Impossible Objects®

Composite-Based Additive Manufacturing (CBAM) Technology

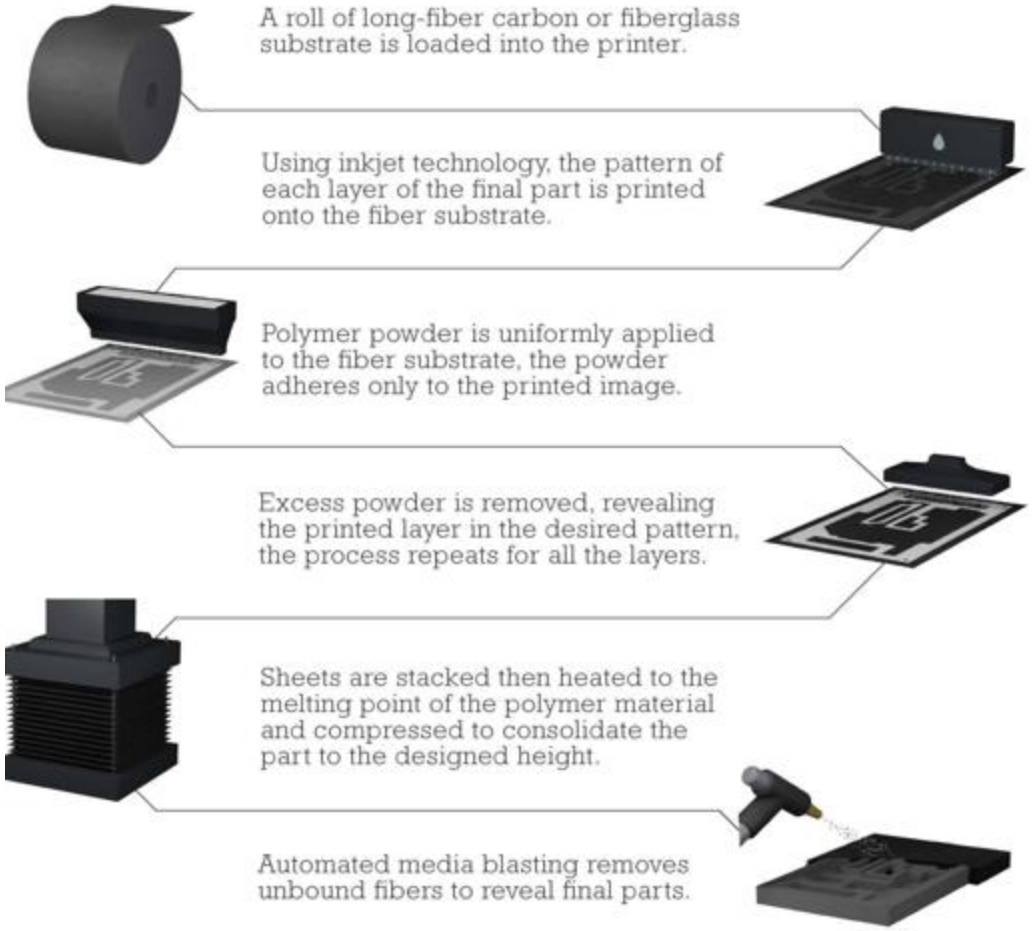
September 2025

CBAM Technology Process Overview

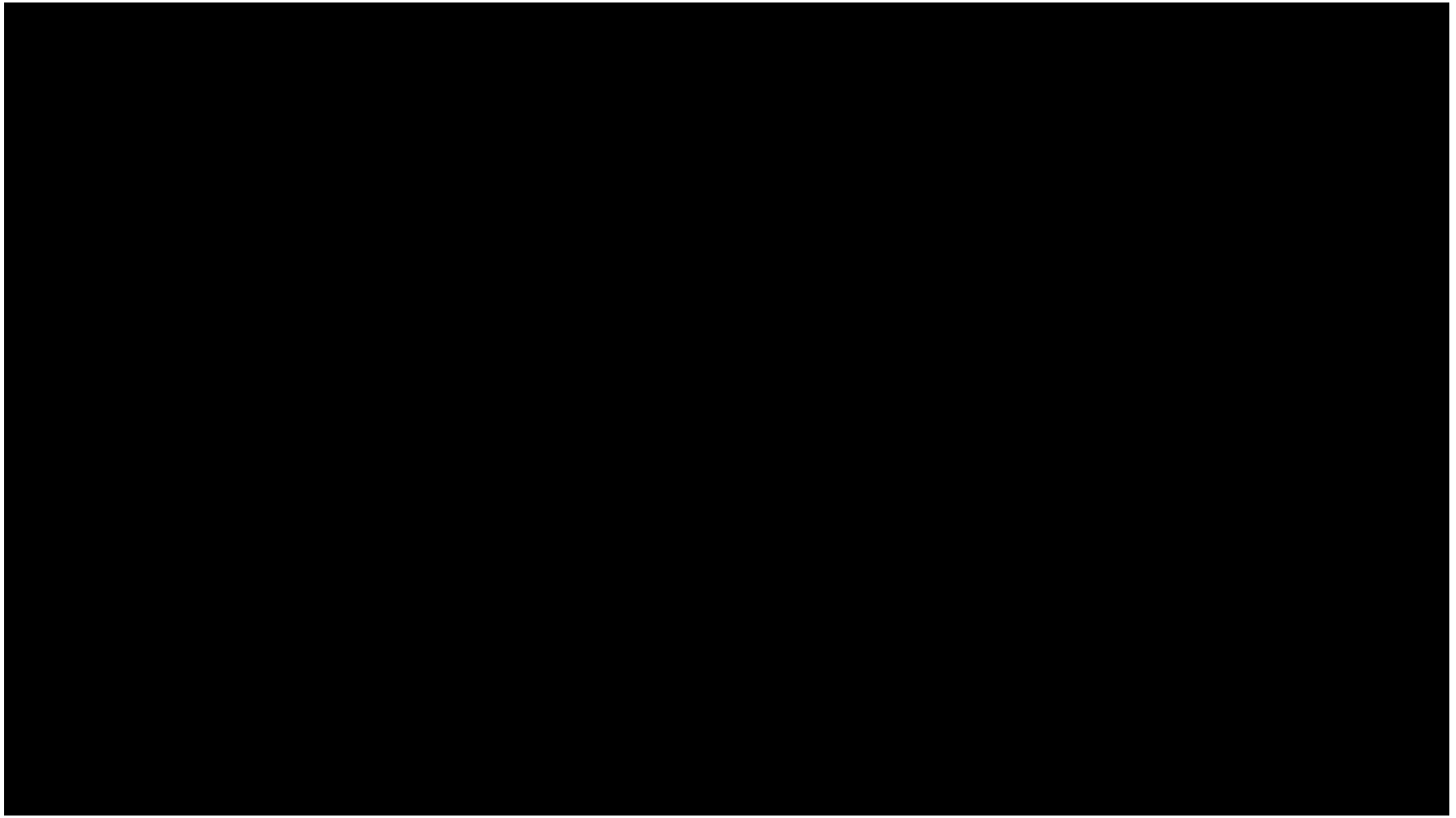
STEP 1 **PRINTING PROCESS**

STEP 2 **HEAT AND PRESS**

STEP 3 **MATERIAL REMOVAL**



CBAM 25 process video



See video: www.impossible-objects.com

CBAM Materials

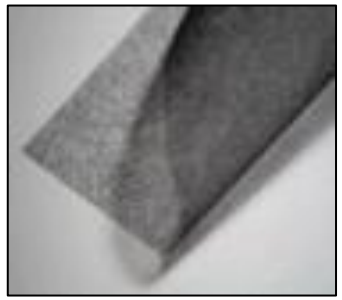
Room temperature deposition

CBAM nonwoven composite veils and materials are typically composed of:

- Engineered fibers (>12.5mm lengths)
- Random fiber orientations
- Bound together with an organic polymer binder

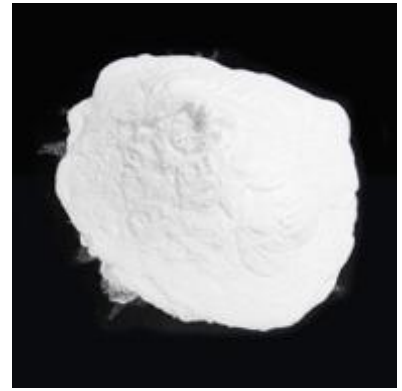
TYPES OF FIBER

- Carbon fiber
- Fiberglass
- Unidirectional - Future




Powder Matrix

CBAM Polymer Matrix:
PEEK (high heat and chemical resistance)
PA12 (Good abrasion resistance, toughness)
Upcycled PA12 (Low cost, sustainable)
Thermoset Epoxy (Strong, stiff, dimensional stable and impact resistant)




In-situ process control for build repeatability

- CBAM 25 in-situ controls to ensure printed images match the intended design and verify the order, completeness, and integrity of pages in the output stack.
- Enhanced process control of printing and sheet powder loading
- Automatic purging and reprinting of defective sheets
- Minimal production scrap
- Fast build part build recovery in event of power outages

The vision system checks printed images to match the intended design

A high-resolution image capture for real-time sheet sequence verification of order, completeness, and integrity of stacks

Current CBAM Properties using non-woven composite

Similar Strength-to-Weight as 6061 Aluminum

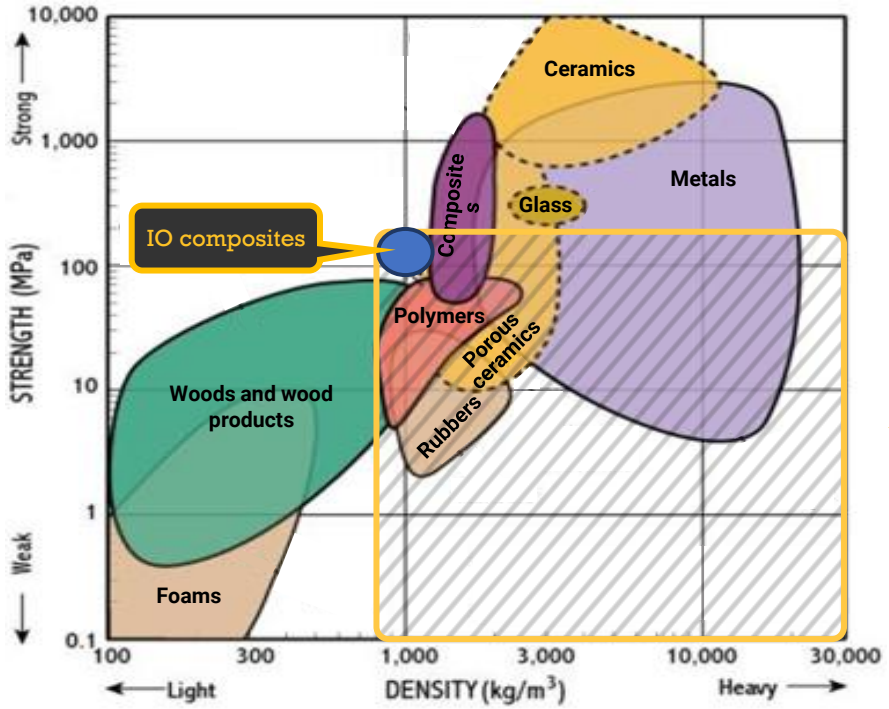
Material Density

Aluminum

2.7 g/cm3

Carbon Fiber/PEEK

1.3 g/cm3



Ashby material chart

Carbon fiber/PEEK Materials in this region can be replaced by IO composites

Technology Use Cases

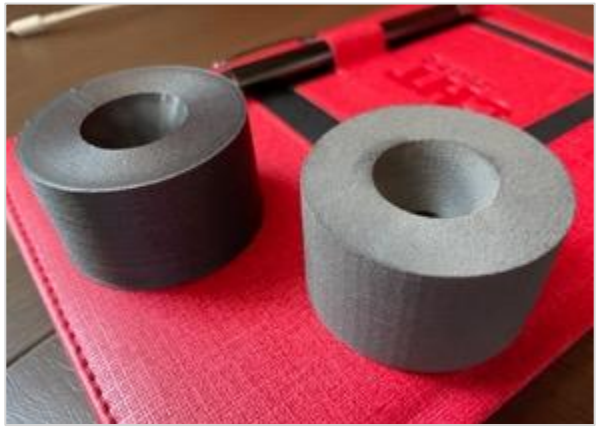
Industrial
Electronic Manufacturing tooling

Automotive
End use part validation

Defense
Spare parts

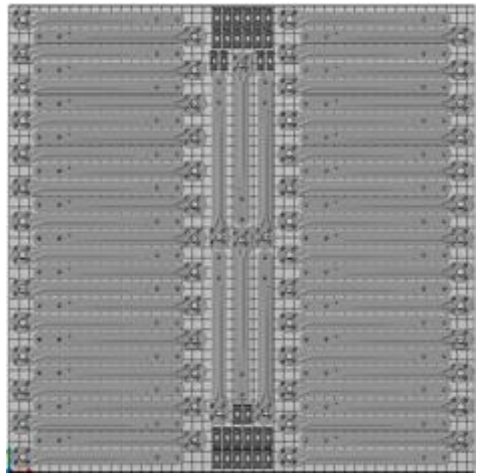
Aerospace
Unmanned Air vehicle components

Academia
Material and Application Research

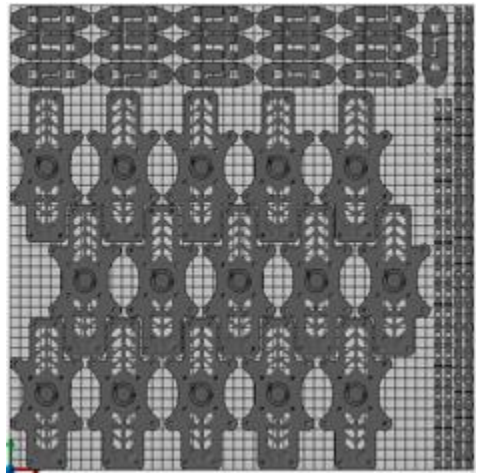


Success Case - Mass Production: one Drone per minute

12,000 units per month
Cost is $50 for part kits



Top view build layout



Bottom view build layout

- **Scale that changes conflicts**: With over 430,000 UASs per year from a single CBAM 25, millions of UASs are possible with just a few machines
- **Additive means innovation**: Innovation is free with AM and mass-produced UAVs can literally be upgraded within hours (vs. months or years)
- **Innovation means impact**: When end users can drive innovation in days, end products provide exactly what's needed where it's needed

Success Cases - Drone systems and parts

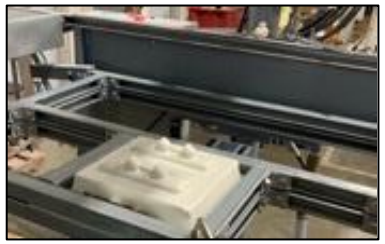
Success Cases – Industrial Tooling

Fabrication Tooling

- High strength properties
- Low thermal CTE expansion
- Future for welding fixtures
- Future for tube forming dies

Injection Molding

Hydroforming



Thermoforming

Autoclave Composite

Electronic Tooling

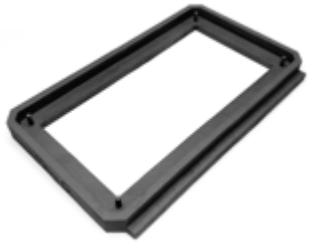
- High temperature >260ºC resistance
- Extreme chemical resistance

Wave solder

Reflow

Fixtures

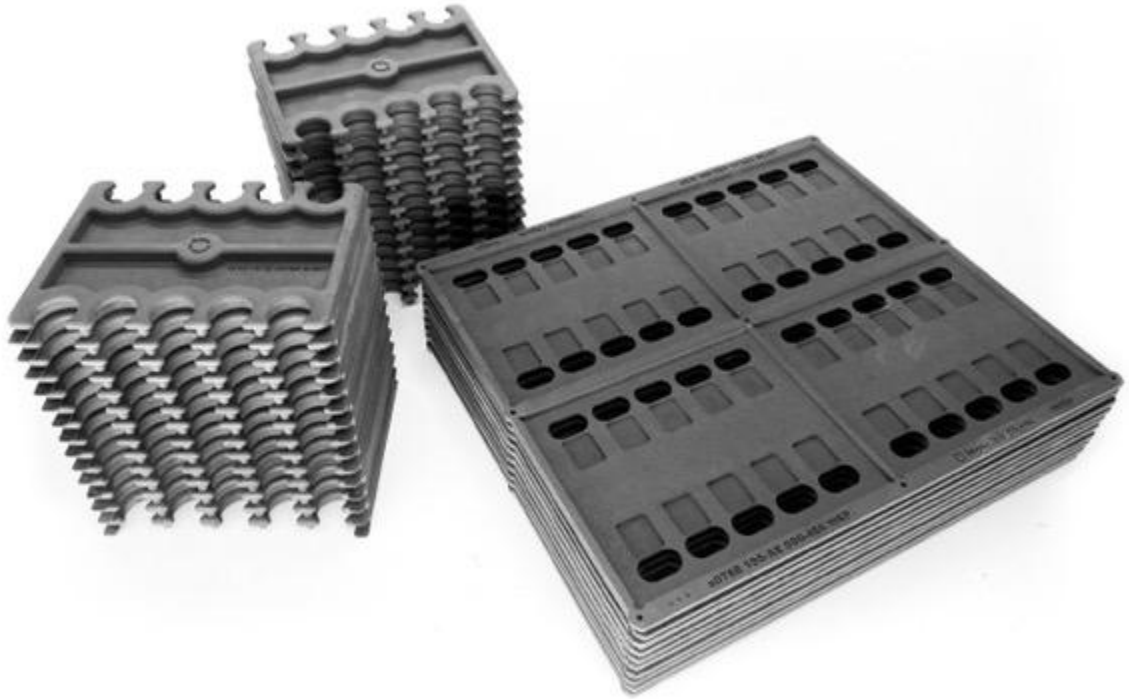
- Excellent surface finish
- Close dimensional tolerances



Heat sink

Automated holding

Success Case – Electronic tooling



25 Carriers, 100 Top Pallets, and 90 Hold Downs

	Traditional CNC	Impossible Objects CBAM	Impact
Material	Fiberglass	Carbon Fiber PEEK	**Better Heat Properties**
Typical Cost	$10,000	$7,500	**25% Cheaper**
Turnaround Time	5+ Weeks	2 Weeks	**50% Faster**

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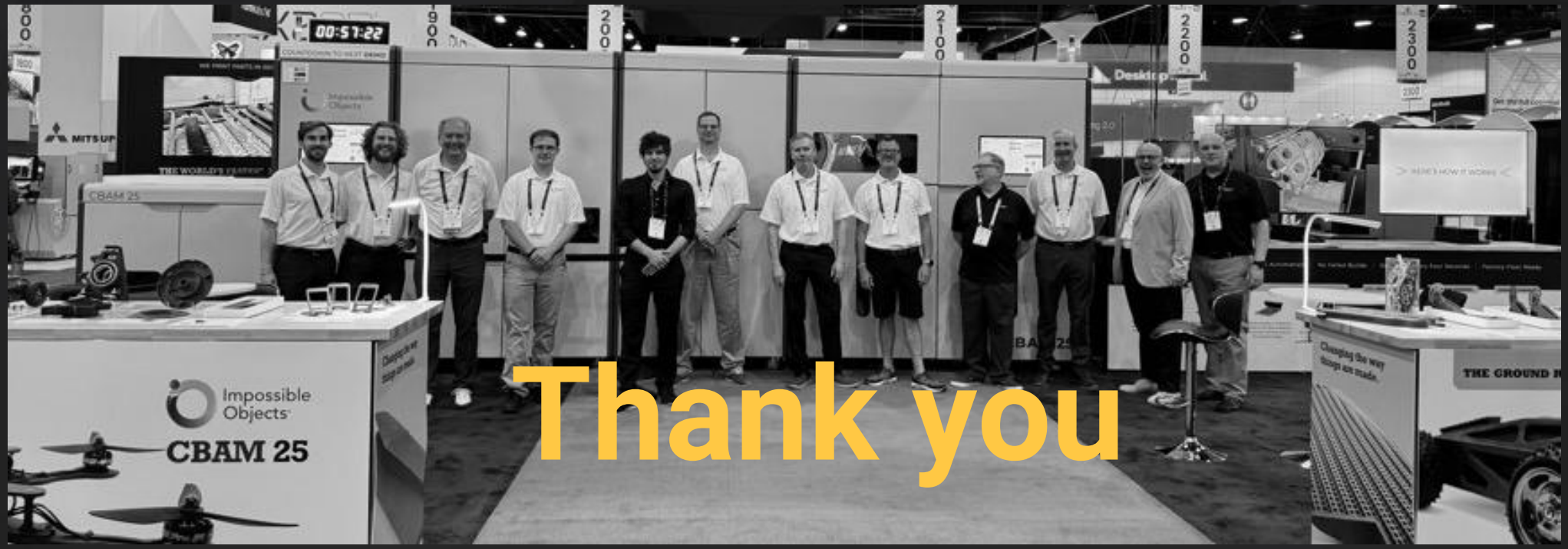

Thank you

Jeff DeGrange
Chief Commercial Officer

jdegrange@impossible-objects.com
Office 847.402.9582 ext. 4
Mobile 612.999.5252
www.impossible-objects.com

CBAM-25 Work Cell

CBAM-25

AUTOMATED
HEATED PRESS

AUTOMATED
REMOVAL STATION

TECHNOLOGY	Composite Based Additive Manufacturing (CBAM)
MAX BUILD VOLUME	18 X 17.7 X 4 inches (457 x 449 x 101 mm)
PRODUCTION SPEED	11,800cm³ per hour 16 Layers per minute
POST PROCESSING	Heating, Pressing & Auto/ Manual Support Removal
SUPPORT	No support material No restriction on build angles
COMPOSITE MATERIALS	Carbon Fiber or Fiberglass with Nylon-12 or PEEK matrix
LAYER THICKNESS	50-60 Micron
POLYMER POWDER(S)	PEEK and Nylon 12
PRINTER DIMENSIONS	24' x 7.5' x 5.5' Feet
POWER REQUIREMENTS	208/3 Phase 50 Amp
OPERATING TEMP	70° / 50% Relative humidity
PRINT RESOLUTION (x,y)	1200 x 1200 dpi
PRINT ACCURACY	0.005 Inches (125 Microns)