

The Quantum Heater-Cooler



Spectrum Medical is proud to present its newest addition to

A powerful and revolutionary Heater-Cooler technology that eliminates the growth the disruption of Operating Room based laminar flow systems and eliminates the

The following three design strategies are fundamental to this radically new patient – safety system:

- The Quantum Heater-Cooler technology is a world first solution in which hot and cold thermal energy is supplied to the patient perfusion circuit using Spectrum Medical's medically approved and specially formulated Glycol solution which eradicates water from the Operating Room and the patient perfusion circuit.
- The Glycol circuit transfers its thermal energy to the patient perfusion circuit using two compatible single-use sterile heat exchangers specifically developed by Spectrum Medical for both the

Arterial and Cardioplegia circuits from Neonates to Adults.

- The Heater-Cooler Unit is silent, extremely powerful and requires no cleaning other than that performed by Spectrum Medical during its annual Sentinel servicing plan.

Within Spectrum Medical and by many of our future customers, Spectrum Medical's radically new Heater-Cooler technology is already known as "Mr. Frosty". Mr. Frosty is clean, safe and silent in the Operating Room and with its unique penguin graphic brings fun back to what has been a very unhappy space.



the Quantum family of Perfusion technologies.

an environment for the Mycobacterium Chimaera bacteria, eliminates the time-consuming need for hazardous cleaning procedures.

System Overview

The Quantum Heater-Cooler unit provides thermal energy to two independent circuits facilitating the simultaneous delivery of either hot or cold energy to both the patient and cardioplegia heat exchangers.

Simply connect the hoses to the single-use PureFlow sterile heat exchangers using Spectrum Medical's "drip free" connectors and with the simple and intuitive user interface initiate the priming function. During the priming phase the air contained within the single-use PureFlow heat exchangers will be replaced with Glycol heat transfer fluid.

Following the priming phase the user will be prompted to enter patient weight and target temperatures. With this information the system compares current cold charge capacity with expected demand and predict whether the remaining energy within the Heater-Cooler is sufficient for the planned procedure.

To end the process simply press the de-prime button and when the de-prime cycle is complete remove the hoses from the heat exchangers. The maintenance of the Glycol heat transfer fluid volume within Mr. Frosty is managed automatically during the re-charging process.

The Heater-Cooler is a fully functional standalone device or can be integrated within the Quantum Perfusion System and controlled directly from the Quantum Workstation.

Mr. Frosty works with both 110v and 220v AC supplies. In a fully charged condition the stored cooling energy is equivalent to 2.1 kW.



System Charging

System recharging of Mr. Frosty's stored cold energy is accomplished using standard Industrial Chiller systems that can be provided either by Spectrum Medical or procured directly by the hospital. The sizing of the chiller systems is dependent on the number of Quantum Heater-Cooler systems in use and the customer's expectations regarding actual Quantum Heater-Cooler re-charge times. As an example, a 2 kW Industrial Chiller System will recharge a fully depleted Quantum Heater-Cooler in approximately one hour.

Industrial Chiller Systems range in power outputs from 0.5kW to 5kW and can use either three phase or single-phase electrical power supplies. Furthermore, Industrial Chiller systems can be mounted to an external wall or as standalone system within a designated internal space.

The Industrial Chiller System will interface with a Spectrum Medical wall mounted re-circulating ring-main system and again the actual size of the ring main and the number of multiple re-charge points will be installation dependent.



Quantum PureFlow



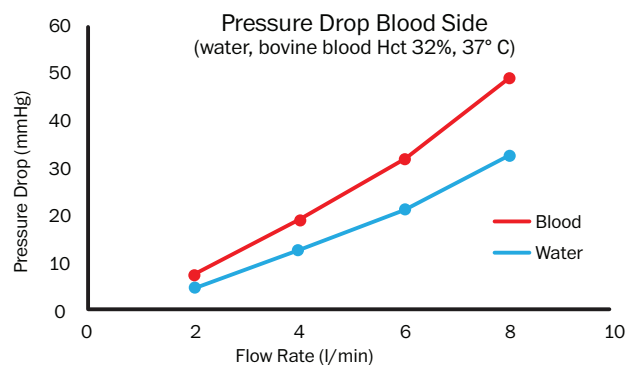
The Quantum PureFlow range of sterile disposable heat exchangers have been designed by Spectrum Medical to provide the safest solution for eliminating the growth environment for the Mycobacterium Chimaera bacteria.

Specifically developed to operate exclusively with the Quantum Heater-Cooler technology and its Glycol heat transfer fluid. Both the Arterial heat exchanger and the Cardioplegia heat exchanger are compact in design, with low priming volumes and minimal pressure drops.

Technical Specifications

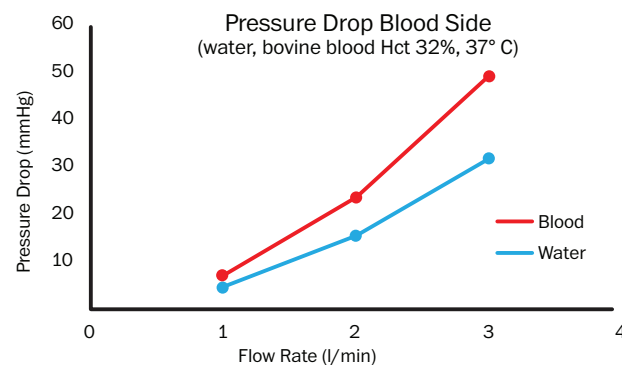
Standard Heat Exchanger: High Flow (adult size)

- Priming volume blood side: 55 ml
- Priming volume HTF side: 70 ml
- Exchange Surface: 0.12 m²
- Maximum flow rate: 8 l/min



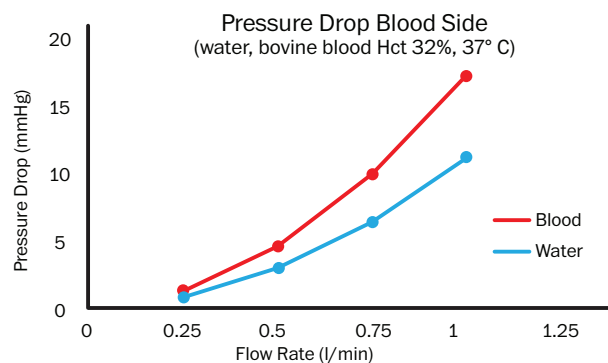
Standard Heat Exchanger: Medium Flow (pediatric size)

- Priming volume blood side: 22 ml
- Priming volume HTF side: 38 ml
- Exchange Surface: 0.05 m²
- Maximum flow rate: 3 l/min



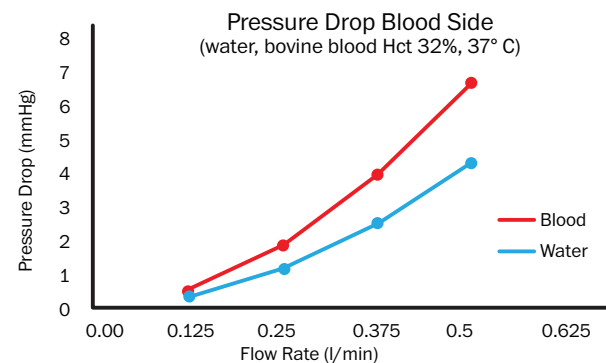
Standard Heat Exchanger: Low Flow (neonatal size)

- Priming volume blood side: 11 ml
- Priming volume HTF side: 22 ml
- Exchange Surface: 0.028 m²
- Maximum flow rate: 1 l/min



Cardioplegia Heat Exchanger

- Priming volume blood side: 22 ml
- Priming volume HTF side: 22 ml
- Exchange Surface: 0.028 m²
- Maximum flow rate: 0.5 l/min
- Relief Valve Opening Pressure: 500 mmHg



Total Customer Support

With an absolute dedication to customer support and total solutions approach to maximizing equipment availability within the hospital, Spectrum Medical has designed a two-tier customer support system called Guardian and Sentinel Total Care.

Guardian Total Care:

Annual Servicing Includes all required servicing visits performed by dedicated Spectrum Medical service personnel and the cost of all servicing items.

Annual Software Updates During the service visit the Quantum Software will be maintained to latest standards including changes to user functionality, updates to enhance maintainability and reliability.

Telephone Support Within standard working hours.

Sentinel Total Care:

Extended Warranty Full warranty on your Quantum Heater-Cooler for its 10-year life at no cost to the customer. Quantum Products beyond economic repair will be replaced with latest 'new-build' technologies.

Accidental Damage Accidental damage including accessories (hose assemblies) for the 10-year life of your Quantum Product at no cost to the customer.

Emergency Loan Equipment Loan equipment provided at no cost if the defective equipment cannot be rectified within 24 hours of being returned to Spectrum Medical.



UK Headquarters:

Call +44 (0) 1242 650120

enquiries@spectrummedical.com

USA and Canada:

Call 800 265 2331

ussales@spectrummedical.com

www.spectrummedical.com



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Registered to:
ISO13485:2016
File No. A14554