



Direct Digital Manufacturing

The factory of the future, today





3D printing has already revolutionised design and development.

Now Direct Digital Manufacturing (DDM) is utilising additive technology in the manufacturing of final components.

DDM is particularly advantageous for small batch production or mass customisation. However, where large volumes are involved, DDM can still have a significant impact. This is because the technology is perfect for the manufacturing of tooling for: moulds, form, assembly and inspection.

We have already assisted world leading aircraft and vehicle manufacturers to implement DDM. These OEMs understand the benefits of designing products without having the constraints of traditional manufacturing techniques. This has allowed designers to challenge convention, incorporating features that could not have previously been manufactured. Components can have reduced weight with improved strength and performance.

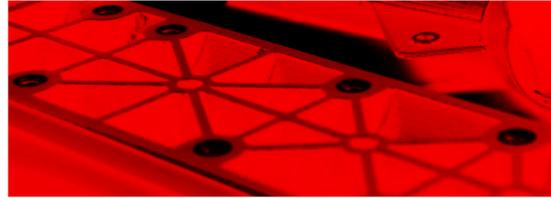
DDM is transforming the landscape for supply chain companies. Components designed for DDM can only be made using DDM. OEMs will therefore seek suppliers that have invested in the technology and fully understand the manufacturing process.

Suppliers with the vision to embrace DDM are investing in this state of the art technology.

Consider the challenges you would face to significantly increase a traditional manufacturing operation; in a DDM facility, production can be quickly scaled by simply adding machines. There is no requirement for additional personnel, tooling or infrastructure.

We at SYS recognise that implementing such a radical business transformation will require a high level of support in both the discovery and implementation phases.

Our team of specialist DDM engineers will support your management and technicians, providing technical and financial insight with experience gained from successfully commissioned past projects.





DDM changes the rules of manufacturing while maintaining a very straight forward production method:



The opportunity for both cost and time reduction in the switch from traditional manufacturing to 3D production can be phenomenal.



BMW have hundreds of fixtures for each production line, here is just one example:

“The layered manufacturing process is well suited for the production of complex bodies that, when using conventional metal-cutting processes, would be very difficult and costly to produce.”

Ulrich Eidenschink **BMW**



Original fixture
Machined out of aluminium using traditional machining techniques.

Total cost: £250

Production time: 18 days



Printed fixture
Produced using Fortus system in ABS material.

Total cost: £104 **58% saving**

Production time: 1.5 days **92% saving**

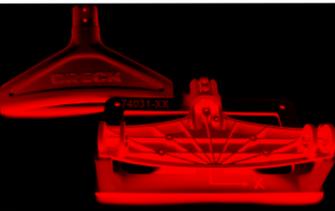




Applications

1 Jigs and Fixtures
 Optimise efficiency by reducing tool weight and optimising ergonomics.

Examples include: holding fixtures, assembly jigs, trim and drill guides.



2 Soluble Core Moulding
 Core geometry created in CAD and built with soluble support material.

The support material dissolves away leaving the composite material.

Cure temperature can go up to 177°C



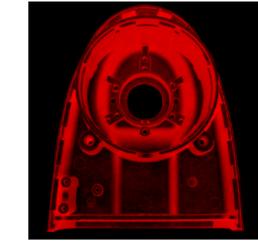
3 Blow Moulding
 Print the mould tool. Inject plastic parts, such as bottles and containers.

Ideal for smaller batch runs, mould tool testing and early part testing.



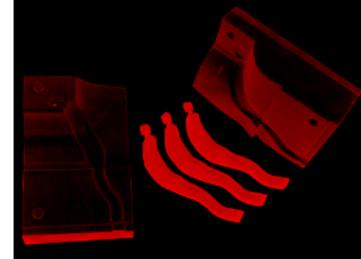
4 Sheet Metal Forming
 Form a variety of materials up to 10,000 psi (69 MPa).

Additive process reduces lead time and tool costs.



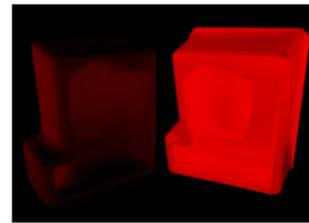
5 Sand Casting
 Use the model as a master to generate a sand mould.

A good fit for creating Sand Core Boxes.

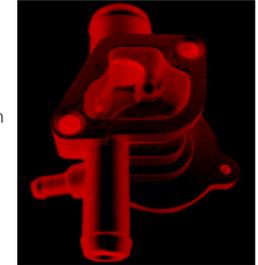


6 Thermoforming Tooling
 Freedom of tool design to suit varying applications.

E.g. internal structures for up to 7mm Kydex material.

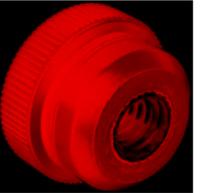


7 Investment Casting
 Replaces traditional injection moulding of wax patterns by printing the pattern and then burning it out.



8 Inserts
 Our technology has the unique ability to be programmed to pause mid-build.

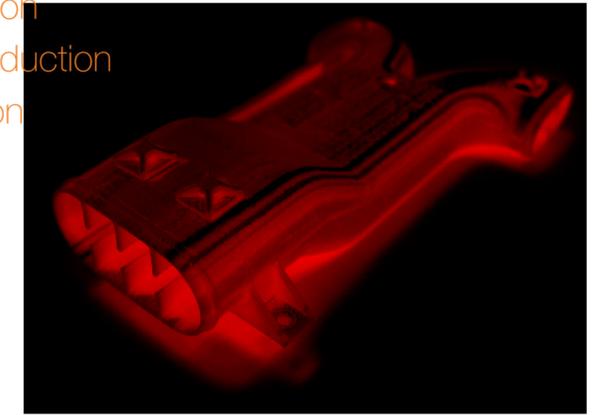
Bolts, nuts, washers, bearings, electrical connectors, metal reinforcement, RFID tags, etc. can all be embedded.



9 End-Use Parts
 Our technology is a great fit thanks to production-grade thermoplastics.

Used for:

- Pilot production
- Bridge to production
- Full production



Direct benefits

- Lower cost
- Shorter lead time
- Speed to market
- Part consolidation

Indirect benefits

- Design freedom
- Change freedom (Continuous product improvement)
- Supports lean initiatives
- True JIT (just-in-time) manufacturing
- Reduced warehouse space/inventory cost
- Decreased obsolescence (Minimal WIP & Inventory to scrap)

3D manufacturing the part is just the beginning; it's what you then use it for. That is when we start to break down traditional process walls.

Applications:

- ① Jigs and Fixtures
- ② Soluble Core Moulding
- ③ Blow Moulding
- ④ Sheet Metal Forming
- ⑤ Sand Casting
- ⑥ Thermoforming Tooling
- ⑦ Investment Casting
- ⑧ Inserts
- ⑨ End-Use Parts



Production materials are the most critical element in Direct Digital Manufacturing. The quality and choice of materials differentiate our technology.

The boundaries are constantly being pushed in materials development. Our DDM specialists are the experts and work with our customers long-term to guide and support them in their use of materials.

Because SYS is a Stratasys Platinum Partner:

- 1 **Beta testing**
We Beta-test new materials with our customers months before they are even released. This keeps our customers at the very heart of this development.
- 2 **Customer feedback**
We offer our customers a direct channel to provide feedback on existing materials. This helps drive the development of new ones.

If you have an application in mind, then why not get in touch with our team to see how DDM could help you?

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BS EN ISO9001:2008 // The quality management system for the supply of 3D prototyping system machines to include installation, machine set-up, optimisation, servicing, training, and application engineering.

