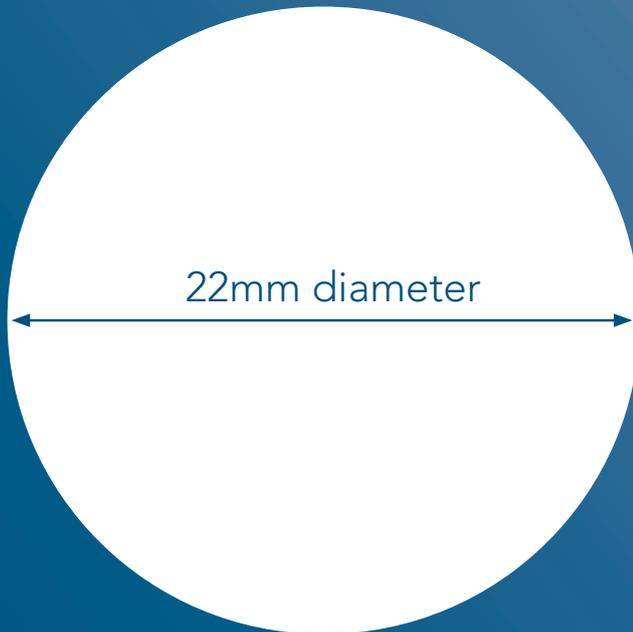
LENGTH	1.5m	1.8m	2.4m	2.7m	3.0m
WEIGHT WITH CONNECTORS*	132g	166g	201g	225g	259g
COMPLIANCE OF CIRCUIT @ 60cm H ₂ O*	0.33	0.38	0.44	0.52	0.56
THERMAL EFFICIENCY*	Net increase of 6.8°C in first 15 minutes at 4L/m in flow rates on anaesthesia machine				

INSPIRATORY AND EXPIRATORY RESISTANCE AT VARIOUS FLOW RATES* (cmH₂O)

LENGTH	10L/MIN		20L/MIN		30L/MIN		40L/MIN		50L/MIN	
	I	E	I	E	I	E	I	E	I	E
1.5m	0.10	0.12	0.33	0.39	0.73	0.83	1.27	1.38	1.95	2.17
1.8m	0.12	0.14	0.44	0.50	1.03	1.15	1.78	1.90	2.72	2.97
2.4m	0.15	0.18	0.51	0.59	1.18	1.33	2.01	2.14	3.09	3.33
2.7m	0.17	0.21	0.57	0.66	1.32	1.49	2.23	2.37	3.45	3.78
3.0m	0.19	0.23	0.96	1.12	2.18	2.36	3.71	4.89	5.23	6.24
CIRCUIT MATERIALS	Corrigated tubing and septum wall, Polyethylene/EVA 22mm connectors, medical grade Polypropylene cuff band, Polyisoprene									

*Independent test data

CALCULATION OF CROSS SECTIONAL AREA (CSA) OF INSPIRATORY AND EXPIRATORY LIMB



$$\text{area} = \frac{\pi d^2}{4} = \frac{3.14 \times 22^2 \text{mm}}{4}$$

$$\text{area} = 379.94 \text{mm}^2$$



Dual Lumen

$$\text{area} = \text{CSA1} = \frac{379.94 \text{mm}^2}{2} =$$

$$\text{CSA1} = 189.97$$

$$\text{CSA1} = \text{CSA2}$$

$$d = \sqrt{\frac{\text{CSA1} \times 4}{\pi}}$$

$$d = \sqrt{\frac{189.97 \times 4}{\pi}} = \sqrt{242}$$

$$= 15.55 \text{mm}$$

The QTube is also very close to the total circuit volume of a paediatric twin limb circuit. Whilst the resistance compared to a twin limb adult circuit is slightly higher, it is still well within clinically acceptable levels.

Breathing circuit selection requires the Anaesthetists expert clinical judgment. As a market leading manufacturer of anaesthesia circuits, we offer a complete range of sizes and configurations to meet the needs of every clinician.

COMMONLY ASKED QUESTIONS

WHAT SORT OF TESTING HAS BEEN DONE PRIOR TO PACKAGING?

Every circuit is fully leak tested to a level that exceeds the requirements of ISO 5367:2013 of 21.9ml/min for Adults and 8.7ml/min for Neonates (pictured). QTube must then pass strict quality control measures before being packaged.

IS THERE AN INCREASE IN INSPIRATORY PRESSURES WITH THE QTube CIRCUIT?

The laws of physics suggest that by decreasing the diameter of the circuit, the pressure will be raised. This is true; however this increase in pressure is so minimal that it will not adversely affect the patient.

HOW LONG CAN THE QTube CIRCUIT BE USED?

Salveo Medical recommends that current hospital protocol is followed regarding the length of time the circuit is used. We have had no feedback related to degradation or impaired performance within these timeframes.

IS THE WORK OF BREATHING (WOB) INCREASED FOR A LARGE PATIENT WHO IS SPONTANEOUSLY VENTILATING?

It is the compliance of the patients' lung that usually impacts on the increased WOB rather than the compliance of the QTube circuit. Patient size should not have any effect on their WOB because the diameter of the circuit delivers a volume of 15.5mm



WHAT ANAESTHETIC MACHINES CAN WE USE WITH THE QTube?

The QTube has been designed for use with the complete range of installed machines in New Zealand including GE, Dräger, Penlon.



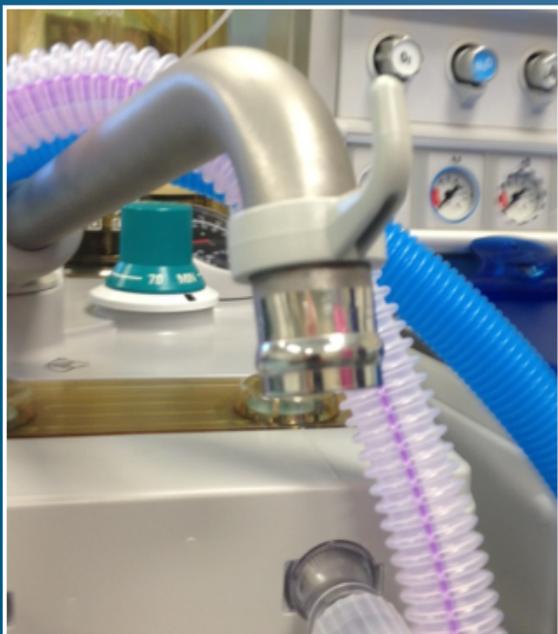
QTube IS DESIGNED FOR USE WITH ALL LEADING ANAESTHETIC MACHINES



HOW DO WE ATTACH THE BLUE REBREATHING LIMB ONTO THE AESTIVA MANUAL BAG ARM?

The QTube can be configured with connectors to fit any Anaesthetic machine including the flexible adapter required for 'A' or 22mm/22mm male to male connector required for 'B'.

A



B



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USA medical

Penlon 



Dräger



ENVIRONMENTAL INFORMATION

The QTube is constructed from tubing that is extruded from polyethylene and polypropylene material. There is a small percentage by weight of EVA blended in and its combustion products are listed below. The septum colour additive is a polyethylene base with a low percentage of FDA approved food colourant. It is free of heavy metals. The materials used are virgin and no regrind or additives are used that would alter the incineration properties of these materials.

ABBREVIATION	DESCRIPTION	COMBUSTION PRODUCTS IN TYPICAL INCINERATION
PE	Low density Polyethylene	Water (H ₂ O), Carbon Dioxide (CO ₂)
PP	Polypropylene	Water (H ₂ O), Carbon Dioxide (CO ₂)
EVA	Ethylene vinyl acetate	Water (H ₂ O), Carbon Dioxide (CO ₂)

The above list of materials are used in the manufacture of the QTube and constitutes >99% of the product by weight. The probable list of combustion products assumes the product is incinerated properly, in the presence of oxygen (air) and in accordance with relevant AS/NZ standards.





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