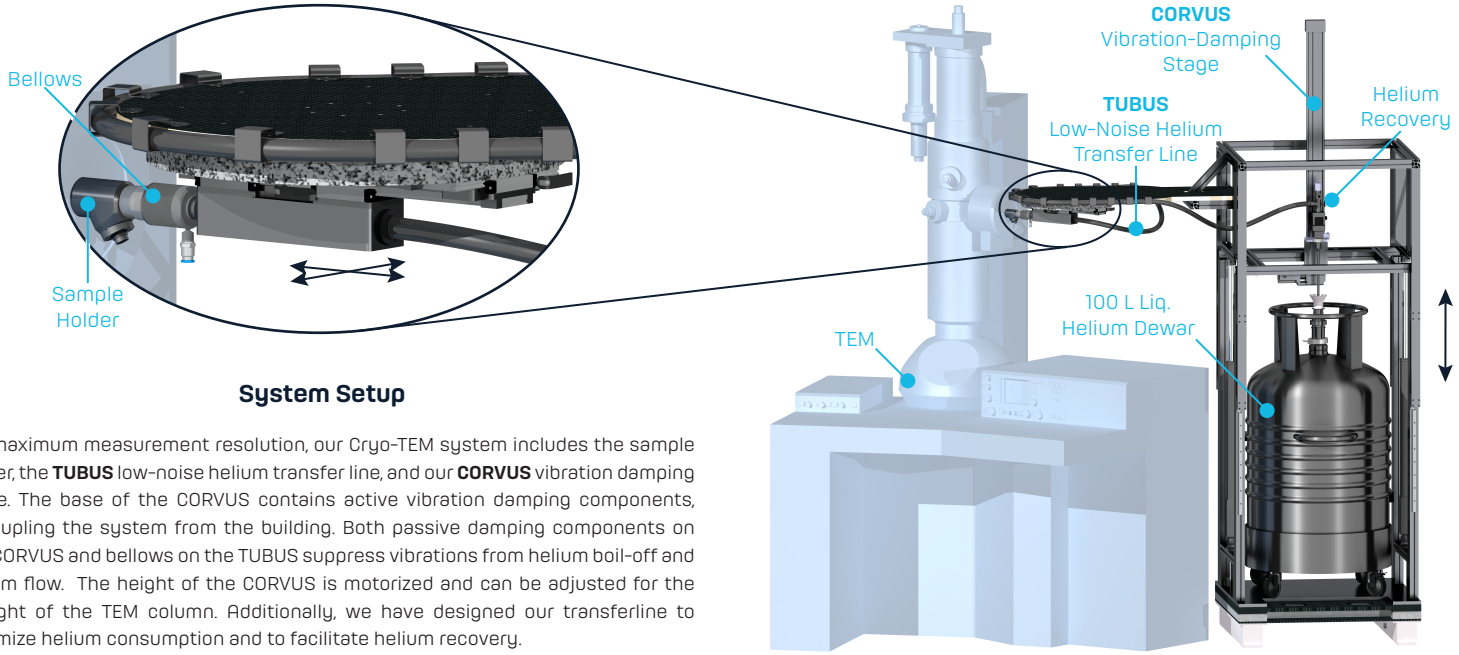
condenZero

Empowering World-Changing Discoveries

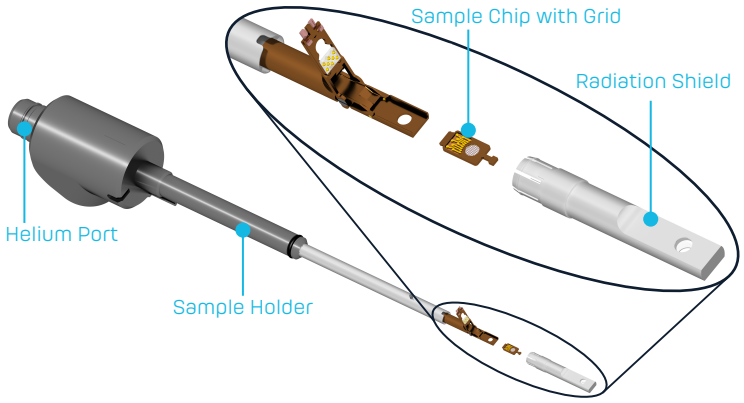
Liquid Helium Cryo-TEM

condenZero specializes in designing ultra-high vacuum (UHV) and cryogenic equipment for high-precision measurements. Our cryogenic sample holders for Transmission Electron Microscopy (**TEM**) use liquid helium to achieve a base temperature of **< 6 K** in a cool-down time of **1-10 min**. This temperature can be maintained with a < **5 mK** stability over a period of more than **24 hours**. Furthermore, our light-weight sample holders require **no modifications** to be made on the TEM column.



System Setup

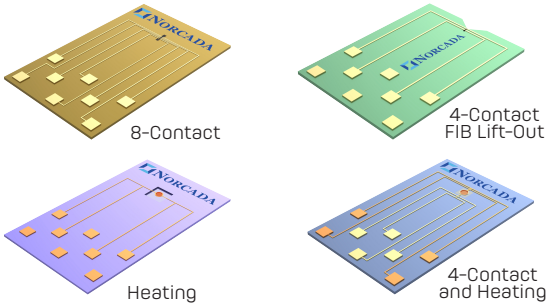
For maximum measurement resolution, our Cryo-TEM system includes the sample holder, the **TUBUS** low-noise helium transfer line, and our **CORVUS** vibration damping stage. The base of the CORVUS contains active vibration damping components, decoupling the system from the building. Both passive damping components on the CORVUS and bellows on the TUBUS suppress vibrations from helium boil-off and helium flow. The height of the CORVUS is motorized and can be adjusted for the heihght of the TEM column. Additionally, we have designed our transferline to minimize helium consumption and to facilitate helium recovery.



In-situ Capabilities

Samples mounted onto standard 3 mm TEM grids or membranes are clipped into a chip inserted into the sample holder. Our holders have a set of 8 pogo pins for optional **electrical biasing**. Together with **Norcada**, we are developing **MEMS chips** with **integrated heating and biasing** capabilities.

NORCADA MEMS Heating and Biasing Chips



Current Specifications

- **Base Temperature** < 6 K
- **Temperature Stability** < 5 mK
- **Cool-Down Time** 1-10 min
- **Base Temp Holding Time** > 24 h
- **Degrees of Freedom** Single Tilt
- **Resolution** < 3 nm

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