MICROWAVE TUBE AREA _System Information

1 **SYSTEM ID:**MWT1-Hydrogen cum Vacuum Furnace **NAME OF EQUIPMENT:**Hydrogen cum vacuum furnace **DIVISION/ GROUP NAME**: MWT **YEAR OF INSTALLATION:**March 2016 **EQUIPMENT MANUFACTURER** :Hind High Vacuum, Bangalore **EQUIPMENT INCHARGE :**Deepender Kant Vikram Singh/Rakesh Meena **PROCESS CAPABILITIES:** Brazing in hydrogen as well as vacuum with job size of 700 mm diameter and 1000 mm height
2 **SYSTEM ID:** MWT2-High Temperature Hydrogen Furnace **NAME OF EQUIPMENT:** High Temperature Hydrogen Furnace **DIVISION/ GROUP NAME:** MWT/ Cathode Group **YEAR OF INSTALLATION**: April 2013 **EQUIPMENT MANUFACTURER**: Therelek **EQUIPMENT INCHARGE: Sushil Kumar Shukla** Tejendr Pratap Singh **PROCESS CAPABILITIES:** Brazing, Firing, Potting and Impregnation
3 **SYSTEM ID:** MWT03-Auger Electron Spectroscopy(Cathode Group) **NAME OF EQUIPMENT** :Auger Electron Spectroscopy **DIVISION/ GROUP NAME:** MWT/ Cathode Group **YEAR OF INSTALLATION:**1985 **EQUIPMENT MANUFACTURER:** Varian **EQUIPMENT INCHARGE** :Ranjan Kumar Barik Sushil Kumar Shukla **PROCESS CAPABILITIES:** Surface elemental characterization, Surface concentration
4 **SYSTEM ID:** MWT4-High Temperature Hydrogen Furnace **NAME OF EQUIPMENT** :High Temperature Hydrogen Furnace **DIVISION/ GROUP NAME** :MWT/ Cathode Group **YEAR OF INSTALLATION:** March 2010 **EQUIPMENT MANUFACTURER**: Naskar **EQUIPMENT INCHARGE** :Tejendr Pratap Singh Tejendr Pratap Singh **PROCESS CAPABILITIES:** Brazing, Firing, Potting and Impregnation

5
SYSTEM ID: MWT06-TIG welder(Klystron Group)
NAME OF EQUIPMENT :TIG Welder
DIVISION/ GROUP NAME: MWT/ Klystron group
YEAR OF INSTALLATION: 2010
EQUIPMENT MANUFACTURER :Lincoln
EQUIPMENT INCHARGE : Rakesh Meena
Rakesh Meena
PROCESS CAPABILITIES:
For TIG welding of metallic joints

6
SYSTEM ID: MWT07-UHV Processing Station(CSF)
NAME OF EQUIPMENT:UHV Processing Station
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION :June 2015
EQUIPMENT MANUFACTURER: HHV Bangaluru
EQUIPMENT INCHARGE :Dr. SK Ghosh/Mr. Ghanshyam Saini
Mr. Ghanshyam Saini
PROCESS CAPABILITIES:
Job Size: 280 cm (Dia)
1200 cm (Height)
Maximum Temperature: 550 degree C
Atmosphere: Vacuum.
Maximum Vacuum: 8*10-10 Torr.
Process Capabilities: Ovening, Cathode activation & Degassing

7
SYSTEM ID: MWT08-Controlled Atmosphere 3" Muffle Furnace (2 Nos.)
NAME OF EQUIPMENT:Controlled Atmosphere 3" Muffle Furnace (2 Nos.)
DIVISION/ GROUP NAME:MWT/CSF
YEAR OF INSTALLATION :March 1980
EQUIPMENT MANUFACTURER :Watkins-Johnson
EQUIPMENT INCHARGE :Dr. SK Ghosh/CSF Team
CSF Team
PROCESS CAPABILITIES:
Muffle Diameter: 3 Inch
Job Size: 4 cm (Width)
5 cm (Height)
Maximum Temperature: 1100 degree C
Heating zone Length: 15 cm
Atmosphere: Dry Hydrogen, Wet Hydrogen & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, Annealing & oxide layer deposition.

8
SYSTEM ID: MWT09-Vertical Retort Furnace
NAME OF EQUIPMENT:Vertical Retort Furnace
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION:April 2002
EQUIPMENT MANUFACTURER: Watkins-Johnson
EQUIPMENT INCHARGE: Dr. SK Ghosh/CSF Team
CSF Team
PROCESS CAPABILITIES:
Job Size: 19 cm (Dia)
35 cm (Height)
Maximum Temperature: 1000 degree C
Atmosphere: Dry Hydrogen, Wet Hydrogen & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, Annealing & oxide layer deposition

9
SYSTEM ID: MWT10-Control Atmosphere Furnace, 5" Muffle
NAME OF EQUIPMENT: Control Atmosphere Furnace, 5" Muffle
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION: Sept 1967
EQUIPMENT MANUFACTURER: Watkins-Johnson
EQUIPMENT INCHARGE: Dr. SK Ghosh/CSF Team
CSF Team
PROCESS CAPABILITIES:
Muffle Diameter: 5 Inch
Job Size: 6 cm (Width)
10 cm (Height)
Maximum Temperature: 1100 degree C
Heating zone Length: 27 cm
Atmosphere: Dry Hydrogen, Wet Hydrogen & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, Annealing & oxide layer deposition.

10
SYSTEM ID:MWT11-Controlled Atmosphere Furnace 8" Muffle
NAME OF EQUIPMENT: Controlled Atmosphere Furnace 8" Muffle
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION: Dec 1987
EQUIPMENT MANUFACTURER: Watkins-Johnson
EQUIPMENT INCHARGE : Dr. SK Ghosh/Team CSF
Team CSF
PROCESS CAPABILITIES:
Muffle Diameter: 8 Inch
Job Size: 14 cm (Width)
16 cm (Height)
Maximum Temperature: 1100 degree C
Heating zone Length: 50 cm
Atmosphere: Dry Hydrogen, Wet Hydrogen & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, Annealing & oxide layer deposition.

11
SYSTEM ID: MWT12-Electrically heated Belljar Type Furnace (Vertical)
NAME OF EQUIPMENT: Electrically heated Belljar Type Furnace (Vertical)
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION : Feb 2014
EQUIPMENT MANUFACTURER: Therelek Engineer Bangaluru
EQUIPMENT INCHARGE : Dr. SK Ghosh/CSF Team
CSF Team
PROCESS CAPABILITIES:
Job Size: 10 cm (Dia)
35 cm (Height)
Maximum Temperature: 1200 degree C
Atmosphere: Dry Hydrogen, Wet Hydrogen & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, Annealing & oxide layer deposition.

12
SYSTEM ID: MWT13-RF Induction Heater
NAME OF EQUIPMENT :RF Induction Heater
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION: Feb 1974
EQUIPMENT MANUFACTURER: LEPEL, New York
EQUIPMENT INCHARGE : Dr. SK Ghosh/CSF Team
CSF Team
PROCESS CAPABILITIES:
Working Temperature: 1500 degree C
Job Size: 8 cm (Dia)
10 cm (Height)
Atmosphere: Dry Hydrogen, Vacuum & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, & oxide layer deposition.

13
SYSTEM ID: MWT14-Controlled Atmosphere Furnace 8" Muffle (New)
NAME OF EQUIPMENT: Controlled Atmosphere Furnace 8" Muffle (New)
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION :Feb 2014
EQUIPMENT MANUFACTURER: Therelek Engineers Bangaluru
EQUIPMENT INCHARGE : Dr. SK Ghosh/Team CSF
Team CSF
PROCESS CAPABILITIES:
Muffle Diameter: 8 Inch
Job Size: 6 cm (Width)
10 cm (Height)
Maximum Temperature: 1150 degree C
Heating zone Length: 30 cm
Atmosphere: Dry Hydrogen, Wet Hydrogen & Nitrogen gas respectively.
Furnace operations: Firing, Brazing, Annealing & oxide layer deposition.

14
SYSTEM ID: MWT16-High Voltage Pulse Modulator (Klystron Group)
NAME OF EQUIPMENT : High Voltage Pulse Modulator
DIVISION/ GROUP NAME: MWT/Klystron Group
YEAR OF INSTALLATION: August, 2009
EQUIPMENT MANUFACTURER :Scandinova, Sweden
EQUIPMENT INCHARGE : Deepender Kant
Vikram Singh Rawat
PROCESS CAPABILITIES:
It is capable to provide 150 kV DC pulsed supply, being used for hot testing of S-Band Klystron.

15
SYSTEM ID: MWT17-Furnace(Klystron Group)
NAME OF EQUIPMENT :Vertical Retort Hydrogen Furnace
DIVISION/ GROUP NAME: MWT/Klystron Group
YEAR OF INSTALLATION :2003
EQUIPMENT MANUFACTURER: Wellmake
EQUIPMENT INCHARGE : Rakesh Meena
Vikram Singh Rawat
PROCESS CAPABILITIES:
For Brazing in hydrogen environment for job size up to 280 mm diameter and 600 mm height

16
SYSTEM ID: MWT20-High Voltage Pulser_1
NAME OF EQUIPMENT :High Voltage Pulser
DIVISION/ GROUP NAME: MWT/Magnetron
YEAR OF INSTALLATION: March 2011
EQUIPMENT MANUFACTURER :BARC Mumbai
EQUIPMENT INCHARGE : Dr. S Maurya
Sh. N. Kanagraj
PROCESS CAPABILITIES:
For High Voltage Hot RF Testing and Ageing of Magnetron

17
SYSTEM ID: MWT21-High Voltage Pulser_2
NAME OF EQUIPMENT: High Voltage Pulser
DIVISION/ GROUP NAME: MWT/Magnetron
YEAR OF INSTALLATION: August 2015
EQUIPMENT MANUFACTURER: BARC, Mumbai
EQUIPMENT INCHARGE : Dr. S Maurya
Sh. N Kanagraj
PROCESS CAPABILITIES:
For High Power HOT RF testing and Ageing of 3 MW Magnetron

18
SYSTEM ID: MWT22-Capacitor Charging power supply(Plasma Group)
NAME OF EQUIPMENT :Capacitor Charging power supply
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: May 2015
EQUIPMENT MANUFACTURER :TECHNIX, France
EQUIPMENT INCHARGE : Dr. U N Pal
Sh. B L Meena
PROCESS CAPABILITIES:
Capacitor charging power supply with rating 40kV,1mA/20kJ, It can be utilized for characterization of high pulse power switches (hold-off voltage upto 40kV max.)

19
SYSTEM ID: MWT23-High Voltage Pulse Modulator (Plasma Group)
NAME OF EQUIPMENT: PULSE POWER SUPPLY
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: December 2014
EQUIPMENT MANUFACTURER :GROWCONTROLS, Hyderabad
EQUIPMENT INCHARGE : Dr. Ram Prakash
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Pulse power supply with ratings10kV/1Amp./1µsec/1-100kHz. It is being utilized for characterization of Dielectric barrier discharge based tubes.

20
SYSTEM ID: MWT24-Semi-Shielded Anechoic chamber (Plasma Group)
NAME OF EQUIPMENT: Semi-Shielded Anechoic chamber
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: March 2015
EQUIPMENT MANUFACTURER: Sahajanand Laser Technology Limited, Gujarat
EQUIPMENT INCHARGE : Sh. Niraj Kumar
Sh. B L Meena
PROCESS CAPABILITIES:
Chamber size : 3.6 m (length), 3.3 m (width), 2.6m (height) with shielding effectiveness Min. -80dB @1GHz and Min. -60dB @ 20GHz. It can be utilized for characterization of microwave signal.

21
SYSTEM ID: MWT26-RF Power Supply (Plasma Group)
NAME OF EQUIPMENT:RF Power Supply
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: January 2005
EQUIPMENT MANUFACTURER: Huttinger elektronik, Germany
EQUIPMENT INCHARGE: Dr. U N Pal
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Output voltage Max. 1.7kV/20-100kHz/10kW, It can be utilized for characterization of Dielectric barrier discharge tubes.

22
SYSTEM ID: MWT27-Vacuum Processing Station_1
NAME OF EQUIPMENT: Vacuum Processing system
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION :October, 2011
EQUIPMENT MANUFACTURER: Advance Process Technology Pune.
EQUIPMENT INCHARGE: Dr. U N Pal
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Length of the Job: 70 cm
Diameter of the job: 50 cm
Heating temperature: 550 degree C
Operating current/voltage: 30 A/440 V
It can be utilized for processing of vacuum tubes.

23
SYSTEM ID: MWT28-Vacuum Processing Station_2
NAME OF EQUIPMENT: Vacuum Processing system
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: December 1996
EQUIPMENT MANUFACTURER: Vacuum Techniques Pvt. Ltd. Bangalore
EQUIPMENT INCHARGE :Dr. U N Pal
Sh. B L Meena
PROCESS CAPABILITIES:
Length of the Job: 50 cm
Diameter of the job: 30 cm
Heating temperature: 500 deg C
Operating current/voltage: 20 A/240 V
It can be utilized for processing of vacuum tubes.

24
SYSTEM ID:MWT29-3 Target RF/DC Pulsed Reactive Sputtering System (Plasma Group)
NAME OF EQUIPMENT:3 Target RF/DC Pulsed Reactive Sputtering System
DIVISION/ GROUP NAME:MWT/Plasma Devices Lab
YEAR OF INSTALLATION: March 2015
EQUIPMENT MANUFACTURER: Advance Process Technology Pune.
EQUIPMENT INCHARGE : Dr. Ram Prakash
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Length of the Job: 25 cm
Inner Diameter of the job: 8mm
Operating current/voltage: 10 A/240 V
For coating on the metallic and dielectric layer.

25
SYSTEM ID: MWT30-Server Machine (Plasma Group)
NAME OF EQUIPMENT: Server Machine
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: March 2014
EQUIPMENT MANUFACTURER: Areva System Consultancy
EQUIPMENT INCHARGE: Dr. U N Pal
Sh. B L Meena
PROCESS CAPABILITIES:
Intel Xenon 8C processor Model E5-4620 95W,2.2 GHz, For simulation of various component of vacuum tubes

26
SYSTEM ID: MWT35-Magnetizer (TWT)
NAME OF EQUIPMENT: Magnetizer
DIVISION/ GROUP NAME:MWT/TWT
YEAR OF INSTALLATION:02/2011
EQUIPMENT MANUFACTURER: Ferrites India, Pune, India
EQUIPMENT INCHARGE:Mr. Purushothaman N
Mr. Pawan Pareek
PROCESS CAPABILITIES:
The equipment is used to magnetize Samarium-Cobalt, ferrite and Alnico magnets

27
SYSTEM ID: MWT36-Signal Generator-N5183A(TWT)
NAME OF EQUIPMENT:Signal Generator (N5183A)
DIVISION/ GROUP NAME:MWT/TWT
YEAR OF INSTALLATION:04/2013
EQUIPMENT MANUFACTURER:Agilent Technologies
EQUIPMENT INCHARGE:Dr. S. K. Ghosh
Mr. Pawan Pareek
PROCESS CAPABILITIES:
100 kHz - 31.8 GHz, 0.01 Hz resolution, Output power at 120 GHz: -130 dBm to +18 dBm. Harmonics @ 1GHz: < -30 dBc

28
SYSTEM ID: MWT37-Laser Welding(TWT)
NAME OF EQUIPMENT: Laser welding
DIVISION/ GROUP NAME: MWT/TWT
YEAR OF INSTALLATION:purchase - 02/2010, installation - 03/2010
EQUIPMENT MANUFACTURER:M/s. Optilase Techniks (I) Pvt. Ltd, Chennai, India
EQUIPMENT INCHARGE: Dr. R. K. Sharma
Ms. Suneeta Arya
PROCESS CAPABILITIES:
Nd:YAG industrial Laser, 1064 nm wavelength. Has monitor display. Average laser power - 300 W, max peak power - 9 kW, max. pulse energy - 56 J, max freq - 1000 Hz

29
SYSTEM ID: MWT15-Helium Leak Detector (CSF)
NAME OF EQUIPMENT:Helium Leak Detector (3 No.)
DIVISION/ GROUP NAME: MWT/CSF
YEAR OF INSTALLATION:Aug 2007
EQUIPMENT MANUFACTURER: Pfeiffer Vacuum
EQUIPMENT INCHARGE: Dr. SK Ghosh/Team CSF
Team CSF
PROCESS CAPABILITIES:
Leak rate: upto 10^11 Torr.
Vacuum range: upto 10^3 Torr.
Operation: Detection of leaks in parts/jobs & vacuum systems.

30
SYSTEM ID: MWT05-Vector Network Analyzer (Klystron Group)
NAME OF EQUIPMENT:Vector Network Analyzer
DIVISION/ GROUP NAME: MWT/ Klystron Group
YEAR OF INSTALLATION:2004
EQUIPMENT MANUFACTURER: Agilent
EQUIPMENT INCHARGE : Debasish Pal, Deepender Kant
Debasish Pal, Vikram Singh
PROCESS CAPABILITIES:
For characterization of Microwave components and sub-assemblies

31
SYSTEM ID: MWT18-RF Peak Power Meter (Klystron Group)
NAME OF EQUIPMENT: RF Peak Power Meter
DIVISION/ GROUP NAME: MWT/Klystron Group
YEAR OF INSTALLATION:2006
EQUIPMENT MANUFACTURER:Boonton Electronics Corp.
EQUIPMENT INCHARGE:Deepender Kant
Vikram Singh Rawat
PROCESS CAPABILITIES:
For peak power measurement of RF pulses

32
SYSTEM ID: MWT19-Spectrum Analyzer(Klystron Group)
NAME OF EQUIPMENT: Spectrum Analyzer
DIVISION/ GROUP NAME: MWT/Klystron Group
YEAR OF INSTALLATION:2007
EQUIPMENT MANUFACTURER: HP
EQUIPMENT INCHARGE: Debasish Pal
Debasish Pal
PROCESS CAPABILITIES:
For spectrum analysis of signals

33
SYSTEM ID: MWT25-ICCD Camera (Plasma Group)
NAME OF EQUIPMENT:ICCD Camera
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION: March 2005
EQUIPMENT MANUFACTURER:Stanford Computer Optics
EQUIPMENT INCHARGE: Dr. Ram Prakash
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Resolution 1360 x1024 pixel and spectral range 110-1300 nm. It can be utilized for capturing of discharge image.

34
SYSTEM ID: MWT31_VUV Spectrometer_1
NAME OF EQUIPMENT:VUV Spectrometer
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION:September 2013
EQUIPMENT MANUFACTURER: Mc PHERSON
EQUIPMENT INCHARGE: Dr. Ram Prakash
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Spectral range:10-275nm, resolution 0.06 nm, focal length 0.2m, grating 2400 groove per mm

35
SYSTEM ID:MWT33_VUV Monochromator
NAME OF EQUIPMENT:VUV Monochromator
DIVISION/ GROUP NAME: MWT/Plasma Devices Lab
YEAR OF INSTALLATION:Feb 2005
EQUIPMENT MANUFACTURER:Mc PHERSON
EQUIPMENT INCHARGE: Dr. Ram Prakash
Sh. B L Meena
PROCESS CAPABILITIES:
Spectral range:120-200nm, resolution 0.06 nm, focal length 0.2m, grating 2400 groove per mm

36
SYSTEM ID: MWT32_UV/Visible Spectrometer_2
NAME OF EQUIPMENT:UV/visible Spectrometer
DIVISION/ GROUP NAME:MWT/Plasma Devices Lab
YEAR OF INSTALLATION:Feb, 2012
EQUIPMENT MANUFACTURER:Princeton Instruments
EQUIPMENT INCHARGE:Dr. Ram Prakash
Sh. Mahesh Kumar
PROCESS CAPABILITIES:
Spectral range:200-400 nm (UV) 300-1100 nm (Visible), resolution 0.09 nm, focal length 0.5m, grating 2400 groove per mm(UV), 1800 groove per mm (VUV)

37
SYSTEM ID: MWT34-Signal Analyzer (TWT)
NAME OF EQUIPMENT: Signal Analyzer
DIVISION/ GROUP NAME: MWT/TWT
YEAR OF INSTALLATION:10/2013
EQUIPMENT MANUFACTURER:Agilent Technologies, India
EQUIPMENT INCHARGE: Dr. S. K. Ghosh
Mr. Pawan Pareek
PROCESS CAPABILITIES:
Can measure from 10 Hz to 44 GHz (Mixers to 1.1 THz). Maximum analysis bandwidth - 40 MHz. Applications include noise figure analysis, intermodulation distortion and harmonic content analysis.