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**Embellishing, engraving materials using laser technology to create innovative surfaces for recycled and sustainable materials.**

**Helen Ann Howells**

**September 2015**



# Embellishing, engraving materials using laser technology to create innovative surfaces for recycled and sustainable materials.

Referenced photographs submitted to the University of Huddersfield in partial fulfilment of the requirements for the degree of Masters of Research.

Helen Ann Howells

September 2015









**Figure 1**

**Myers, Daniel**

**(2013)**

***Mixed plastic and acrylic laser etched.***

Recycled mixed plastics bought chipped from Gumpys Manchester.

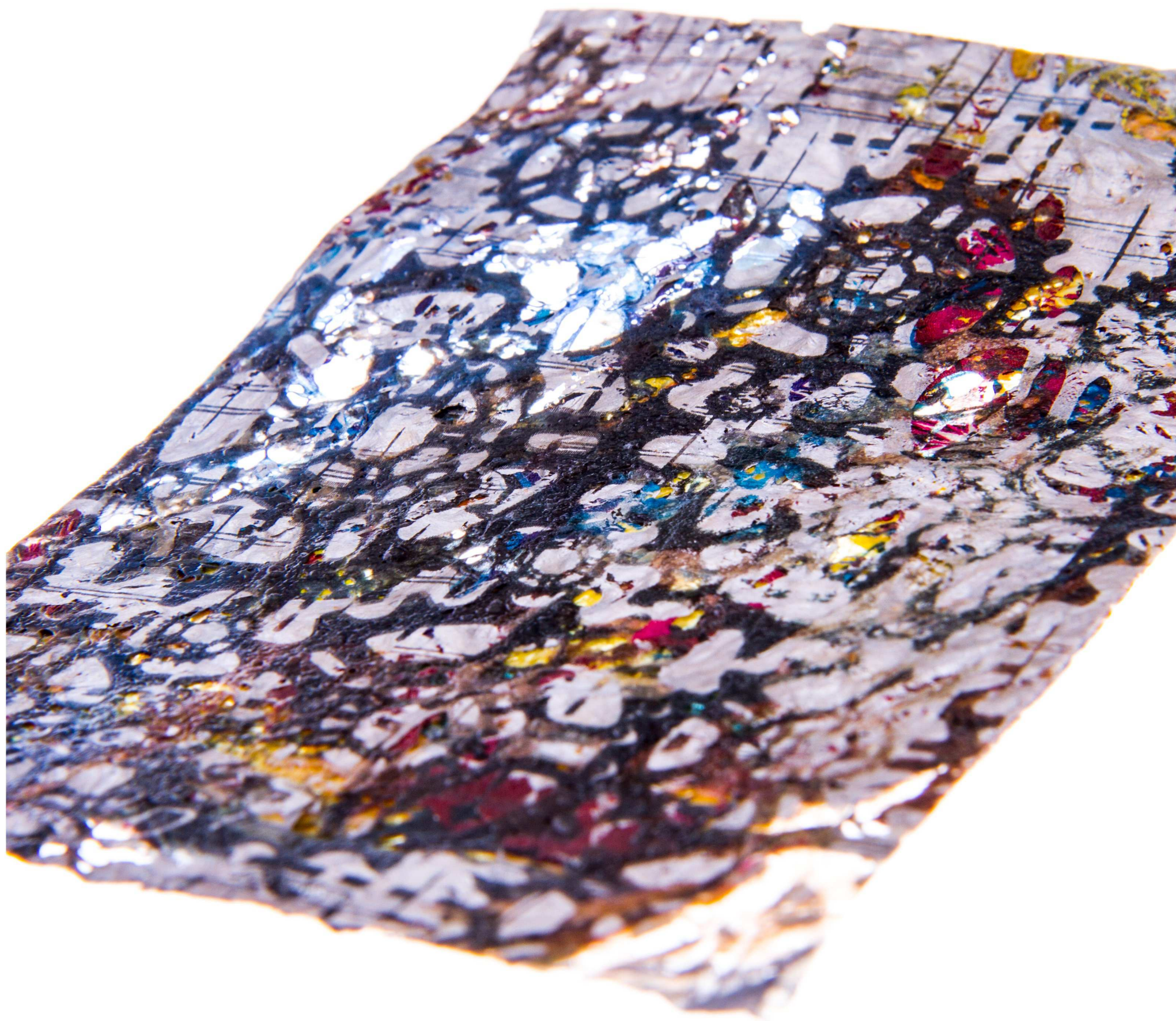
PP (Polypropylene) and HDPE (High density polypropylene).

Sandwiched between two Food grade fibreglas Teflon sheets. Cooked (melted) in a sandwich toaster at 180 degrees for approximately 20 minutes.

Acrylic trapped and melted with plastic into a thick tile.

Laser engraved design added to surface area. Cut on bandsaw.









**Figure 2**

**Myers, Daniel**

**(2013)**

***Multi layered crisp packet cut and etched.***

Sandwiched between two Food grade fiberglass Teflon sheets. Ironed plastic (PP- Polypropylene) and aluminium crisp packets at heat setting 204 °C (400 °F).

Laser engraved with 'Cogs' design. Cropped to image size using laser.







### **Figure 3**

**Myers, Daniel**

**(2013)**

***Knitted, etched and cut media tape.***

Manual knitted video plastic tape (Mylar) with size five (metric 5.5) needles in a basic stockinette stitch.

Ironed material structure at heat setting 204 °C (400 °F). Material was sandwiched between two sheets of cooker liners made from food grade fiberglass Teflon.









**Figure 4**

**Myers, Daniel**

**(2013)**

***Multi--media laser etched plastic.***

Sandwiched between two Food grade fiberglass Teflon sheets. Ironed at 190 °C (375 °F)

Layered materials of plastics and card. PP (polypropylene), Aluminium crisp packets and recycled card. PVA glue used raw to bond materials together.

Laser etched over uneven surface with 'Cog' design.









**Figure 5**

**Howells,Helen**

**(2015)**

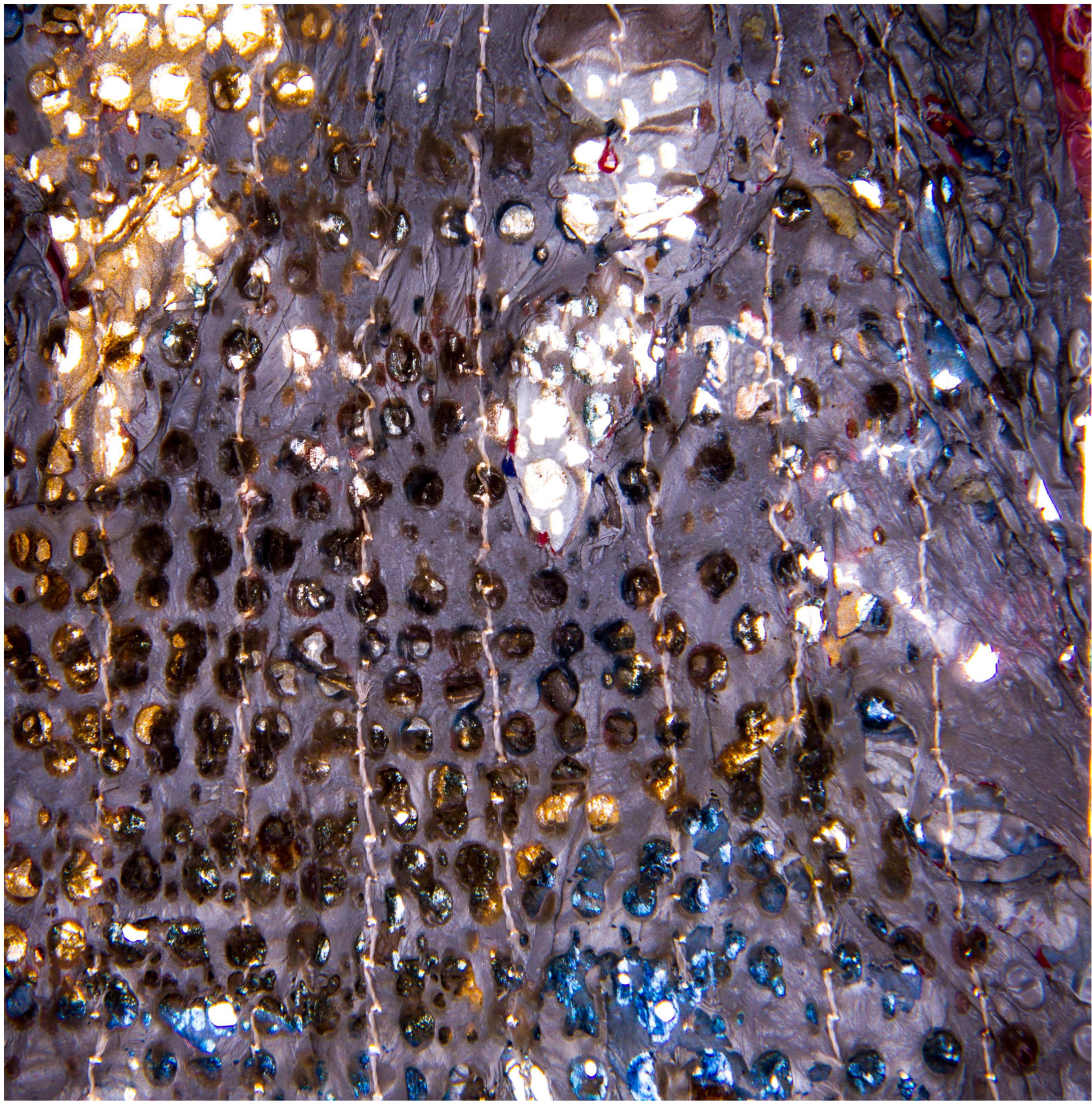
***Textured ,etched, recycled and remoulded plastic.***

Remoulded plastic packaging PET (Polyethylene Terephthalate) into a thin textured material.

Sandwiched between two Food grade fiberglas Teflon sheets. Ironed at 190 °C (375 °F)

Laser etched with 'Cog' design. Laser cropped to dimentions of image.









**Figure 6**

**Myers, Daniel**

**(2013)**

***Stitched, etched, melted, remoulded and cut plastic.***

Sandwiched between two Food grade fiberglass Teflon sheets. Ironed at 190 °C (375 °F)

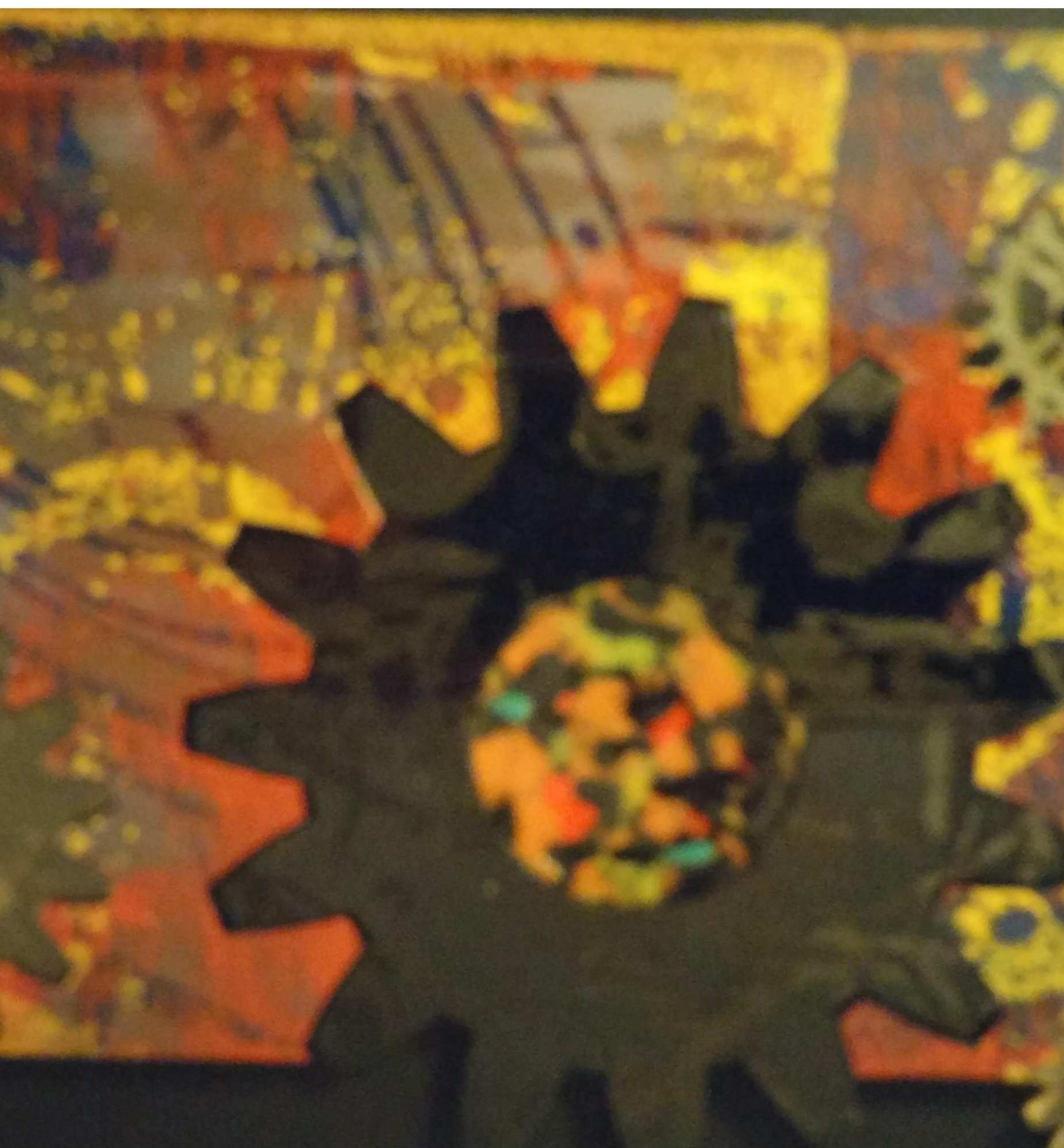
Layered PP (polypropylene), aluminium crisp packets with machine stitch to embellish surface.

Laser etched over stitch and material with simple 'Dots' design. Trimmed to image dimensions with laser cut.









**Figure 7**

**Howells, Helen**

**(2015)**

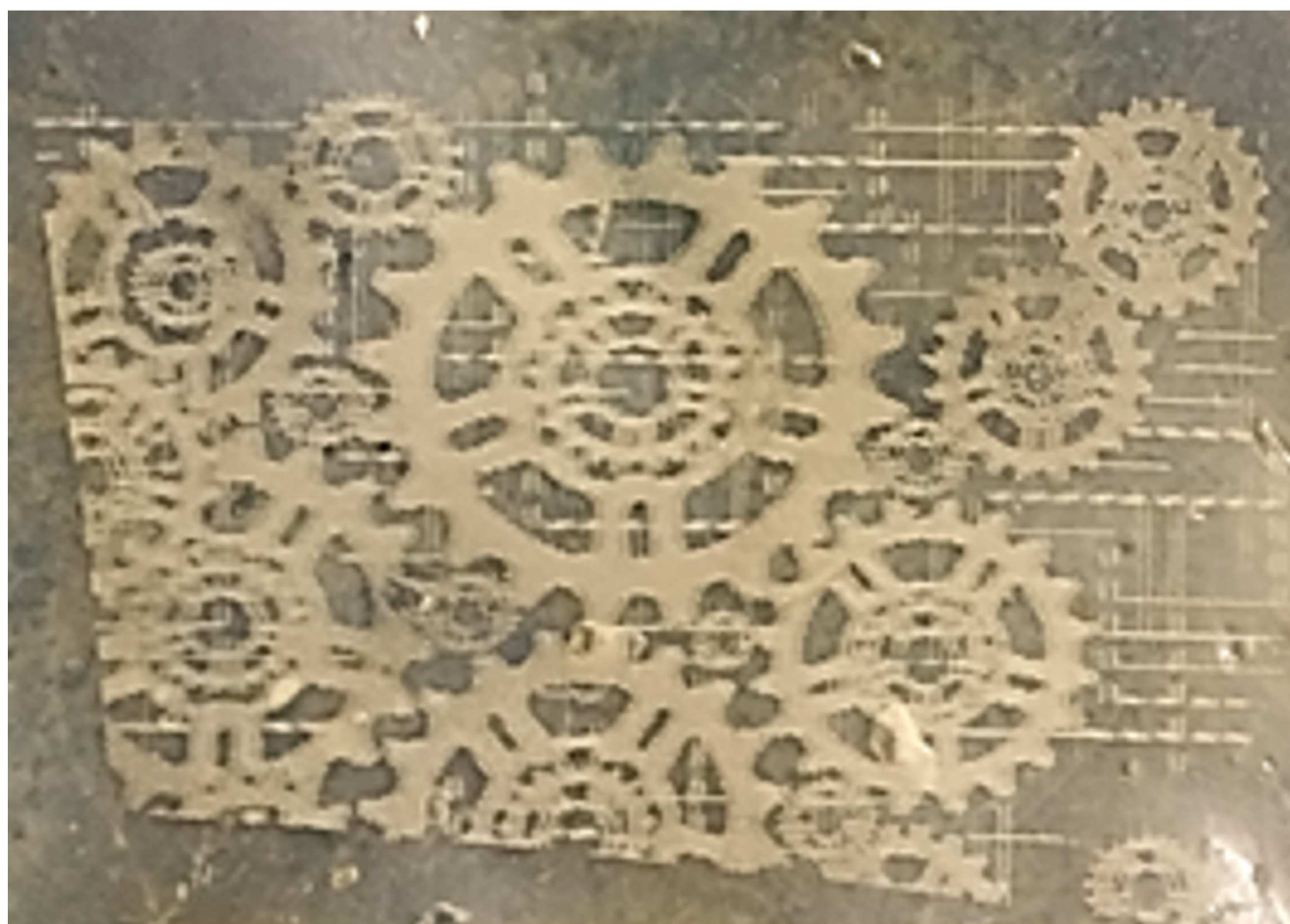
***Acrylic etched and blockprinted***

Laser cut 'Cog' shapes out of acrylic from waste material bin. Assembled materials and used plastic adhesive to bond separate components together.

Laser etched 'Time pieces' design over large areas of acrylic. Etched 'Cog' design over smaller components.

Block Printed over large sections with blue foam that had been laser etched with 'Time pieces'.

Small cogs laser etched with cogs and cut. Large cogs laser engraved with 'Time piece' design and cut out of acrylic materials.



**Figure 8**

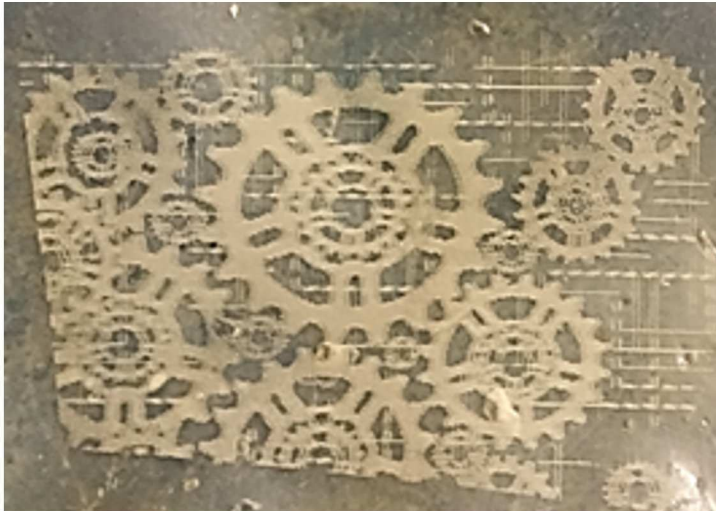
**Howells, Helen**

**(2015)**

***Bio-pastic laser etched.***

Starch bio-plastic made with hob method.

Laser etched design of 'Cogs' added to the uneven translucent surface.









**Figure 9**

**Howells, Helen**

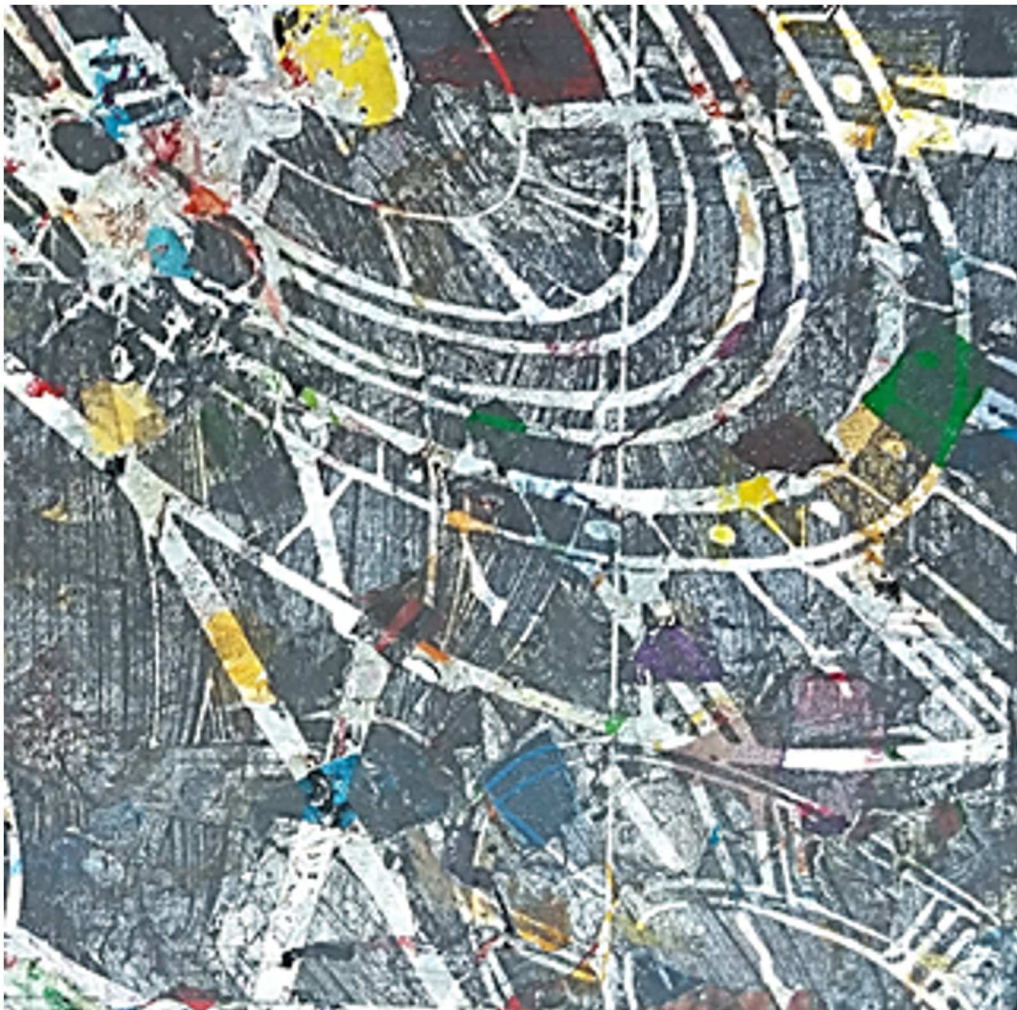
**(2015)**

***Tile remoulded plastic, etched and cut with trapped colours.***

Oven method used with press to re-mould at 204 °C (400 °F). Process made Plastics into thin, new recycled flat sheet.

Thermark chemical compound painted onto the surface and laser etched with 'Time piece' design.

Laser cut to dimensions of the design.









**Figure 10**

**Howells,Helen**

**(2015)**

***Anchor remoulded plastic dangling earring***

Oven melting method used to remould PP (polypropylene), aluminium crisp bags into a thin flat material.

Laser cut shape of Anchor using Ezcad software.











**Figure 11**

**Howells, Helen**

**(2015)**

***Masking bubble wrap.***

Ironed polyethylene resin bubble wrap at 148 °C (300 °F) sandwiched between greaseproof paper. Paper masking tape applied to the surface.

Laser etched design of timepieces added and cut to dimensions of design.

Layer of varnish added to seal plus add hues to the paper masking tape design on the surface of the bubble wrap.









**Figure 12**

**Myers, Daniel**

**(2013)**

***Cooked textured plastic with laser engraving.***

Ironed between two greaseproof sheets at 148 °C (300 °F). PET (Polyethylene Terephthalate) melted into a thin textured material.

Laser engraved 'Dots' design over surface.









**Figure 13**

**Howells,Helen**

**(2015)**

***Acrylic cut and etched 3d layering.***

Acrylic sourced from material recycling bin.

Laser cut cog shapes in various colours.

Small Engraved cogs with 'Time piece ' design. Main cogs cut with no engraving added.

Layered and bonded together with plastic adhesive.









**Figure 14**

**Howells,Helen**

**(2015)**

***3D Moulded plastics.***

HDPE moulded plastic into a hollow cylinder from milk bottles using two cylinders and oven method.

2, 3 and 4 Plastic chips moulded into 3D a rectangular prism using a hollow pipe and oven method.

PP (Polypropylene) and HDPE (High density polypropylene) in 2,3 and 4 was collected and chipped.

No laser engraving added.











