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C2Po1A-04: Helium-3 Piping and Gas Handling Implementation for Colossus

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Colossus will be a large millikelvin platform that will have a two-meter diameter mixing chamber plate. This uniquely large millikelvin platform will utilize a cryogenics plant to maintain progressively lower temperatures at each of the three upper stages and precool the lower three stages of the system. At the millikelvin stages, Colossus will employ multiple commercially available dilution units to achieve millikelvin temperatures at the intermediate cold plate and mixing chamber stages. The incoming helium-3/helium-4 process fluid mixture for each dilution unit will flow through tubes wrapped around copper posts attached to each of the upper stages of the system. These tubes will function as capillary heat exchanger to reduce the temperature of the incoming helium mixture to the appropriate temperature at each stage.

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