CONSTRUCTIONS 3D

MaxiPrinter

Fast, Mobile, Compact

www.constructions-3d.com

MaxiPrinter, the complete solution for automated construction

SUMMARY

MaxiPrinter System Overview

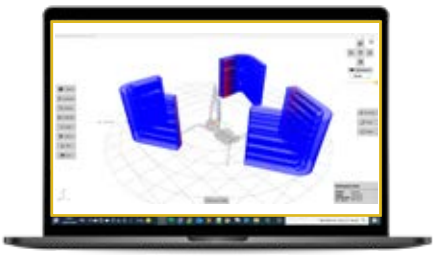
Content of the Pack

1 MaxiPrinter

1 automated pumping system
with direct data reporting

1 automated silo kit 1.2m^3
(or 317 gal)

1 Remote control screen



C3D Slicer Software
developed by Constructions-3D

Pumping hose for
concrete

Pumping rotors and stators

2 Aluminium loading ramps
with the 20 feet maritime container

C3D Starter Kit

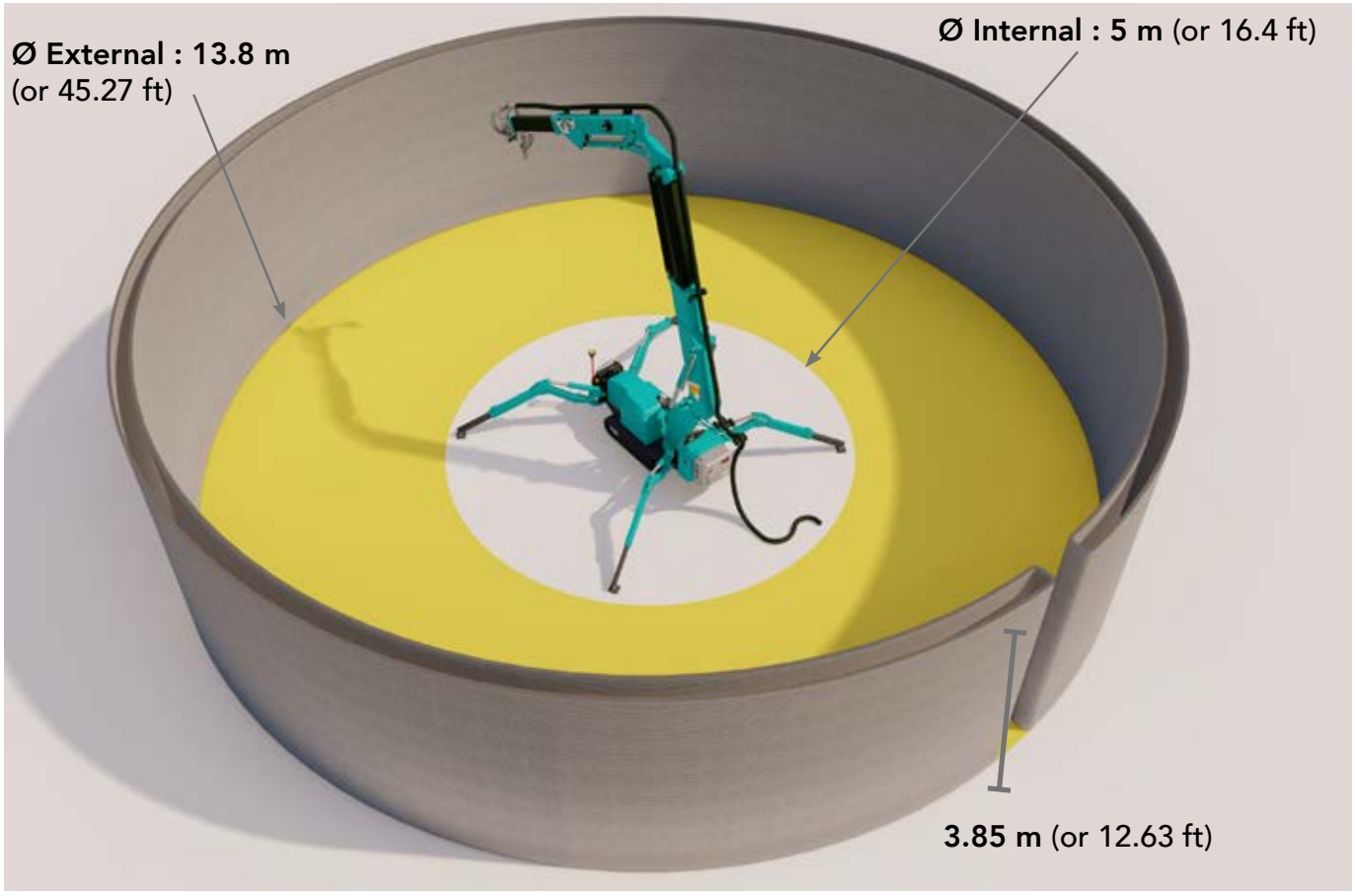
Logistics

Transport in a 20’
maritime container

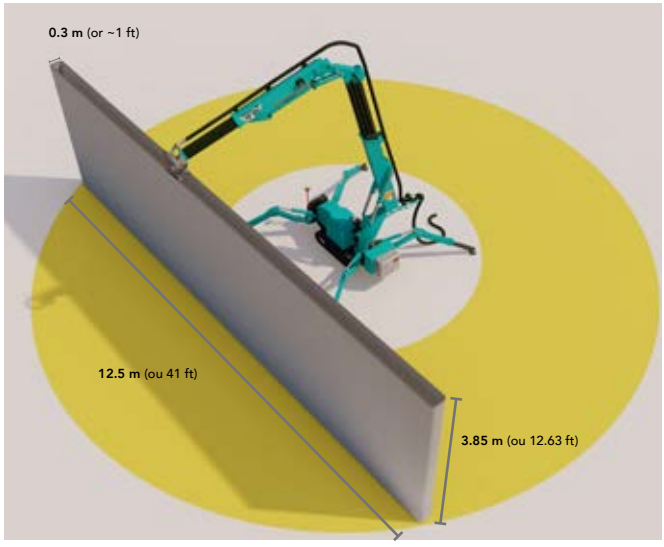
Total weight : less than 7 tons
including container

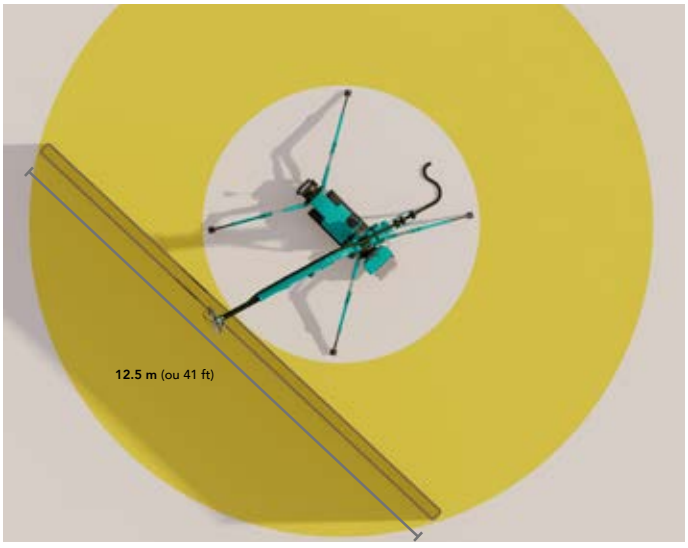
Dimensions of the printing area

Internal diameter minimum 5 m - maximum 13.8 m (or 45.27 ft) for a structure of 3.85 m (or 12.63 ft) height.



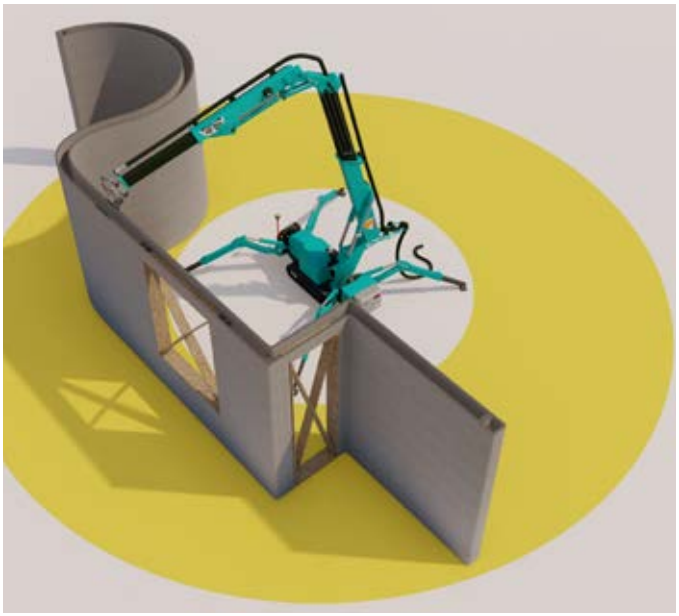
Ex: Longest wall is 3.85 meters high (or 12.63 feet).

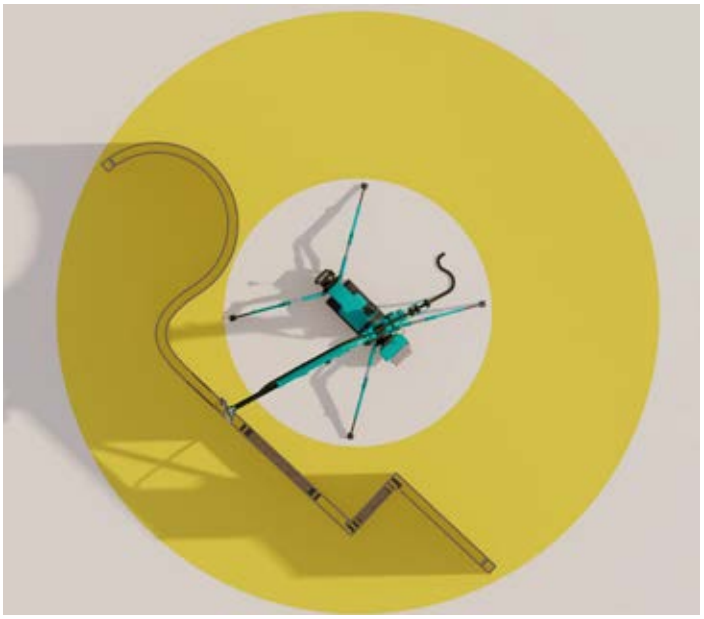




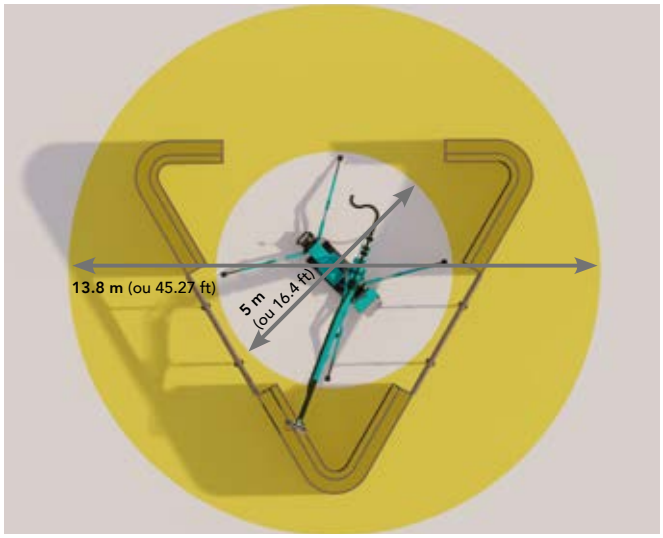
Examples of work area

Ex: Complex printable 3.85 m high wall (or 12.63 ft)

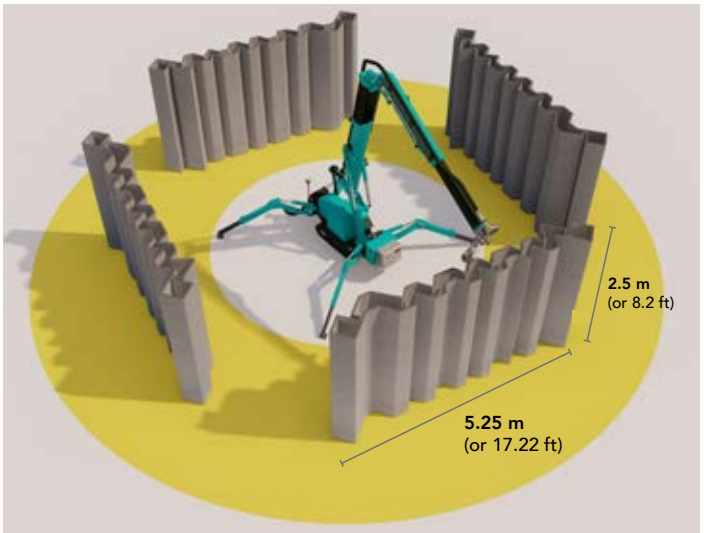




Ex: Accueil C3D - Height : 3.80 m (12.47 ft) / Maximum diameter : 12.5 m (41 ft)



Ex: Pavillon C3D - Height : 2.50 m (8.2 ft) / Maximum diameter : 13.5 m (44.29 ft)



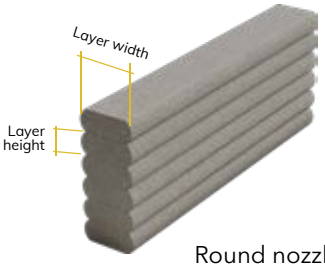
Chronology of Installation

Step 1 Deployment and installation of the material (1h00 - 2 people)

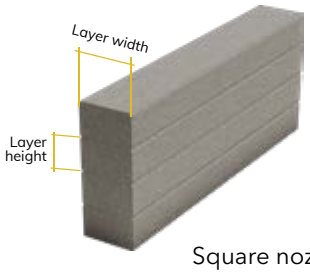
Step 2 Initialization of the printer and the pump (1h00 - 2 people)

Step 3 Printing (minimum 2 people)

Step 4 Cleaning and storage (1h30 - 2 people)



Round nozzle



Square nozzle

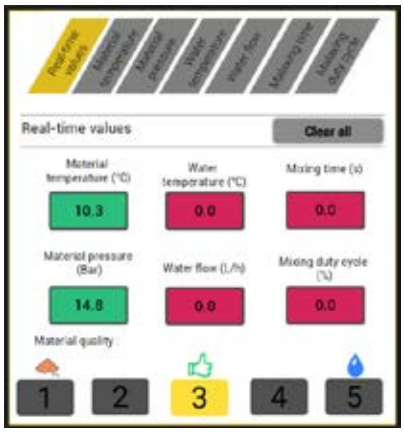
Material parameters

Layer height adjustment	Yes, in C3D Slicer
Usual layer heights	25 mm (or 0.98 in) Possible : 10 mm - 40 mm (or 0.39 - 1.57 in)
Layer width adjustment	Yes, during printing
Usual layer widths	Round nozzle : 2.5 x layer height
For the deposit of layers	Square nozzle : 1 x layer height
	Round and square nozzles included

Printing data

Pause and resume while printing	Yes
Pause time not to be exceeded	Defined by the material used
Preventive pump cleaning frequency	Every 2 hours of printing
Preventive cleaning time	5 min
Rotor and stator change frequency	Every 24 hours of printing
Hose purge and reset	15 min
Pumping system data	Online acquisition and display

Pumping system data reporting

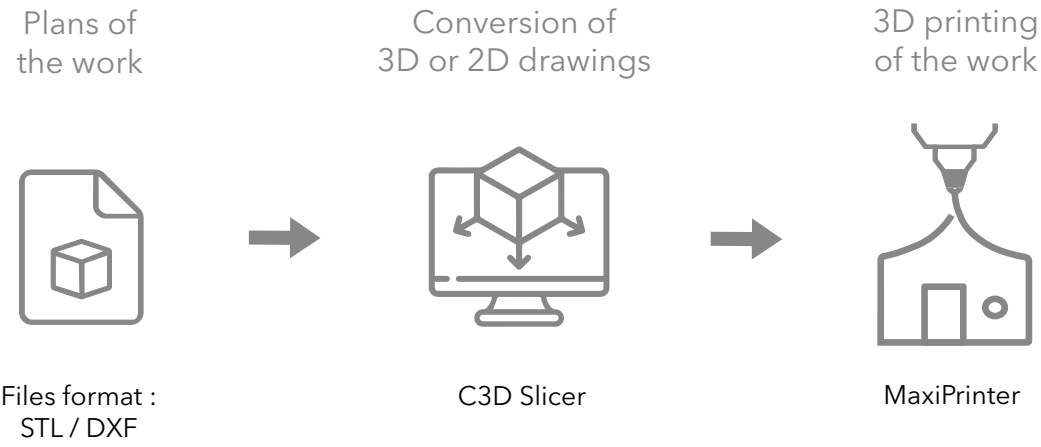


Pumping system data acquisition directly displayed on MaxiPrinter control interface. Contact us for more details.

Live camera

Live viewing of the serious extrusion to the camera located on the print head.

Steps to print : from 3D file to print-on-site



Materials

The MaxiPrinter system is open for use with all types of printable materials.

(contact us for more details)

Training and support

C3D on-site training	83 rue des Mines Innovantes, 59860 Bruay-Sur-l'Escaut FRANCE
Number of people	5 trainees maximum
Topics during theoretical and practical training	Modeling constraints and preparation of print files Material and control Pumping system Control and monitoring of machine Relevant constructive solutions for 3D printing Organization of a 3D printing site Printing on site in real conditions Maintenance

Construction sites of MaxiPrinter

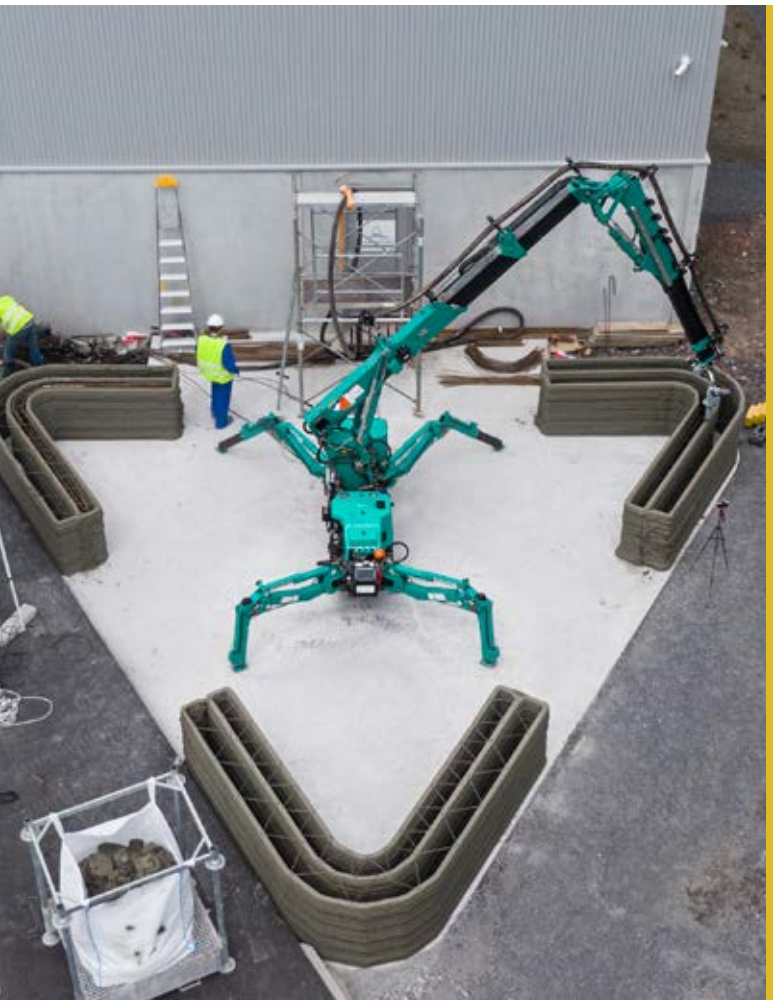
Construction sites of MaxiPrinter

Le *Pavillon* (November 2019)

Printing sequence	Walls printed one after the other
Wall dimension	Height : 2.5 m / length : 5.40 m (or 8.2ft / 17.72 ft)
Wall type	Two partitions wall
Printing time per wall	8h / per wall
Total duration of the printing phase	4 days
Material used	C3DMIX
Amount of material used	22 Ton
Floor space	Approx. 60 m^2 (or 646 sqft)

L'Accueil (July 2021)

Printing sequence	Continuous printing of the entire structure including the lintel
Wall dimension	Height : 3.8 m (or 12.47 ft)
Wall type	Three-partitions wall with lintel
Printing time	30h
Total duration of the printing phase	34h
Material used	Tector 3D Build Lafarge / Reinforcement deposit during printing
Amount of material used	28 Tons (or 30.86 ton)
Floor space	Approx. 60 m^2 (or 646 sqft)



La *Tour* (2022 Construction in progress)

3 floors - 12.5 meters in height (or 41 ft)

Tallest 3D concrete printing project in the world

Technical details of the subsystems

MaxiPrinter

General specifications

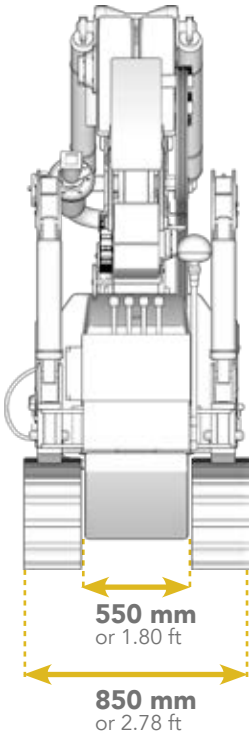
Type	Hydraulic robot arm mounted on tracks Degrees of freedom: 5 Electric motor and thermal engine
Control mode	 Manual control for arm folding/unfolding  Remote control screen with camera feedback for printing
Details of the control screen	3D printer control Control of pump speed, start and stop Control of print nozzle linear speed Manual activation of nozzle movements Display of the percentage of completion of the current print job
Weight	2700 kg (or 5952 lbs) Pressure on the tracks: 0.61 kgf/cm^2 (or 8.68 psi) Ground pressure in printing (under each foot): 0.93 kgf/cm^2 (or 13.23 psi)
Electrical Requirements	Maximum electrical power during printing: 10 kVA Power supply: 380V three-phase 3P + N + E
Climatic conditions	Machine capable of remaining under moderate rainfall: IP67 components Machine capable of maintaining its accuracy under 60 km/h (37 mph) of wind Extreme operating temperature between -5 °C and 50 °C (or 23°F and 122°F) for the machine

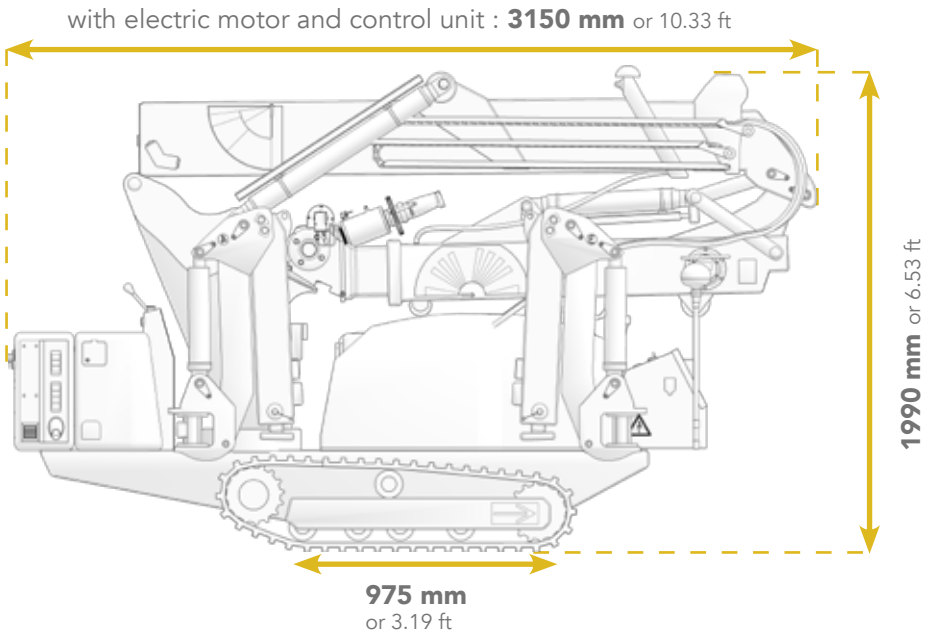
Details of the control screen

Type	Touchscreen attached to the machine frame
Nozzle speed	Up to 200 mm/s
Material flow	(see «pumping system» p.22)
Water-to-material ratio on pump	Adjustment of water-to-material ratio from the machine control interface
Available languages	English, French, German (other languages available upon request)
Data accessible during printing	Material pressure and temperature Mixing water flow rate and temperature
Export of printing-related data	Mixer cycles
Other functions	Manually added notes during printing Modifications of printing parameters
Camera	Export of CSV format data related to printing from the USB port on the screen Pausing and resuming of prints Setting of pressure/temperature alert thresholds for material and mixing water Real-time visualization of bead deposition using a camera mounted on the machine head
Weather Channel	Display of data from the weather station located on the MaxiPrinter: temperature and ambient humidity

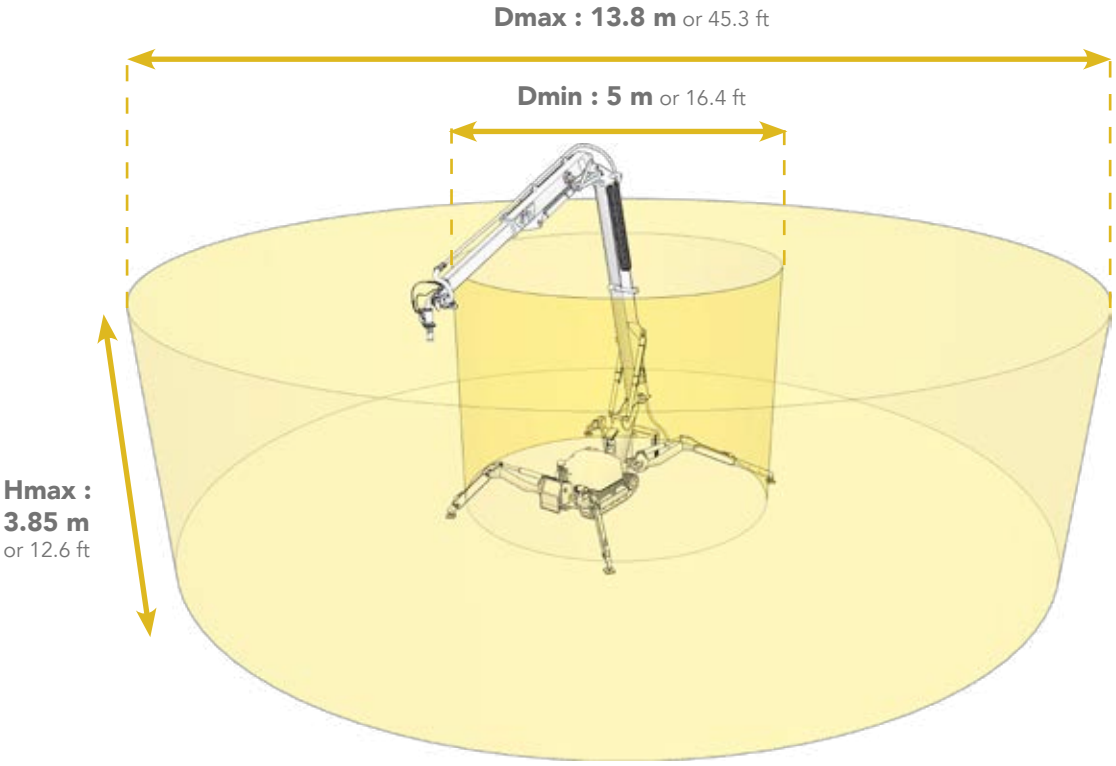
Space requirement

Folded machine (dimensions in mm)





Unfolded machine (dimensions in m)



Folding/unfolding requiring manual operation (1 person)
Folding/unfolding time : 10 min

Machine moving

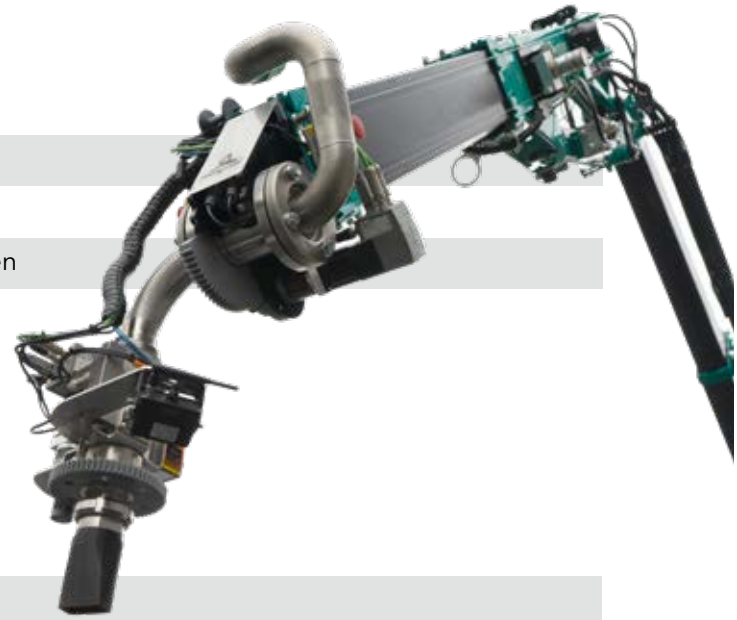
Possible on driveable ground when machine is in folded configuration
Catterpillars tracks by diesel engine
Travelling speed on tracks : 3 km/h (or 1.8 mph)
Maximum permissible slope when travelling on tracks: 15°

Printing capacity

Absolute accuracy	1-5 cm (0.39-1.97 in) depending on the position of the arm in the printing area
Repeatability level	1 mm (or 0.04 in)
Maximum linear nozzle speed	200 mm/s (or 7.87 in/s)
Usual printing speed	100-150 mm/s (or 3.94-5.91 in/s)
Maximum vertical construction speed	Parameter defined by the material used. Usual speed: 30 - 60 cm/h (or 0.98-1.97 ft/h)
Nozzle speed	Adjustable during printing
Pause and resume	Possible during printing
Break time not to be exceeded	Parameter defined by the material used. Usual time limit: 10 min

Printing nozzle

Rotating nozzle following the path of the printed layer
Pneumatic valve for instant print stop/resume
Display of the camera acquisition directly on the control screen
Recorded video of the print saved on SD card



Maintenance

Standard maintenance of a hydraulic machine
Oil and filter change in accordance with maintenance manuals
Maintenance of the thermal engine in accordance with maintenance manuals
Checking the nozzle and rotating joints to remove the dirt

Pumping System

General specifications

Type	Double mixing and continuous pumping system Acquisition of pumping data displayed on the control screen Dry material supply (premix) for a silo
Control	From the MaxiPrinter control interface, or in manual mode
Pumping capacity	Min : 1 L/min, Max : 32 L/min (or 0.26 gpm - 8.45 gpm) Usual - approx. 10 L/min (depending on mounted rotor and pump stator) Pump flow rate adjustable during printing, via the control screen
Grain size tolerance	Up to 5 mm (or 0.2 in)
Fibre tolerance	Yes, only flexible fibers. Maximum length : 25 mm (or 0.98 in) Up to 2% of the mass of the material
Maximum permissible pressure	50 bar (or 725 psi) (depending on material : 5 to 25 bar (or 72.5-362 psi))
Pumping rotors + flexible stators	DN50 mm
Hose length	26 meters (or 85.3 ft)

Electrical requirements

Voltage	Three-phase, 50Hz
Maximum power	10 kW in peak
Automated silo	1.2m³ for dry material (or 317 gal)

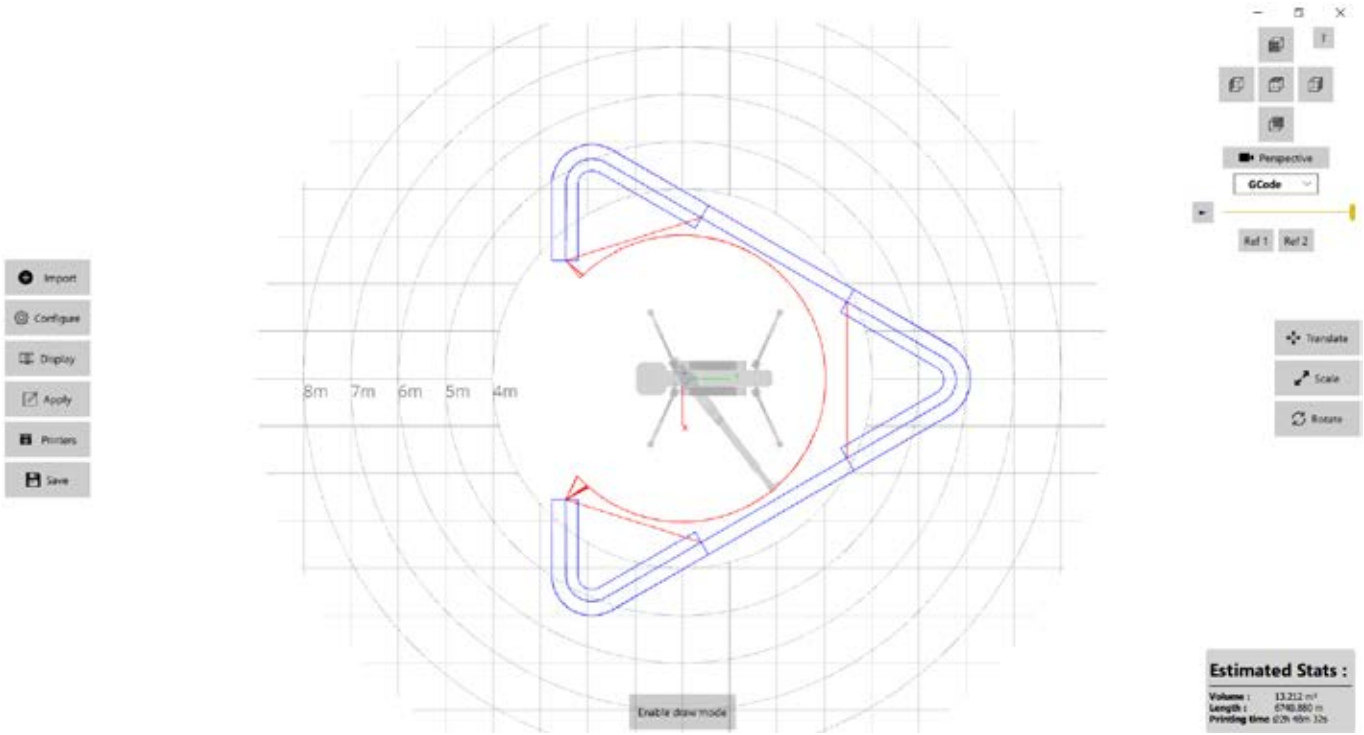
C3D Slicer

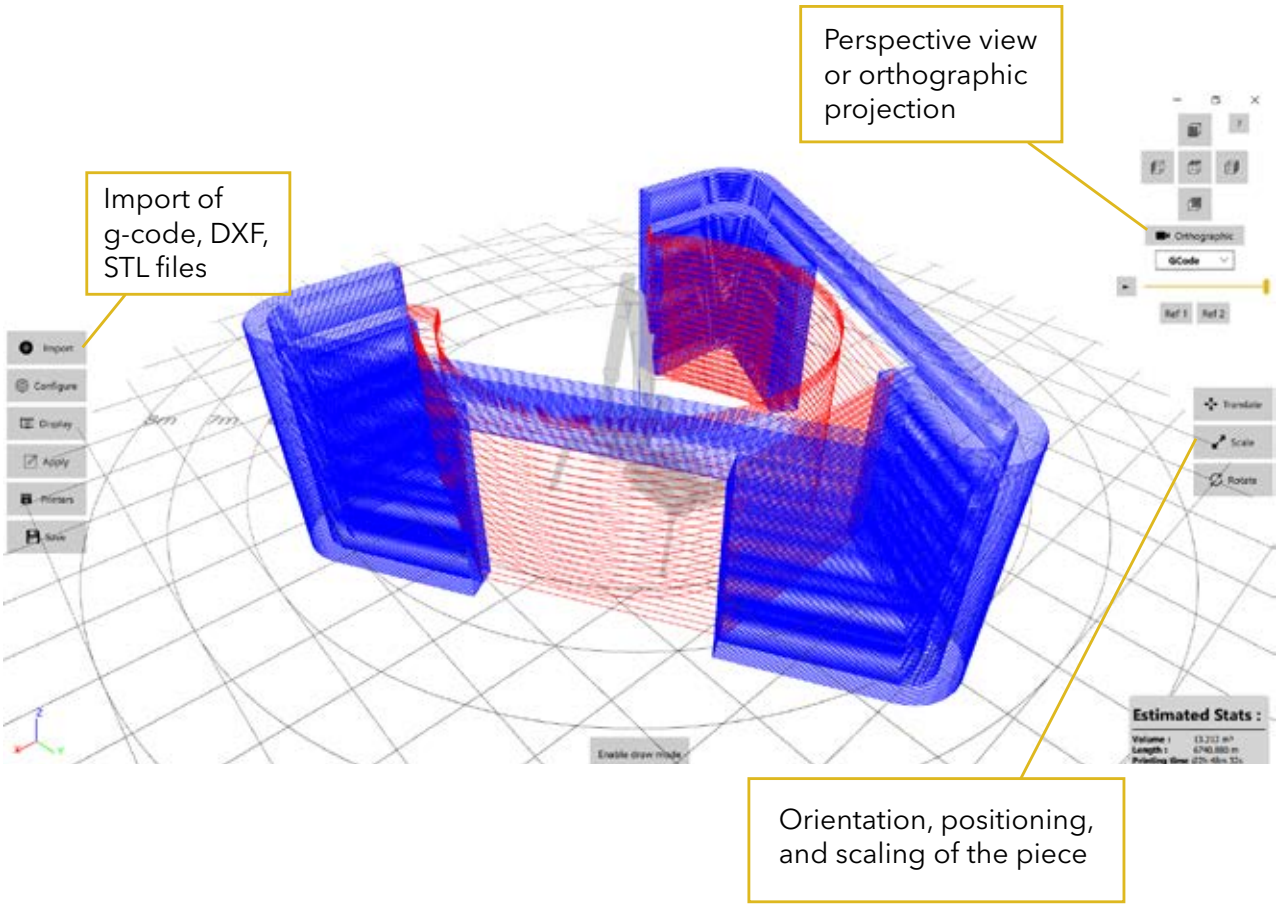
The slicer of Constructions-3D

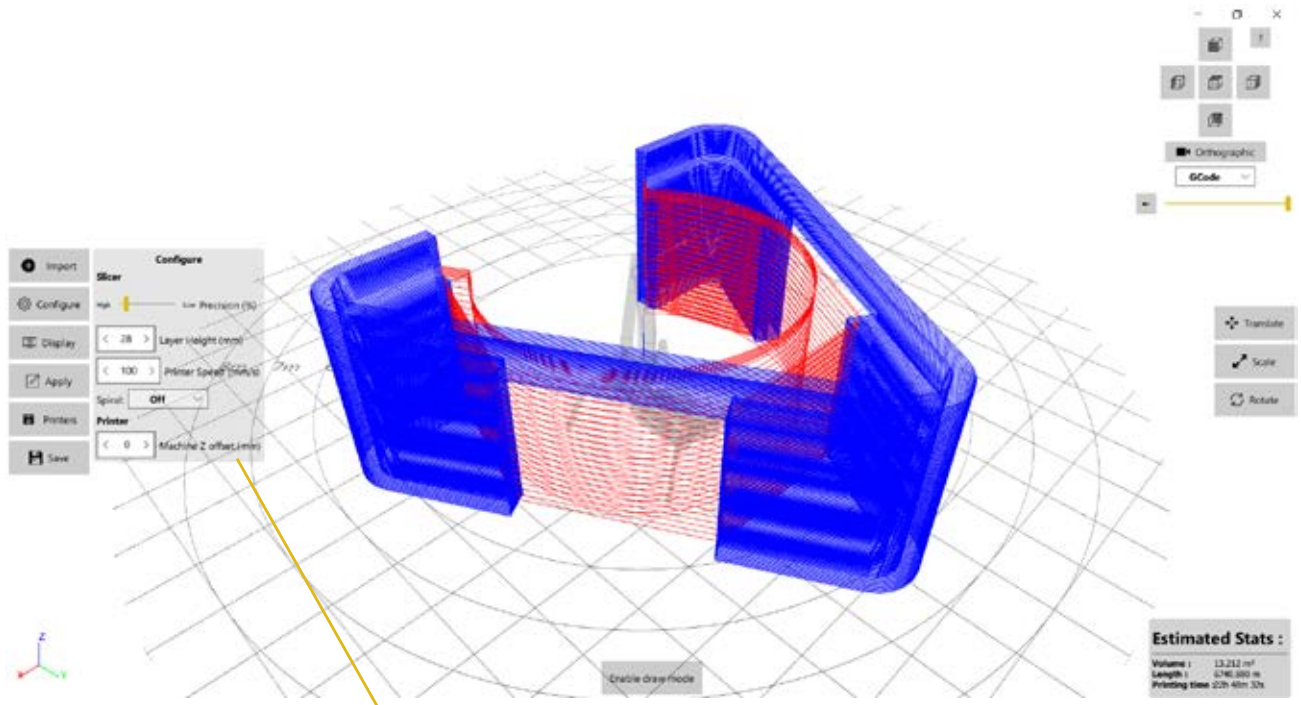
C3D Slicer is natively installed on the MaxiPrinter control screen.

General information	Slicer developed by Constructions-3D, especially for 3D printing of buildings Allows the user to process any type of file in STL and DXF format Intuitive and easy to use
Features	Orientation of the piece Scaling of the piece 3D visualization and processing of the STL file 3D visualization and DXF file processing 3D visualization of G-CODE file Choice of curve precision Choice of the layer height Choice of the speed of the nozzle Choice of the type of slicing: spiralized (continuous deposition), standard, or semi-spiralized
Minimum requirements for PC configuration	Processor: Intel Core I5 8250U or AMD Ryzen 5 3500U 8 GB RAM Graphics Processor: Intel UHD 620 or AMD Vega 8 200 MB hard drive

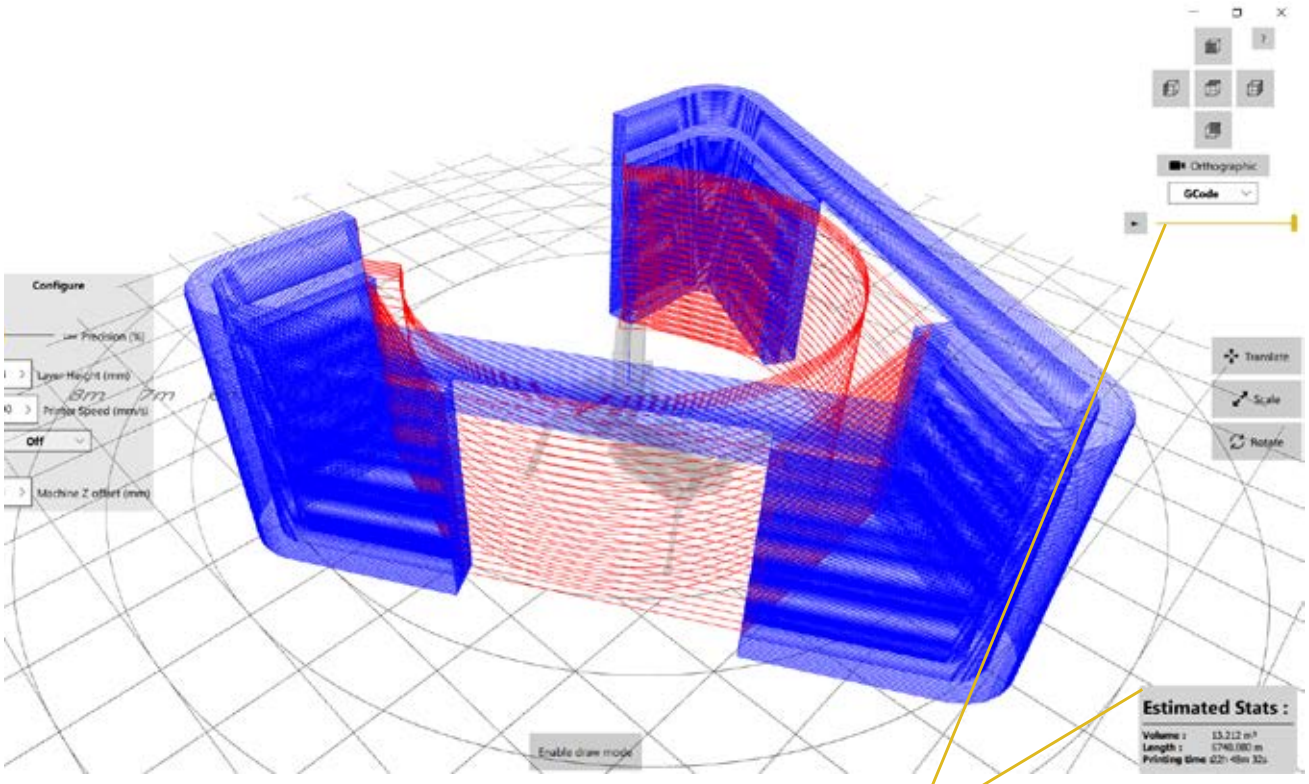
C3D Slicer Overview







Configuration of the slicing mode, (spiralized or standard) layer height, nozzle speed, curve precision.



Visualization of G-code, trajectories with and without extrusions. Estimation of the amount of material needed and the printing time.

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Constructimeter

Automated testing press for fresh 3D printing material

MiniPrinter PRO

The robust, versatile 3D printer is designed to meet the high expectations of professionals seeking precision, efficiency and ease of use. Printing dimensions: 1.2 m x 1.2 m x 1.2 m.

MiniPrinter EDU

Compact 3D printer developed for education

MiniPrinter PRO XL

The most versatile 3D concrete printer for industry, laboratory, and construction. Printing dimensions: 1.2m x 2.5m x 1.2m.

Training and support

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Our project

LA CITADELLE des SAVOIR-FAIRE

The first 3D concrete printed building in France
The most ambitious project of open-air laboratory for 3D construction
Work in progress

30/03/2020
Obtaining
the building permit

11 200 m²
or 13 395 sqyd
Building land

2 800 m²
or 3 349 sqyd
3D printed
buildings

1500 m²
or 1 794 sqyd
Warehouse for
the manufacture
of 3D printers

CONSTRUCTIONS 3D

Complete solutions for automated construction

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