CyBe

CyBe is a Dutch company run by Berry Hendriks, who comes from a family working in the construction industry. CyBe is using a robot arm to print relativly small objects with their own mortar, “CyBe Mortar” with a grain size of 0-3mm. The mortar sets in 3 minutes and achieves structural strength in 1 hour.
CyBe focuses on three main areas - robots, mortar and software. As for Robots, they use two different off-the-shelf robots and as far as we know, they use a Grasshopper plugin for Rhino to slice their prints.
Cybe has been working on real world applications of 3D printed construction and have found a niche in 3D printing sewerpits and benches. When printing larger prints, they print and assemble small segments on site.1

Project & development	Year of establishment	2016								
	Year of entering into construction 3D-Printing	2016								
	Number of employees	Less than 10	Less than 25	Less than 50	Less than 100	Less than 500	Less than 1000	More than 1000	Unknown/ Undefined	
	Targeted market	Printers	Printer parts	Materials	Furniture/ Sculptures	Building components	Building projects	Other	Unknown/ Undefined	
	Development stage of printers	Conceptual	Protoypes	Working products	Commercial products	Other	Unknown/ Undefined			
	Development stage of printed materials	Conceptual	Prototypes / Test prints	Usable products	Commercial products	Other	Unknown/ Undefined			
	Patent(s) status	Not patented	Patent pending	Patent granted	Other	Unknown/ Undefined				
	Patent coverage	Printer design	Printing technology	Material	Nozzle/ Deposition system	Material feeding system	Movement system	Software/ Firmware	Other	Unknown / Undefined
	Largest print up to date (size)	Less than 1m3	Less than 5m3	Less than 10m3	Less than 25m3	Less than 50m3	Less than 100m3	More than 100m3	Unknown/ Undefined	
	Largest print up to date (category)	Minor test prints	Furniture/ Sculptures	Building elements	Less than 50m2 buildings	Less than 100m2 buildings	More than 100m2 buildings	Multiple storey building	Other	Unknown / Undefined
Technology	Additive Manufacturing technology type	Material Extrusion (Layered)	Material Extrusion (Suspended)	Binder Jetting	Other	Unknown/ Undefined				
	Form Freedom	2D freedom	2.5D freedom	3D freedom	Full 3D freedom	Other	Unknown/ Undefined			
	Fabrication location	In situ	On-site prefabrication	Off-site prefabrication	Partial prefabrication	Other	Unknown/ Undefined			
	Fabrication approach	Direct fabrication	Direct fabrication	Component fabrication	Formwork fabrication	Stay-in-place formwork fabrication	Cover/ Engulfing fabrication	Other	Unknown/ Undefined	
Printer	Movement system	Cartesian gantry	Delta gantry	Robotic arm	Mobile robotic vehicle	Cable suspension	Other	Unknown/ Undefined		
	Maximum printable volume	Less than 1m3	Less than 5m3	Less than 10m3	Less than 25m3	Less than 50m3	Less than 100m3	More than 100m3	Unknown/ Undefined	
	Maximum printable area	Less than 1m2	Less than 2m2	Less than 5m2	Less than 10m2	Less than 25m2	Less than 50m2	More than 50m2	Unknown/ Undefined	
	Deposition method	Jetting	Pressure extrusion	Mechanical extrusion	Mechanical movement	Gravity deposition	Sintering/ Welding	Other	Unknown/ Undefined	
	Number of print heads	Single	Multiple	Array	Other	Unknown/ Undefined				
	Print Head/ Nozzle diameter	Less than 1mm	Less than 5mm	Less than 10mm	Less than 25mm	Less than 50mm	Less than 100mm	More than 100mm	Unknown/ Undefined	
	Print head/ Nozzle features	Three axis motion	Rotational/ Tangential motion	Omni-directional motion	Troweling mechanism	Other	Unknown/ Undefined			
	Material feeding system	Manual	Included, semi-automated	Included, fully automated	Separate, semi-automated	Separate, fully automated	Other	Unknown/ Undefined		
	Theoretical printing speed	Less than 0.1m3/h	Less than 0.5m3/h	Less than 0.1m3/h	Less than 2m3/h	Less than 5m3/h	Less than 10m3/h	Less than 20m3/h	More than 20m3/h	Unknown / Undefined
	Actual printing speed	Less than 0.1m3/h	Less than 0.3m3/h	Less than 0.5m3/h	Less than 1m3/h	Less than 2m3/h	Less than 5m3/h	Less than 10m3/h	More than 10m3/h	Unknown / Undefined
	Accuracy	Less than 5mm	Less than 10mm	Less than 50mm	Less than 100mm	More than 100mm	Unknown/Undefined			
	Printer (diss)assembly speed	Less than 1 hour	Less than 10 hours	Less than 24 hours	Less than 2 days	More than 2 days	Other	Unknown/ Undefined		
	Price per printer unit	Less than 10.000$	Less than 50.000$	Less than 100.000$	Less than 250.000$	Less than 500.000$	More than 500.000$	Unknown/ Undefined		
Material	Material possibilities	Single material	Multiple materials	Structure/ Support material	Other	Unknown/ Undefined				
	Material type	Traditional concrete	Alternative concrete	Clay	Soil	Plastic	Metal	Resin	Other	Unknown / Undefined
	Price	Less than 50$/m3	Less than 100$/m3	Less than 150$/m3	Less than 300$/m3	Less than 500$/m3	Less than 1000$/m3	Less than 2000$/m3	More than 2000$/m3	Unknown / Undefined
	Compression strength	Less than 5MPa	Less than 15MPa	Less than 25MPa	Less than 50MPa	Less than 100MPa	Less than 200MPa	More than 200MPa	Unknown/ Undefined	
	Tensile strength	Less than 1MPa	Less than 3MPa	Less than 5MPa	Less than 10MPa	More than 10MPa	Unknown/ Undefined			
	Aggregate size	No aggregates (Paste)	Up to 2mm (Fine mortar)	Up to 4mm (Rough mortar)	Up to 6mm (Fine concrete)	Up to 16mm (Concrete)	Up to 40mm (Rough concrete)	Over 40mm (Rough concrete)	Other	Unknown / Undefined
	Aggregate weight (kg/m3)	Ultralightwt. (<500)	Lightweight (500-1000)	Normal weight (1000-2000)	Normal weight (1000-2000)	Heavyweight (<2000)	Unknown/ Undefined			
	Material verification	Conceptual	Prototype	Partially tested	Extensively tested	Certified	Other	Unknown/ Undefined		
	Material hardening time	Less than 1 hour	Less than 10 hours	Less than 24 hours	Less than 2 days	Lees than 5 days	Less than 10 days	More than 10 days	Other	Unknown / Undefined
	Material usability time	Less than 15 minutes	Less than 60 minutes	Less than 2 hours	Less than 5 hours	Less than 10 hours	More than 10 hours	Other	Unknown/ Undefined	
	Raw material price	Less than 50$/m3	Less than 100$/m3	Less than 150$/m3	Less than 300$/m3	Less than 500$/m3	Less than 1000$/m3	Less than 2000$/m3	More than 2000$/m3	Unknown / Undefined
	Raw material availability (in construction)	Industry standard	Extensively used	Partially used	Niche usage	Not used	Other	Unknown/ Undefined		