1.0 Introduction:- This document gives an overview of PASF Tools and Equipments, Users are advised to go through this to understand this document as it gives a brief description of the key tools and equipments at PASF-CeNSE-IISc before going to the details of some of the equipments as in the below link.

This document will also help the users to decide the equipments that they want to use before contacting PASF Staff for further activities.

https://sysefandpackagingfacility.cense.iisc.ac.in/pasf-services/

The brief description starts with **Tool ID, Tool Name** & brief description of the tool, its application.

1.0 PASF001- MTI Precision CNC Dicing Machine:-

This is a semiautomatic dicing machine which can dice wafers up to 3" dia. Wafer materials are Silicon, Sapphire, STO & Glass. Dicing can be done manually or through a PC software. The moving accuracy of this dicing machine is 2.5u and position accuracy is 0.01mm.

2.0 PASF002, PASF003 - Climatic chamber Votsch 1, 2:-

The Votsch temperature chamber has a test space volume of 100litre and the range of temperature setting is -70°C to +180°C with a heating rate of 2.5K/min & a cooling rate of 3K/min. The humidity RH % range is 10% to 98% (with temp range +10°C to +95°C). The useable space of the temperature chamber is 345(L) x 345(W) x 400 mm(H).

Typical application of this temperature chamber is temperature & humidity cycling, climatic test and reliability test of PCBA. The unit is fully programmable with continuous data logging on a PC.

3.0 PASF004 - SCS Parylene Deposition system:-

A Vaccum deposition system with control of process paramters and has a chamber size of 30x30cm and a dimer up to 100gms. The deposition is done from several Angstorms to few microns.

Parylene coatings are unique in that they are deposited at room temperature through a vapor deposition process. Parylenes are chemically stable and provide excellent moisture, chemical and dielectric barrier properties. The coatings also offer superior thermal stability, notable mechanical properties and high tensile strengths.

4.0 PASF005 & PASF025 – SemiAutomatic Wire Bonder:-

HB10/ HB16 is a manual/ semiautomatic thermosonic wire bonder for Wedge bonding, Ball bonding. CeNSE-IISc typically uses for Ball and Wedge bonding of Au & Al wires only. It features a touch panel display with Parameter settings.

The wirebonding machine is used to bond the die to package (PCB or Ceramic Substrate). Several Simple packages to complex 64 Pin packages can be wirebonded and equipment needs parameter optimization. Typically Prototype wirebonding is done using this tool.

5.0 PASF006- Laser Welding Machine:-

The 4 axis Nd-YAG Laser Welding machine is for spot and continuous laser welding metal alloys such as SS/Kovar, Invar only. The work holder can accommodate up to 40mm dia parts only with minimum spot size 0.3mm & penetration depth up to 0.7mm.

The laser welding can be used to weld above type of packages with very high precision and provides a reliable weld for many applications such as sensor housing and other metal packages.

6.0 PASF007- DC Probe Station:-

The DC Probe station is for probing wafers is a 320x320x180 station with a 2”X2” travel a 0-30° chuck travel and a Microscope Focus block. Fine Position at ~10u resolution and a quick stage movement of 25mm drive per revolution.

The DC Probe station is for probing wafers of 2” or substrate mounted die and for IV characterization and RF DC parameters probing.

7.0 PASF008- Helium Leak Detector:-

The Helium leak detector are used for package dry or oil filled leakage after sealing. They offer a fine leak of $5^{\wedge}10^{-12}$ mbar l/s & in sniffer mode $1^{\wedge}10^{-7}$mbar l/s. Response time ~1sec.

8.0 PASF009- Fibre Laser Marking Tool:-

Fiber Laser Marking machine has marking area of 150x150mm with a depth upto 4mm and min character height of 0.35mm. Supports almost all standard format files like jpeg, bmp, tif and DXF etc...

Fiber Laser Marking Machine can process all metal and some non-metal materials. It can be used on stainless steel, carbon steel, copper plate, aluminum plate and many more.

9.0 PASF010- Automatic Dicing Saw:-

The automatic dicing saw is used to singulate the die from a processed wafer, The Dicing saw can process 4" and 6" wafers with 1.2mm thickness maximum. Wafer materials are silicon, glass, ITO. Min die size is 1.2x1.2mm.

The Automatic dicing saw is fully programmable and has several safety features.

10.0 PASF011- Pneumatic Pressure calibrator:-

The pneumatic pressure calibrator 0-20bar range instrument has a precision of 0.005% & accuracy of 0.003% of Full scale and stability of 0.0075% per year.

The pressure calibrator is fully programmable with stability of 10ppm

The pressure calibrator is used to calibrate and test pressure sensors of various types.

12.0 PASF013- Hot Air Oven:-

The hot air oven has a temperature range of 20°C to 250°C. This has a microprocessor based PID controller with a separate motor and heater controller.

The hot air oven is for used for curing epoxies during packaging of die on the substrate.

13.0 PASF014- Sand Blasting Tool:-

The sandblasting tool has a dimension of 39x43x43 cm with working pressure from 1.5 bar to 6 bar. Requires a compressed air with 150-500lpm.

Sandblasting is process of cleaning a hard surface by forcing solid particles across that surface at high speeds using compressed air for making Patterns on silicon and Glass.

14.0 PASF015- High Power Plasma Cleaner:-

The plasma cleaner has a vaccum pump and chamber dimensions of 6" diameter x 6.5" length & samples can be placed with low, medium and high power settings.

Plasma cleaning involves the removal of impurities and contaminants from surfaces through the use of an energetic plasma or Dielectric barrier discharge (DBD) plasma created from gaseous species. It also acts as activiating the surface

15.0 PASF016- Remi Centrifuge:-

The plasma cleaner has a vaccum pump and chamber dimensions of 6" diameter x 6.5" length & samples can be placed with low, medium and high power settings.

In a Centrifuge, the substances are separated based on their density under the influence of gravitational force. When spun rapidly, lighter particles stay at the top and heavier particles go to the bottom during centrifugation.

16.0 PASF017- Pneumatic Pressure calibrator:-

The pneumatic pressure calibrator 0-200bar range instrument has a precision of two levels of accuracy—0.02 % FS or 0.01 % reading—let you balance accuracy and budget.

The pressure calibrator is used to calibrate and test pressure sensors of various types which are of Absolute and Guage Type.

17.0 PASF018- ATT Climate & Humidiity test Chamber

The ATT Chamber has a 110 Litre capacity with internal dimensions of 548x447x447mm and Temperature range of -40C to +180C.

Heating rate of 2.6K/min, Cooling rate of 2.9K/min. RH range is 10 to 95%.

Typical application of this temperature chamber is temperature & humidity cycling, climatic test and reliability test of PCBA. The unit is fully programmable with continuous data logging on a PC.

18.0 PASF019- Chemical Wet Bench

The chemical wet bench is a station for handling chemicals. Mixing of chemicals is to be done following safety protocols and procedures.

19.0 PASF020- Soldering and Desoldering Station

The Manual Soldering Station has a Power of 80W and range of temperature is set by front LED Display from 50°C-450°C. There are various soldering tips which are available and the accessories like stripper, cutter, solder lead, solder paste is used.

The Desoldering Station is for Desoldering components by gently blowing the hot air on the component pads, this also is a settable temperature control Desoldering station with range of 100°C to 400°C.

20.0 PASF024- Flip Chip Bonder

The Flip chip bonder is used for various types of bonding techniques based on the substrate and application. Some key features of this bonder are placement accuracy 0.5um and alignment accuracy of 0.1um. with low to high bonding force, temperature and die sizes.

21.0 PASF021- TS17 Profile Projector

The Profile Projectors are optical comparators and the target is placed on the stage, and a light is shined on the target from underneath. This causes the target's profile, or shadow, to be projected on the screen. A telecentric optical system is used to enable accurate measurements.

Screen Diameter is 360mm, 200X100mm travel size, repeatability +/-4um and Magnification of 10x.

22.0 PASF026- Vaccum Oven

The Vacuum oven extracts moisture from the material by lowering the boiling point such that the losses of compounds apart from moisture are minimized. Usually, the item is instantly dried under considerate pressure and conduction heat, thus leaving only the required moisture residue.

The specifications of Vaccum oven are Chamber Size: 350mm X350mm x 350mm with a Vacuum level: 5 mbar (min) & Temperature setting from Ambient to 250'C with a Ramp rate: 3'C /min

23.0 PASF021-TS13 Ultra Probe Sonicator

Ultrasonic degassing (deaeration, in the case of air) is an efficient method of removing dissolved gasses and/or entrained gas bubbles from a variety of liquids, including water, candle waxes, aluminum alloy melts, epoxies, silicone oils, adhesives, coating solutions, beverages, polymers, inks, paints, transformer oils, emulsion and suspension products, motor oils and many more

Specifications of Ultra Probe Sonicator are Max. power: 500WRMS, Frequency: 20kHz, Amplitude setting: 10% – 100% & Control mode: auto-tuned optimum frequency mode

24.0 PASF 032- High Resolution 3D Printer

The projection microsterolithography 3d printer is a 10um resolution(XY) printer based on photo sensitive resin with a +/-1 um positional accuracy(XY).Build size Max is 100x100x75mm and layer thickness 10-40um. STL file is the input to this printer. Typical applications of this printer are to print very fine microfluidic structures, Medical devices etc

25.0 PASF-GEECI- Wafer Grinder

Compact, automatic grinder that can thin upto 8'' workpieces made of various materials, including Si and SiC

26.0 PASF-GEECI-Wafer Dicer

Enables ultrasonic-wave dicing of upto 8'' Si, SiC, ceramic, and glass wafers as well as alignment of multiple mounted workpieces

27.0 PASF-GEECI- Die Bonder

Enables adhesive and eutectic attachment of dies sized 0.1–30 mm in automatic, semi-automatic, and manual modes. Allows die picking from upto 8″ wafers, 2" and 4" waffle packs, as well as 2" and 4" gel packs. Fully automatic pick and place capability with a 3-µm accuracy at 3 sigma

28.0 PASF-GEECI Automatic Wire Bonder

The automatic wire bonder has changeable bond heads, allowing wedge-wedge and ball-wedge bonding of thin, heavy, and ribbon wires in a X: 100 mm/Y: 150 mm/Z: 42 mm working area and at an approximate speed of 2 wire bonds per second. It can create heavy and ribbon wire bondheads with 2–24 mil Al, Cu, and AlCu wires and ribbon wire bondheads with 10–80 mil by 1–16 mil Al, Cu, AlCu

wires. It can also create thin wire wedge-wedge bondheads with 0.5–3 mil Al and Au wires and 0.7–2 mil Cu wires as well as ball-wedge bondheads with 0.7–2 mil Au wires.

29.0 PASF-GEECI Shear Tester

Automatic shear tester with high sensor accuracy and resolution, a large X stage, and superior axis speed, cameras, and illumination. Enables various types of testing, including that of thin and heavy wire pull, ball shear, ribbon wire pull, and die shear

Please Note:- The Majority of Test Equipments like PSU, DMM, Oscilloscope, Function Generators, LCR Meters, Evaluation Boards etc etc are not listed and the specifications are as per Standard Product Catalog.

If the User is interested they can contact the CeNSE-IISc PASF Team or drop a mail to pasf.cense@iisc.ac.in support@geeci.in

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