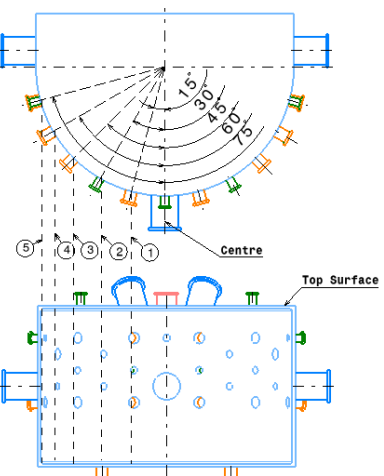
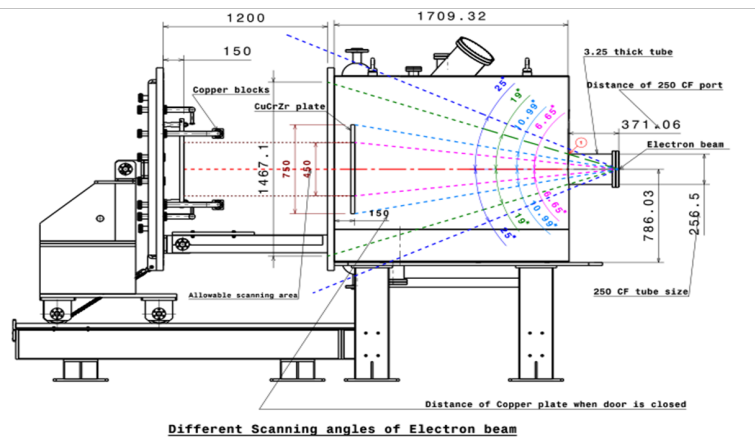


VACUUM CHAMBER PORT DETAILS



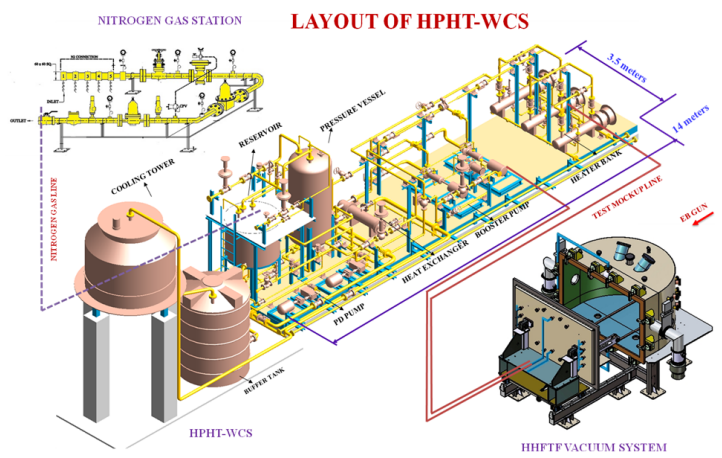
Axis line	Ports	Type	Position from Top surface (mm)
Centre	Pc	250 CF	750
Centre	P0	63 CF	300
1-15 deg	P1, P1'	100CF	300
	P2, P2'	63 CF	600
	P3, P3'	100 CF	900
2-30 deg	P4, P4'	63 CF	450
	P5, P5'	63 CF	750
3-45 deg	P6, P6'	100 CF	300
	P7, P7'	63 CF	600
4-60 deg	P8, P8'	100 CF	900
	P9, P9'	100 CF	450
5-75 deg	P10, P10'	63 CF	750
	P11, P11'	63 CF	300
	P12, P12'	100 CF	900



ELECTRON BEAM SCANNING

PRESENT STATUS

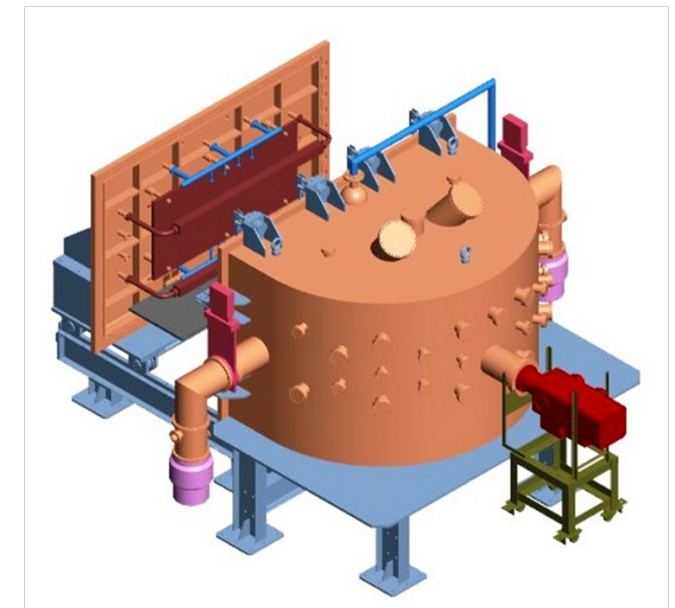
- ❖ Vacuum system for high heat flux test facility was successfully commissioned and its functionality was tested as per design requirements.
- ❖ Various subsystems of high heat flux test facility were integrated with vacuum system and their performance wastested.
- ❖ Hardwired interlocks were implemented for safe operation of vacuum system during high heat flux testing.



CONTACT

Website: www.ipr.res.in/httd/index.html
 Ph-No: +91-79-2396 2239
 Fax.No: +91-79-2396 2277
 E-mail id: technology@ipr.res.in

VACUUM SYSTEM FOR HIGH HEAT FLUX TEST FACILITY



High Temperature Technologies division



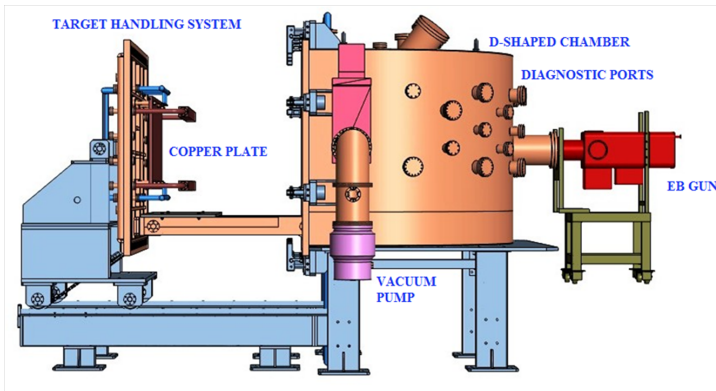
Institute for Plasma Reserach
 Bhat, Gandhinagar, Gujarat,
 India-382428
www.ipr.res.in

OBJECTIVE

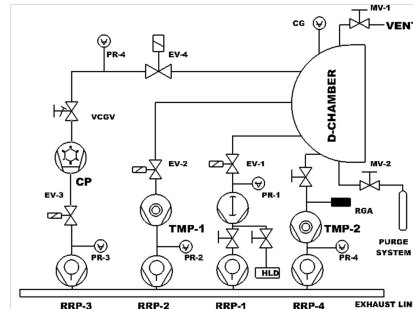
- To test large sized (1m x 1m) and heavy components (1 Ton) such as divertor and first wall components of ITER-like device
- Designed for mounting electron beam gun, diagnostics & monitoring equipments / sensors and vacuum pumping system of HHFTF

DESIGN

- Configuration** : D-shaped double walled
- Material of construction** : SS 304 L
- Vacuum requirement** : 10^{-6} mbar
- Dimensions**: 2.5m dia, 1.5m height
- EB gun ports** : 3 Nos.
- Diagnostic ports** : 29 Nos.
- Beam dump (copper based)** : 3Nos
- Pumping ports**: 4 Nos
- Test component** : 1m² area, 1 Ton
- Design code** : ASME Sec VIII Div.1
- Target handling facility** : Mounted on rail mechanism with hydraulic clamping
- Cooling lines** : Chamber, beam dump, target



VACUUM PUMPING SYSTEM



- RRP- Rotary pump
- TMP – Turbo Molecular Pump
- CP- Cryo Pump
- PR – Pirani Gauge
- EV – Electro Pneumatic Valve
- MV – Manual Valve
- CG – Compound Gauge
- VCV- Variable Conductance Gate Valve

Roughing Pumps : 5 Nos

- Rotary pump: 60 m³/h
- Root pump: 150 m³/h

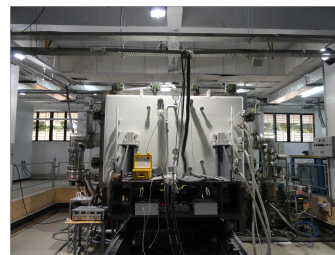
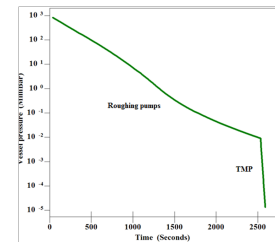
UHV pumps : 2 Nos

- TMP: 1900 l/s for N₂
- Cryo : 4500 l/s for N₂

Total volume : 5 m³

Ultimate vacuum : 1.8 x 10⁻⁶ (mbar)

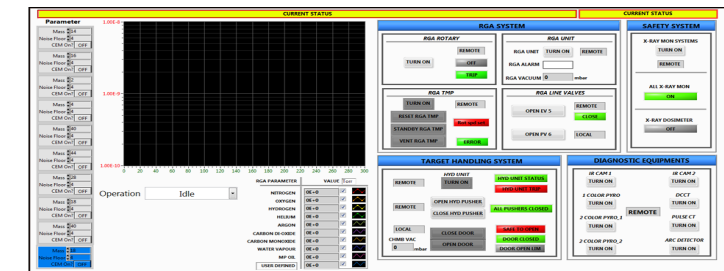
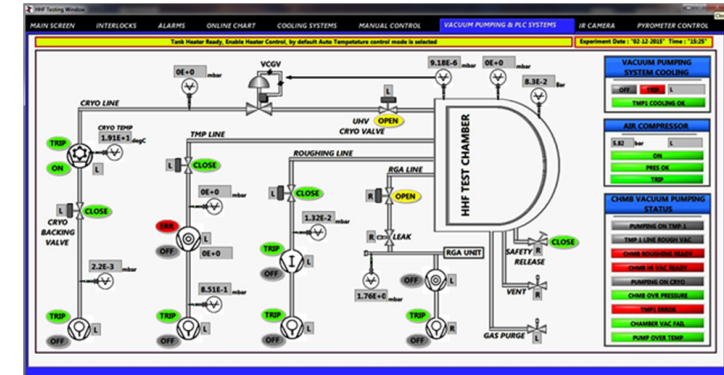
Total pump down time: 60 minutes



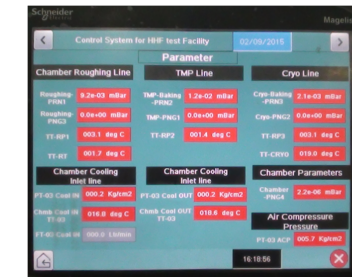
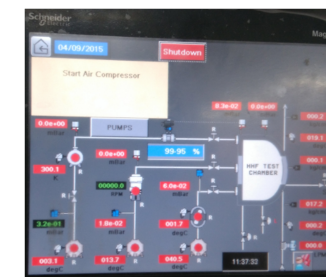
VACUUM SYSTEM ASSEMBLY

CONTROL SYSTEM

- PXI & PLC based fast real time data acquisition and control system for vacuum data measurements, display and status indication, safety interlocks.
- Remote operation of vacuum pumping system using Human Machine Interface (HMI)



GUI of DACS for Vacuum System



HMI for Vacuum System