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Design, optimization and operational parameters of multichannel cryogenic transfer line for XFEL AMTF

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The cryogenic transfer line for XFEL/AMTF is dedicated for transferring cryogenic cooling power from helium refrigerators to a cryogenic test facility by means of the constant flows of supercritical and cold gaseous helium. The external envelope of this cryoline contains 4 cold process lines and a common radiation shield, as well as the system of supports and thermal contraction compensators. The line was designed and manufactured within the scope of Polish in-kind contribution to the XFEL project. The line has been in operation since 2012. The paper presents exergetic analysis of the line. Working parameters of the line have been measured and compared with the thermodynamic model. Entropy minimization approach towards multichannel cryogenic transfer lines optimization is presented.

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