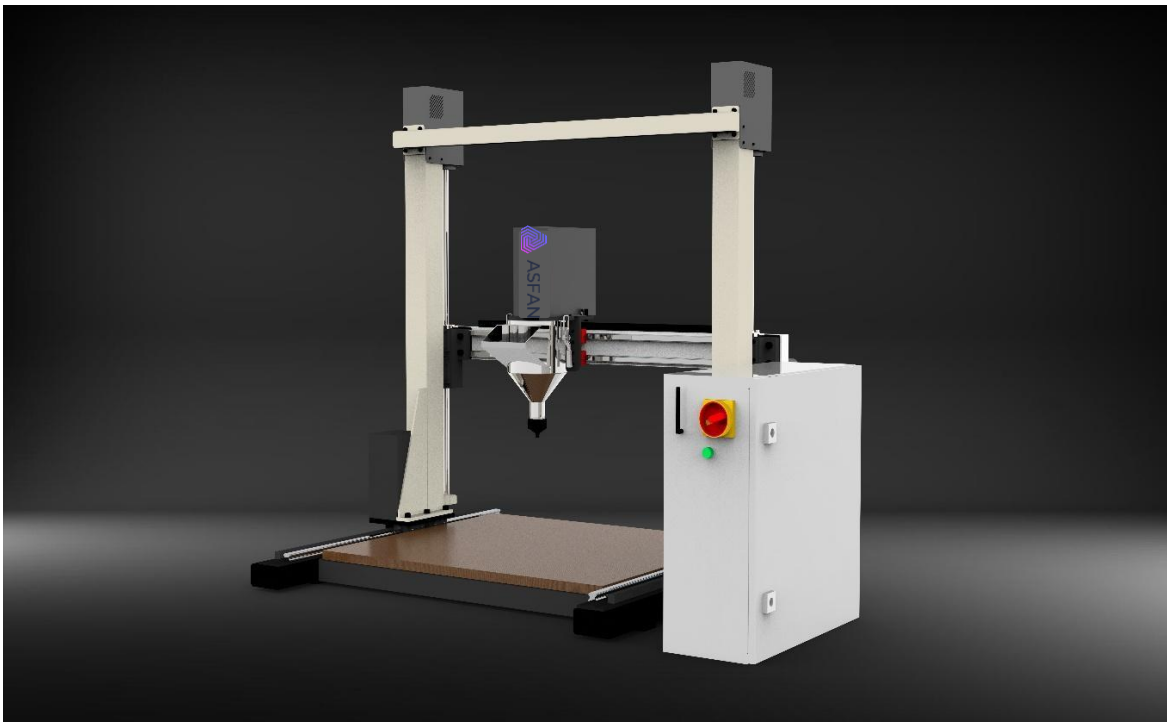
ASFAN

TableTop Small

Laboratory Scale Concrete 3D printer



Specifications

Printer Type: Gantry Based 3D printer

Print (Build) Volume: X-600mm x Y-600mm x Z-600mm

Motion Axis of Gantry: 3 Axis (X, Y, Z)

Bed Platform for Printing: Polypropylene Thick CNC Machined Plastic Platform along with thick swappable plastic boards to remove and change the Prints.

All machine parts are powder coated and sprayed with lacquer to make surface hard, other parts which are in contact with concrete materials are made up of **Stainless-steel** material. entire structure is made up of carbon steel and all guideway and rack and pinion mounting surfaces are CNC machined to the zero level to maintain the parallelism and perpendicularity of the structure for long-term. Even we do stress relieving after welding so machine accuracy remain same over long period of time. We don't use aluminum extrusion unit to make structure because over the year it loses its stability and accuracy.

Precision: +/- 0.5mm

Position repeatability: 0.2mm

Layer Resolution: between 10-50mm

Print Speed: 10-150mm/Sec

Max Movement Speed: X-150mm/Sec, Y-150mm/Sec, Z-60mm/Sec, Screw Rotation 60 RPM
Motors: Hybrid Stepper Motors (Equivalent to servo)

Gearboxes: Low Backlash, Noise Less, High Precision Planetary Gearbox which provides High torque and stabilized movements.

Motion Mechanism: Linear Guides from HIWIN made in **TAIWAN** on all axis and motion movement with Racks and Pinions from THK JAPAN. we use **Module 2** racks and pinions which provide better stability than any other modules racks.

Mixer

Type: Pan mixer
Blades: Minimum 4 no's
Capacity: 100 kg minimum
Number of mixers: 1 no of Pan mixer
Mixer 3kW Standard

Screw Extruder with integrated hopper 7 kg material storage capacity.

- Extrusion head comes with 7 Kg Material loading capacity.
- Head is provided with High torque Hybrid Servo motor and Gearbox to process 2mm aggregate.
- Head is removable for cleaning and swapping with easy clamping.
- Inside head there is auger screw to push the material.
- We provide all kinds of nozzle mentioned in above specification.

Nozzle System

- Nozzles are Interchangeable
- Nozzle control mechanism: Automatic shut-off of material with screw control
- Circular Nozzle: 5mm,10mm, 15mm

Nozzle customization:

Provision for usage of customized nozzles with following probable changes, but not limited to –

- With sides and without sides [Sides provide the flushing effect by trimming excess projecting materials from the previous printed layer. Also, it ensures the filament geometry is well controlled. These sides aid getting a superior finish of the object printed.
- Modifications to the cross-sectional shape of the nozzle with additional mountings or notches
- Modifications to the interior surface characteristics of the nozzle

Printing materials

Capable of printing any cementitious systems which is having properties of Pump ability, Extrudability and Printability.

- Concrete / Mortar / Clay / Ceramic Paste
- Supplementary cementitious materials
- Alternative cementitious materials
- Aggregates (used in cement concrete) have a maximum size of **2** mm
- Commonly used fibres (secondary reinforcing materials i.e. steel fibres, PP fibres, GFR & CFR etc.) in cement concrete.

Service, Maintenance and Other terms

- The concrete 3D printer will be ready for delivery only after it successfully passes the 3D printing tests at the DELTASYS E FORMING workshop, using the materials which is compatible for 3D printing
- Warranty - 1 year on all components (except wear and tear of the parts).
- Comes with Complete operation/ working manual.

Electronic System

- Powerful Custom Electronics system with all safety features
- Branded Standard Transformers
- Hybrid servo drive system from German brand
- SMPS for drives from German Brand
- Entire cabling from LAPP Germany
- Proper Track chain to guide entire cable movement in X Y axis.
- 32Bit Microprocessor and smooth and jerk free Heavy DUTY Hybrid Stepper drive system
- Safety Emergency stop switch

Sensors

- Limit switches/Proximity sensors: X, Y, Z, C, Hopper (Siemens make)
- Tachometer RPM Sensor to measure RPM of screw extruder
- Concrete Pressure: Concrete Pressure Gauze

Polycarbonate Rigid Enclosure for Controlled Environment

- One of the standout features of this R&D Tabletop Concrete 3D Printer is its fully enclosed build chamber made with high-strength polycarbonate panels.
- This rigid enclosure plays a critical role in maintaining a stable and controlled environment during the printing process—essential when working with cementitious and paste-based materials that are sensitive to ambient conditions such as temperature, humidity, and air flow.
- For researchers, this means more accurate and repeatable results, especially when experimenting with advanced or non-conventional materials like geopolymer mixes or rapid-set mortars.

- It also helps minimize external contamination, ensures safety in the lab, and supports better material behaviour analysis under consistent conditions.

User - 3D printer interface (Software):

DE e-Builder CAM slicer Software with following functions

- Slicer: DE e-Builder CAM slicer for concrete 3D printing
- Parameters: Print Speed, Layer height, Nozzle selection, Flow rate multiplier (User can easily increase and decrease the extrusion flow rate on fly while machine running also)
- Printer and Printing Management: Software controlled
- Connection to the machine: Wi-Fi/Ethernet
- Camera Connectivity: Internet Protocol camera can be operated and see live working through smartphone, Tablet, PC and Laptop
- Supporting OS: Windows 11 and higher Windows OS versions
- Input 3D model file format: STL
- Functions: Loading 3D model, slicing 3D model, Manual Control, Monitoring the printing parameters,

- Manual Control: X, Y, Z, C, Pump and extrusion
- Layer Height: Minimum 15mm
- DE eBuilder CAM will simulate and display the entire 3D printing operation (before the actual printing) and its associated parameters such as time of printing, material consumption rate, print rate, and all other relevant information.
- DE eBuilder CAM communicates with the operator regarding the necessary safety information and errors in the entire process appropriately.
- Our software allows for a single point and integrated control of all the sub-components such as the print head unit and others for a synchronized printing mechanism/action.
- Our software allows for start-pause-change-resume workflow