

RAM CANNULA MECHANICAL FLOW DATA

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PURPOSE & SUMMARY:

The objective was to measure the flow resistance of seven sizes of RAM Cannula. The test procedure was based on the standard: BS EN 13544-2:2002+A1:2009 Respiratory therapy equipment – Part 2: Tubing and connectors, Appendix A.3 Method of test for resistance to gas flow of tubing, which sought to measure the resistance of flow through 2,000 mm of tubing at 4 lpm, with a maximum allowable flow resistance of 0.9 kPa/m (9.2 cmH₂O). This test extended to test complete cannula assemblies at multiple flow rates to fully characterize flow resistance vs. flow rate.

METHODS, PROCEDURES, AND STUDY ENDPOINTS:

Method of determining resistance to flow – Dry air is pumped at known flow rates through the devices with air allowed to vent to atmosphere through the cannula prongs. Resistance to flow is measured as the pressure difference between that measured at the connector and atmospheric pressure.

Procedures - Flow testing is based on ISO standard BS EN 13544-2:2002+A1:2009 Respiratory therapy equipment – Part 2: Tubing and connectors, Appendix A.3 Method of test for resistance to gas flow of tubing. This procedure was modified and documented in ETP-018 Flow Test, where multiple flow rates are used to verify the reading at 6 lpm. Further, the ISO standard is designed to test straight lengths of tubing, this testing is conducted on cannula assemblies. Five samples of each part number were tested. All samples were tested and data collected from 2 lpm to 15 lpm.

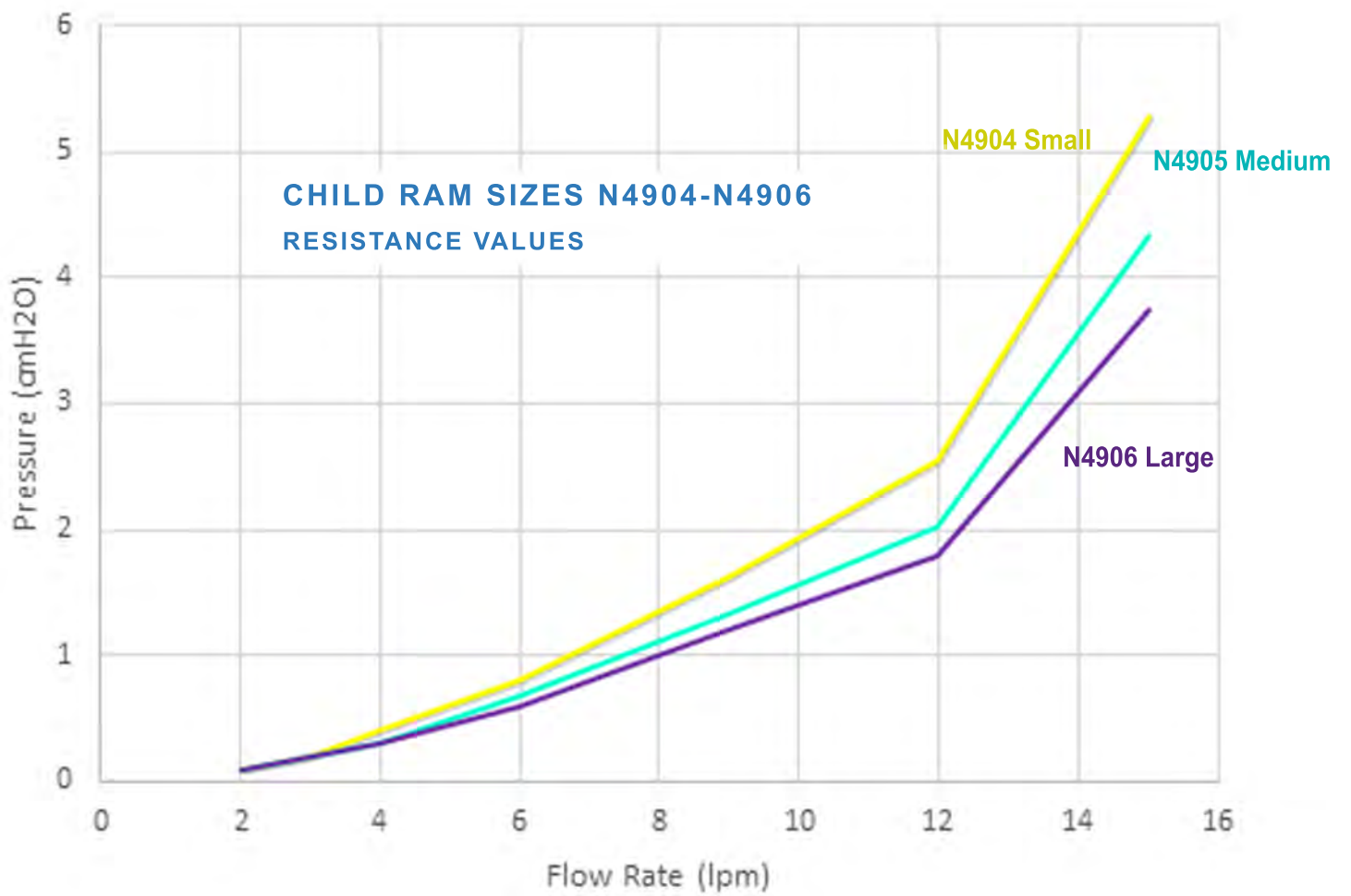
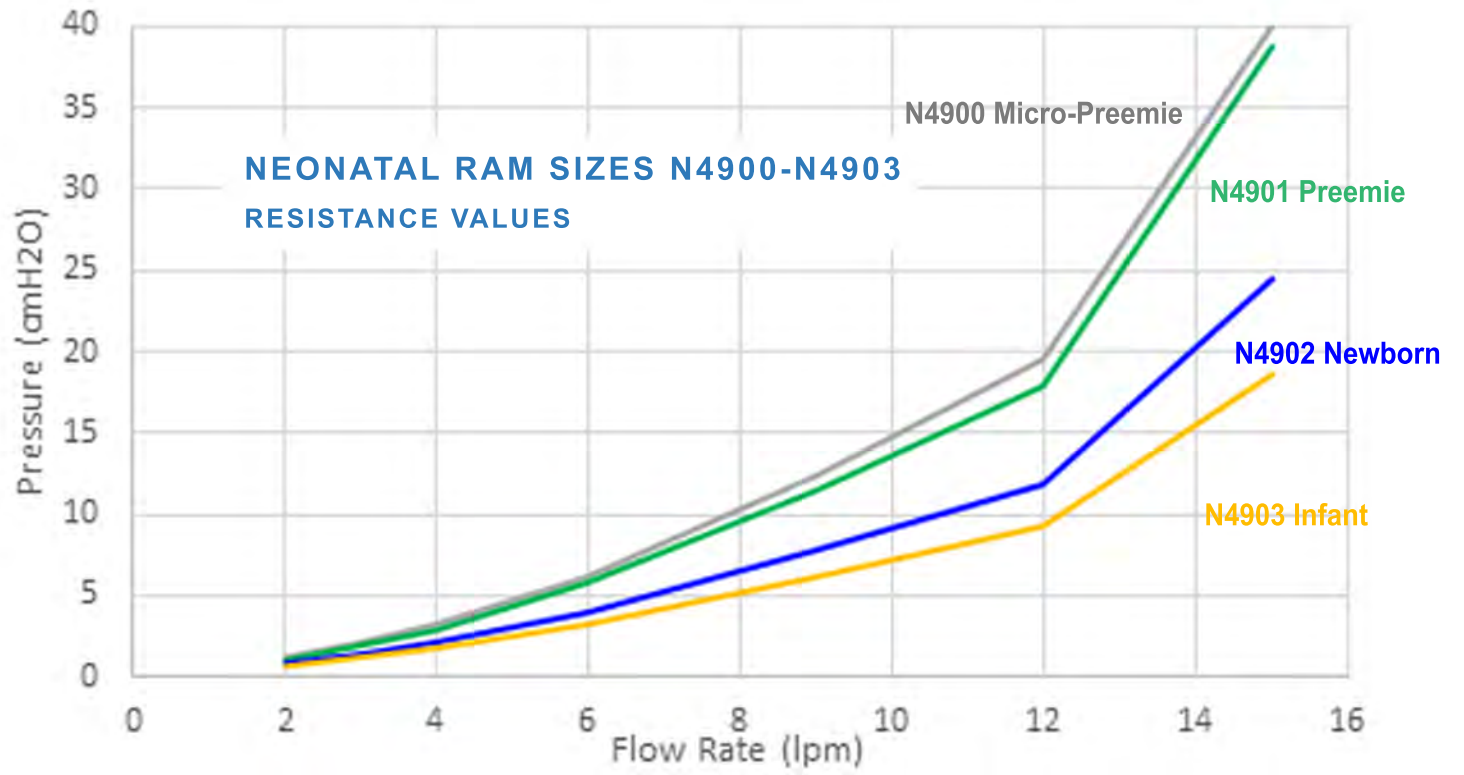
CONCLUSIONS:

Neotech Neonatal sizes: N4902 & N4903 and Neotech Child sizes: N4904, N4905, and N4906 had between 0.083 – 0.597 kPa/m flow resistance at 4 lpm, below the standard allowable flow resistance of 0.9 kPa/m.

Neotech Neonatal sizes: N4900 & N4901 had higher flow resistance with 1.025 and 1.137 kPa/m, respectively. These values were above the standard allowable flow resistance of 0.9 kPa/m. A primary contributing factor for this is the standard is not designed for a system test, rather gas flow through a straight tube as well, the ISO standards for flow values during testing do not consider the size of the patient.

CALCULATING PRESSURE AT PRONG EXIT:

Source Pressure (at RAM connection) - Resistance = Pressure at prong exit



REFERENCES:

1. BS EN ISO 5367:2014 Anaesthetic and respiratory equipment, Breathing sets and connectors, Clause 5.5 Resistance to Flow.
2. Data was aquired though physical testing and verified through Computational Fluid Dynamics (CFD) analysis.



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