

3M BUCKLEY
INNOVATION
CENTRE

JIGS AND FIXTURES

How jigs and fixtures
can improve production efficiency



WHAT ARE JIGS AND FIXTURES IN MANUFACTURING?

Effective jigs and fixtures can support manufacturers by improving the speed, functionality and cost of the production processes.

Jigs and fixtures are simply a bespoke tool which enables the most efficient production Process or machine operation.

A jig supports, holds and locates a work piece guiding tools to perform specific operations. It is a device that can control the location and motion of the tooling process. Examples include drilling, tapping and reaming.

A fixture is used to secure, support or mount but does not guide any tooling operations. It is typically used within a mechanical or machining process, including turning, milling and grinding.



THE BENEFITS OF USING JIGS AND FIXTURES



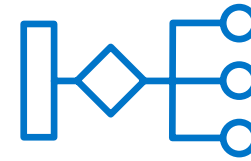
Precision and reliability



Quality and repeatability



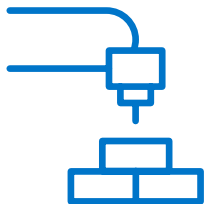
Maximised efficiency and increased productivity



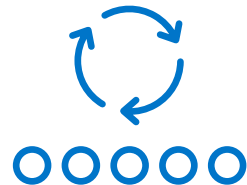
Simplified assembly operations



Reduced cycle times



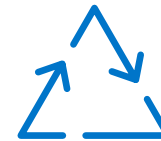
Simplified machining operations



Consistency & improved workflow



Enhanced worker safety/ human error reduction



Reduce waste

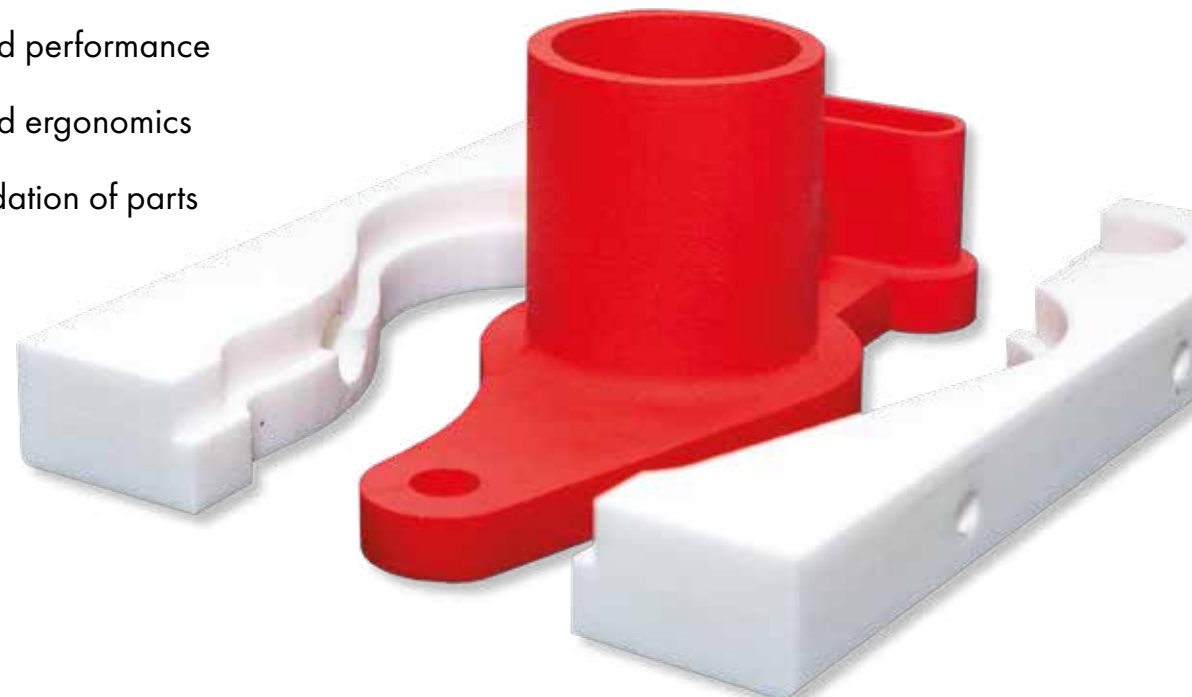
JIGS AND FIXTURES AND ADDITIVE MANUFACTURE

Additive manufacture (AM) allows manufacturers to optimise the creation of their jigs and fixtures, providing greater design flexibility and increased complexity, without the limitations associated with more traditional process. Parts can be manufactured to a high degree of accuracy resulting in low production costs and increased speed delivery.

AM technology forms part of the design, prototyping and evaluation cycle. This provides opportunities for improved jigs and fixtures design, increasing functionality, performance and precision.

Utilising AM within the production of jigs and fixtures will result in:

- ◆ Improved production efficiency
- ◆ Improved design and functionality, including light weighting
- ◆ Time and cost savings
- ◆ Greater customisation capabilities
- ◆ Improved performance
- ◆ Improved ergonomics
- ◆ Consolidation of parts



HOW JIGS AND FIXTURES CAN BE USED IN YOUR INDUSTRY

Jigs and fixtures are used across a wide variety of industries, including the following:



Manufacturing

- production assembly
- plating & polishing fixtures
- layout templates
- automation/robotics
- testing fixtures
- inspection & quality control
- machining & tooling jigs



Electronics

- pcb test fixtures
- press tool fixtures
- pcb alignment plates
- pin placement assemblies
- assembly fixtures
- mobile phone test jigs
- brazing and sealing fixtures
- labelling and marking templates

HOW JIGS AND FIXTURES CAN BE USED IN YOUR INDUSTRY

Jigs and fixtures are used across a wide variety of industries, including the following:



Engineering

- precision tool guide
- go/no go gauges
- machining jigs & fixtures
- cnc machining guides
- welding fixtures
- mechanical assembly
- mechanical inspection



Automation

- part assembly
- automotive welding fixtures
- part alignment jigs
- mounting frame fixtures
- inspection & quality control

JIGS AND FIXTURES AT THE 3M BIC

We have worked with numerous industries developing jigs and fixtures to support manufacturing.

Here are just a few examples:

Soft jaw grips



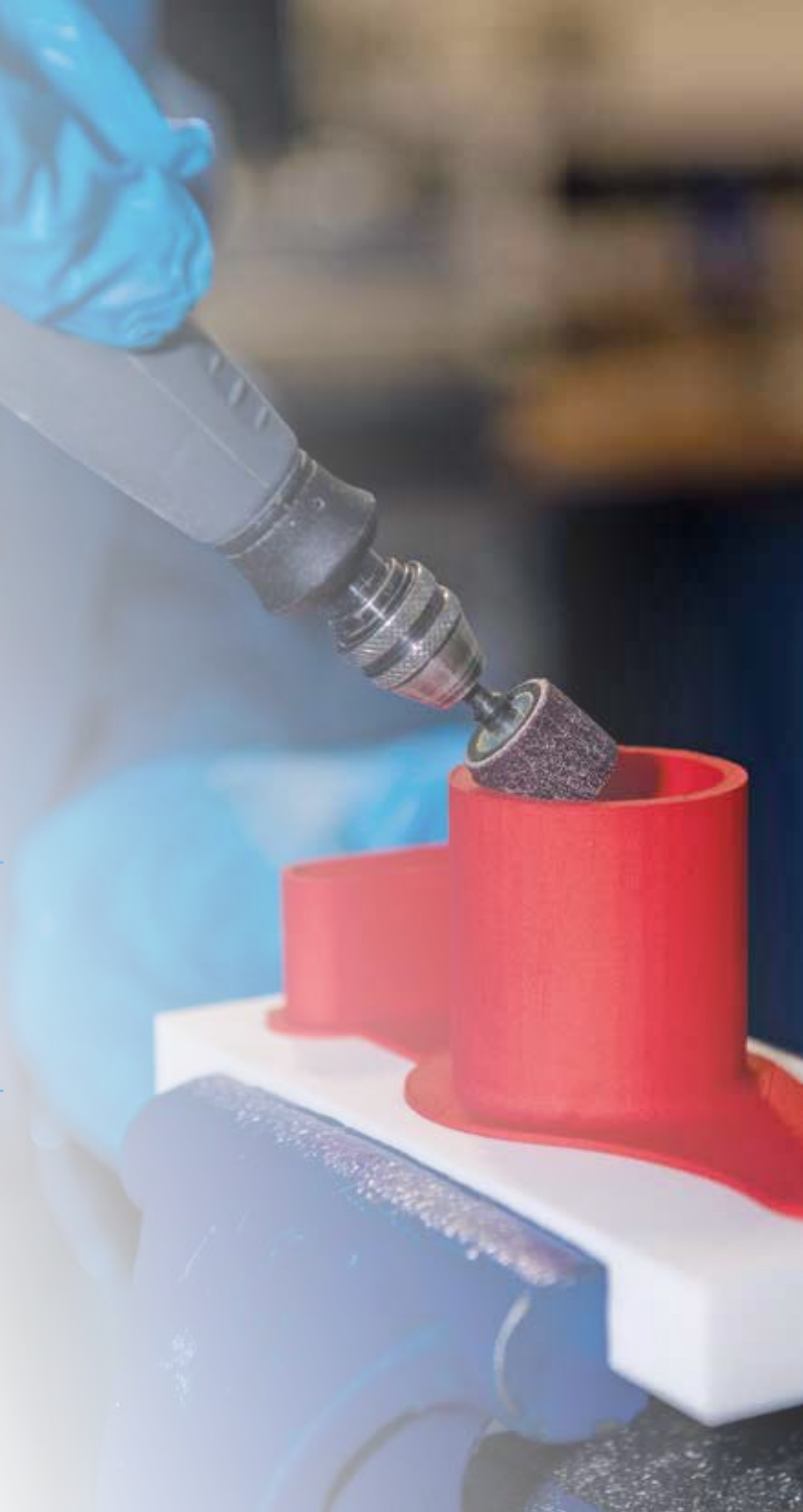
Brief To locate and secure irregular profile parts whilst carrying out work and minimising damage to the surface of the part.



Challenge A normal vice will hold flat or angular shapes tight and secure, however, for a part with irregular or circular profiles this is not always possible with a conventional vice without some possible surface damage.



Outcome Producing in-house cad designs, the 3m bic developed and 3d printed bespoke vice jaws to the precise shape of the part. Using specific 3d printed materials allowed for the secure location of the part with no surface damage. The resulting soft jaw grips were produced at a fraction of the cost of traditional methods.



JIGS AND FIXTURES AT THE 3M BIC

Precision alignment machine fixture



Brief To identify a solution to ensure precise duplication within the machining process.



Challenge Mounting and supporting irregular parts within the machine accurately enabling reduction in set up time and improved productivity.



Outcome Design and 3d print a bespoke fixture to facilitate accurate location for the precision machining process.



JIGS AND FIXTURES AT THE 3M BIC

Precision alignment welding jig



Brief To create multi-point alignment and precision orientation for a welding/ fabrication process.



Challenge A multi-piece fabrication process has inefficient set-up time and cost and requires a fixture or jig to enable repeatable precision location and alignment prior to welding process.



Outcome Using cad design development and 3d printing, a bespoke jig was created to enable the operator to set up a complex precision location and alignment for a contact point prior to the fabrication procedure. This resulted in increased productivity, reduced costs and improved lead times.



JIGS AND FIXTURES AT THE 3M BIC

Gauges and guides compressor gasket



Brief To enable inspection of complex hole alignment for quality control prior to assembly.



Challenge To improve inspection time and quality control process in relation to a mass-produced component with multiple hole features.



Outcome Using cad design development and the 3d print of a bespoke go/no go gauge with multiple extrusions to house precise alignment, ensured correct dimensions and layout of each feature. This resulted in a reduction in inspection time and increased productivity. Utilising am materials for the gauge led to cost savings in relation to a traditional material, which would have required solid block machining.



3M BUCKLEY INNOVATION CENTRE

At the 3M BIC, we understand that every business has bespoke challenges, constraints and requirements related to the specifics of their industry. Our aim is to enable, support and provide individual solutions to meet these challenges.

Contact us today for a FREE consultation to find out more about how we can support your design and development of jigs and fixtures at the 3M BIC and how our team can help.



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 3M Buckley Innovation Centre

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Inspiring global professionals

 **Kirklees**
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