

3. Durability Vacuum Chamber

- Box vacuum chamber: Low vacuum capability (< 1 Pa)
- Degassing Chamber: Degassing from water and generate steam
- Feedthroughs: Thermocouple, Liquid/Gas, Optical, Pressure Transducer
- Instrumentation: Flowmeter, Vacuum Pump, Data acquisition system, Chiller, Mass scale, DSLR camera, Computer with data acquisition software
- Test section: 4 cold plates with 40 flat coupon samples installation at once
- Purpose: This durability vacuum chamber test longevity of various micro/nanoengineered surface, polymer coated surface and novel hydrophobic materials coted surface with steam condensation conditions. The custom-built chamber is vacuum compatible and able to monitor the experimental temperature, pressure, heat transfer rate, and provide visual access to the sample so large-scale degradation can be observed. The box chamber is a flanged pressure vessel with ten viewports that enable high speed imaging and lighting. Four aluminum cold plates are installed and connected to the external chiller loop to promote faster condensation on the outer surface of the test samples, which are exposed to the saturated water vapor.

