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C1Po3D-06: Streamlined Heat Leak Estimation for Vacuum Jacketed Cryogenic Pump Assemblies

Monday 19 May 2025 14:00 (2 hours)

Notable cost is invested in the liquification of cryogenic fluids such as liquid Nitrogen, Helium, Hydrogen, and Argon. End users have an interest in knowing the level of heat leak cryogenic systems experience, and convenient methods of heat leak calculations. End-users value pump designs that minimize heat leak in cryogenic systems to improve system efficiency and reduce operating costs. At the engineering and design phase, heat leak calculations assist in establishing the efficacy and confirmation of designs for vacuum jacketed, cryogenic, extended shaft pump assemblies as well as gaseous cryogenic compressors and blowers. When compared to more sophisticated finite element (FEA) analysis methodologies provided by engineering analysis programs such as ANSYS®, this relatively straight forward, one dimensional heat leak analysis method provides reliable first-pass estimates that assist in design optimization by achieving similar accuracy while being faster and easier to implement, making the method an ideal tool for early design evaluation.

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