5. Tube Durability Setup

- Cylindrical vacuum chamber: Vacuum capability (~1 KPa)
- Feedthroughs: Thermocouple, Optical, Pressure Transducer
- Instrumentation: Flowmeter, Vacuum Pump, NI Data acquisition system, Chiller, Electric tape heater, DSLR camera, Computer with data acquisition software
- Test section: 9 tubes at different vertical plane having ~5.5-inch length

Purpose: This vacuum chamber is designed to test the durability of several Micro/Nano engineered coated tubes simultaneously with high temperature vapor for the periods of up to several months. Steam/ any vapor is generated inside the chamber and degassed with a controlled heater. A chiller supplies cold water to the feedthrough where it splits and flows through all the coated tubes connected by Swagelok fittings. A camera is installed to visualize the condensation on tubes inside the vacuum chamber. DAQ system is installed to record the thermocouple reading, pressure of the vacuum and cooling liquid flow rate. These help to measure the condensation heat transfer coefficient.