TABLE 3. Condensation Points at One Atmosphere

Gas	Degrees C
Cyclopropane	−33
Nitrous oxide	−88
Ethylene	−104
Helium	−269
Carbon dioxide	−78
Nitrogen	−196
Oxygen	−183
Air	−194
Xenon	−108

negative Joule-Thompson coefficients, which means that these gases warm on expansion, as has been observed experimentally. It was found that agents such as nitrous oxide and carbon dioxide that have high constant tank pressures as well as large Joule-Thompson coefficients and high condensation points can give problems with valve freezing. With nitrous oxide this is compounded further by the fact that the freezing point is within two degrees of the condensation point.[5]

For gases such as oxygen and compressed air, gauge pressures fall as the amount of gas diminishes, and dP will become smaller as the tank is bled. Thus, cooling owing to Joule-Thompson expansion will decrease as the tank is bled. However, none of this cooling results in any observable change in gas flow because the condensation points for these gases are so low.

References

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Neonatology

MONITORING PERFUSION IN CARDIOPULMONARY BYPASS Two techniques are reported: 1) the use, in the neonate, of the umbilical artery rather than the aorta for extracorporeal circulation; 2) the use of a muscle *p*H electrode for continuous monitoring of muscle *p*H as an indicator of peripheral tissue perfusion and respiration. The umbilical artery is easier, faster, and simpler to use for extracorporeal circulation than the aorta and was adequate from the hemodynamic point of view: 300 ml/min at a perfusion pressure of 110 mm Hg with a no. 8 Fr. end-hole polyethylene feeding tube. Complications of umbilical-artery catheterization are discussed.

When perfusion is adequate, muscle *p*H is essentially the same as arterial *p*H. When muscle perfusion decreases, muscle *p*H falls due to lactic acid production but arterial *p*H will not reflect it, since inadequate perfusion does not remove the lactic acid from the muscle. This difference between muscle *p*H and arterial *p*H forms the basis for monitoring the inadequacy of peripheral perfusion. (*Harken, A. H., and Filler, R. M.: The Use of the Umbilical Artery and Muscle pH Monitoring in Neonatal Cardiopulmonary Bypass, J. Thorac. Cardiovasc. Surg. 63: 973–976, 1972.*)