

# Heat Assisted Draining Board

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## The Design Problem

Crockery often takes painfully long to dry naturally. Sometimes it can take full days for the crockery to still be slightly damp after washing. For this reason I have chosen to design and develop a product to assist crockery in its drying process using aluminium combined with the extrusion process.

## Research

There were several subjects which were covered in my research, these were specific subjects which i felt needed to be investigated in order to obtain the necessary anthropomtrical, geometrical and functional specifications for the product. These subjects were titled as follows:

Heating Methods

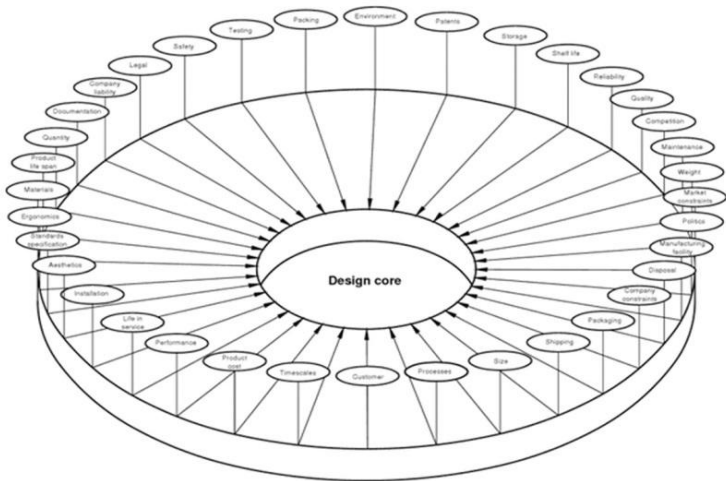
The science of drying

Existing Products

Average sizes of crockery

Extruded Shapes

Extrusion Constraints

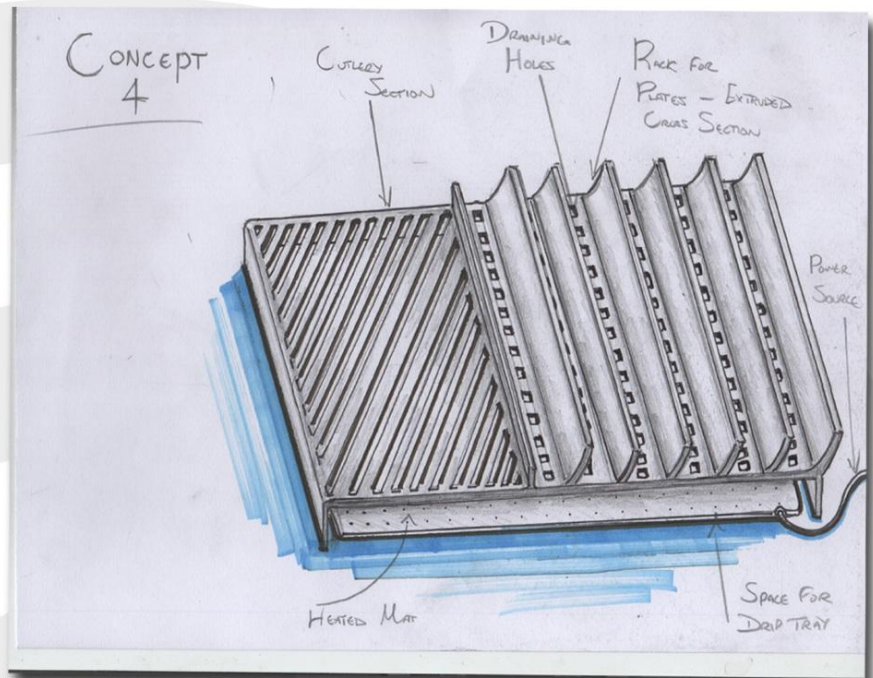
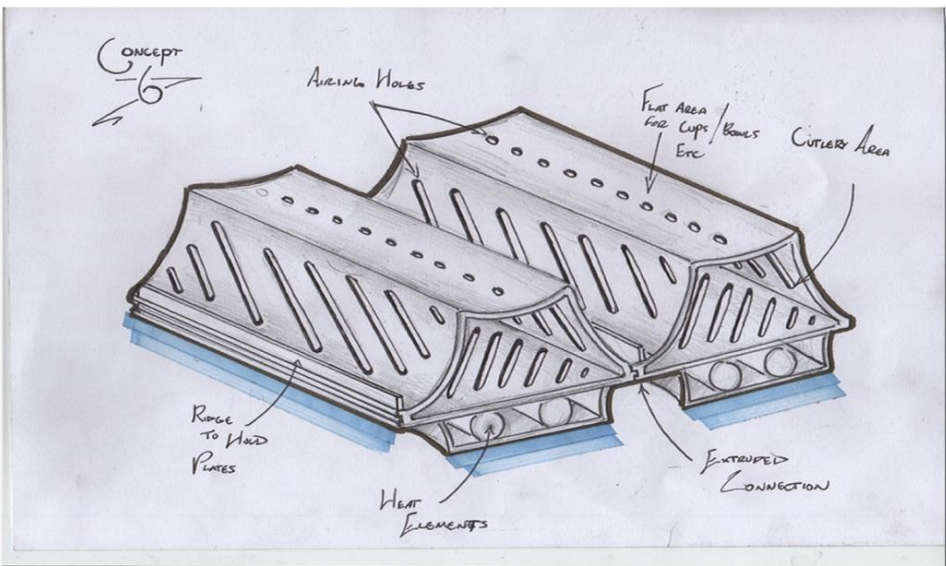
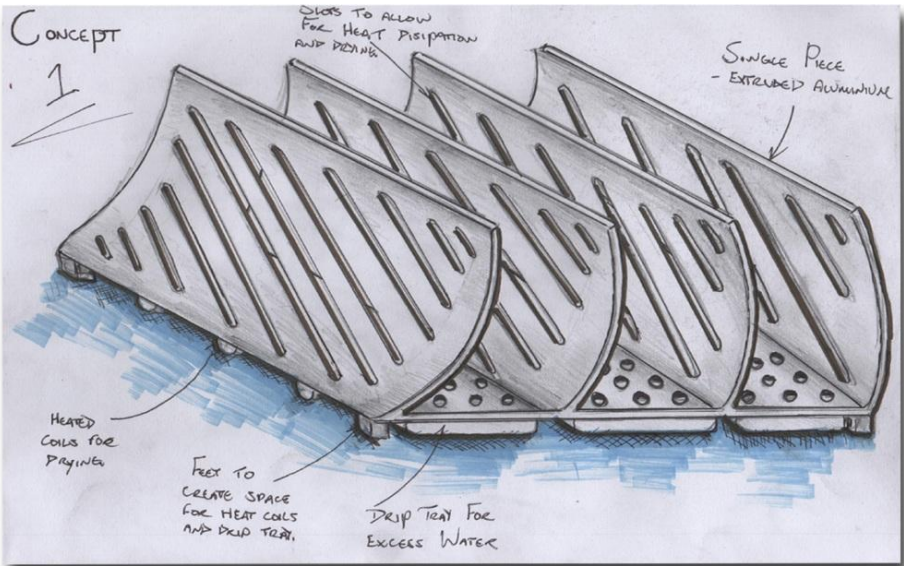


## Design Specification

Above shows the “Pugh” design specification. I took each of the categories on this diagram and used prior research to derive criterion. This built my design specification.

## Concept Generation

Below are the 3 concepts which conformed to the design specification most. These 3 concepts showed elements of flexibility and innovation whilst meeting functional requirements.



## Concept Selection

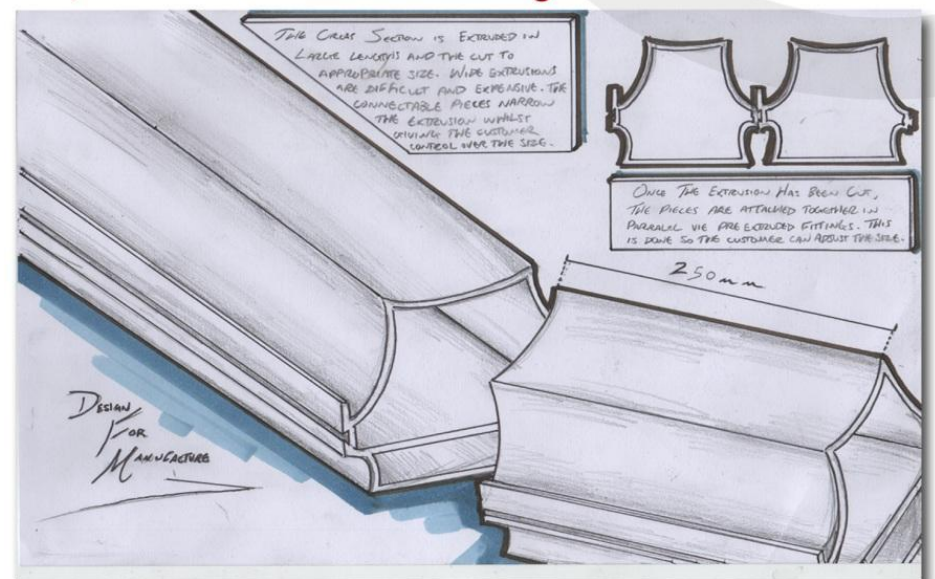
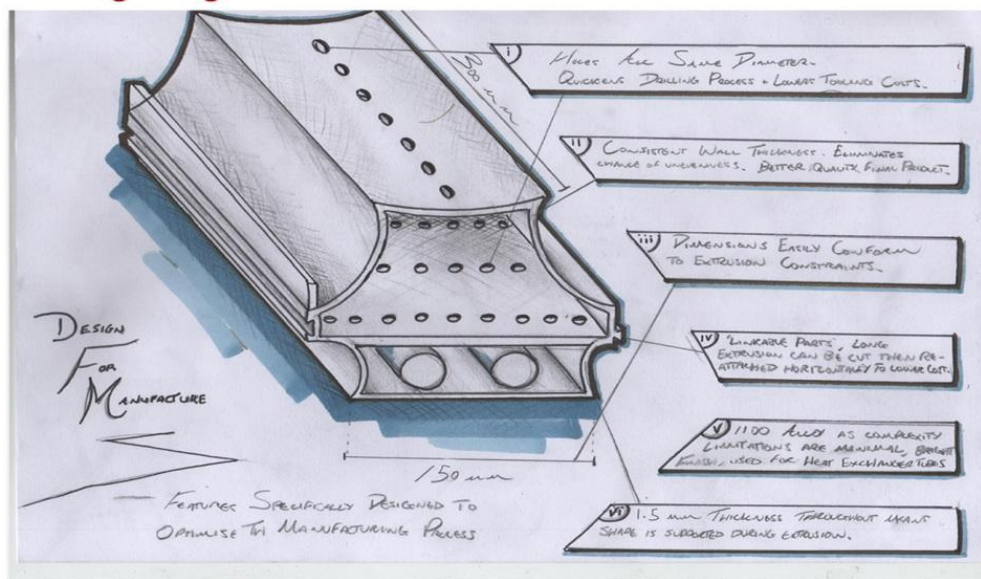
Again I opted for the “Pugh” concept selection matrix to narrow my choices. This comprises of a weighted rating system which prioritises features depending on importance.

Weighting (multiplier)	Specification Criterion	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5	Concept 6	Concept 7	Concept 8	Concept 9	Concept 10
2	Reliability	14	14	12	12	8	16	12	8	8	12
1.5	Ease of Use	10.5	10.5	10.5	10.5	9	12	10.5	9	10.5	12
1	Portability	8	7	8	8	8	8	7	8	8	7
1.5	Energy Efficiency	10.5	9	9	12	7.5	9	9	12	12	10.5
1	Time Scale	7	7	7	8	7	7	8	8	7	8
1.5	Maintenance	10.5	10.5	12	10.5	10.5	10.5	12	12	10.5	12
1	Quantity	8	8	9	8	8	8	8	8	7	7
1	Market/Customer	7	7	7	7	7	7	7	7	7	7
1	British Standards/Testing	7	7	7	7	7	7	7	7	7	7
1	Patents	10	10	10	10	10	10	10	10	10	10
1.5	Product Cost - To Consumers	10.5	9	12	12	12	10.5	9	10.5	7	10.5
1	Reliability	7	6	8	8	7	8	8	7	5	7
1	Installation	8	8	8	7	7	8	7	8	9	8
2	Manufacturing Processes	16	14	16	16	16	16	14	12	16	12
1	Environment	7	7	7	7	7	7	7	7	7	7
1	Competition	7	7	7	7	7	7	7	7	7	7
1	Ergonomics	8	8	8	7	6	8	8	5	5	8
1.5	Safety	9	9	10.5	12	12	12	10.5	9	9	10.5
1	Shelf Life	7	7	7	7	8	8	8	7	8	8
1	Materials	9	9	9	8	7	8	7	6	8	7
1	Aesthetics	7	6	8	7	8	8	7	5	7	8
1.5	Manufacturing Cost	10.5	9	12	12	10.5	12	10.5	7.5	10.5	7.5
1.5	Size (15 being small)	10.5	9	10.5	9	10.5	10.5	9	6	9	9
1	Weight (15 being low weight)	7	7	7	7	7	7	8	6	8	8
	Totals	216	205	221.5	219	207	224.5	210.5	192	202.5	210

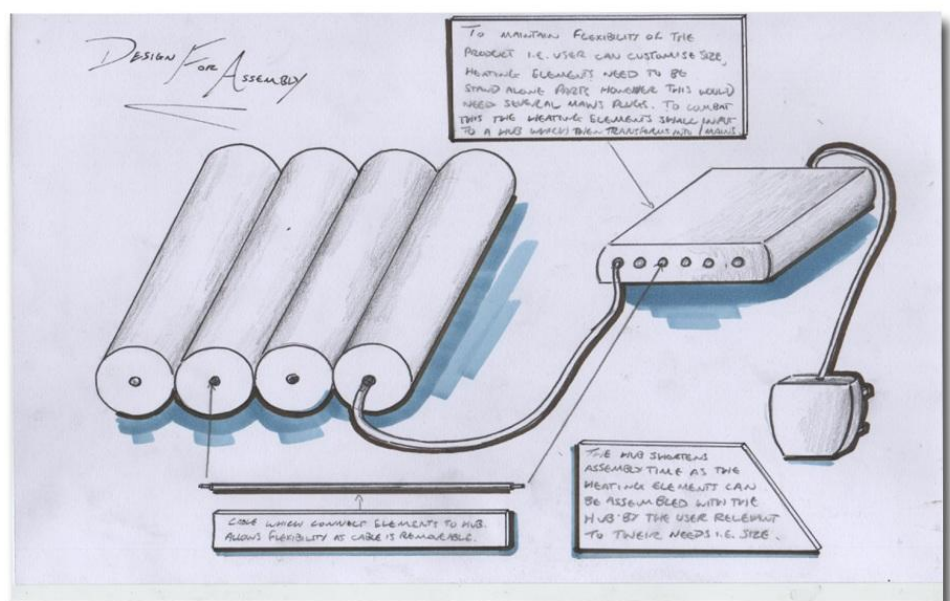
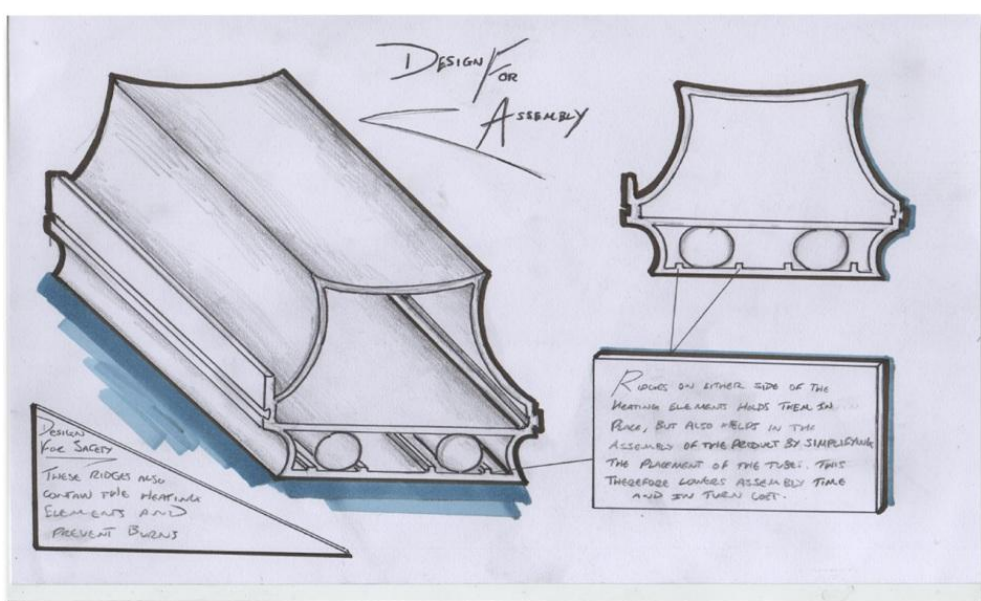


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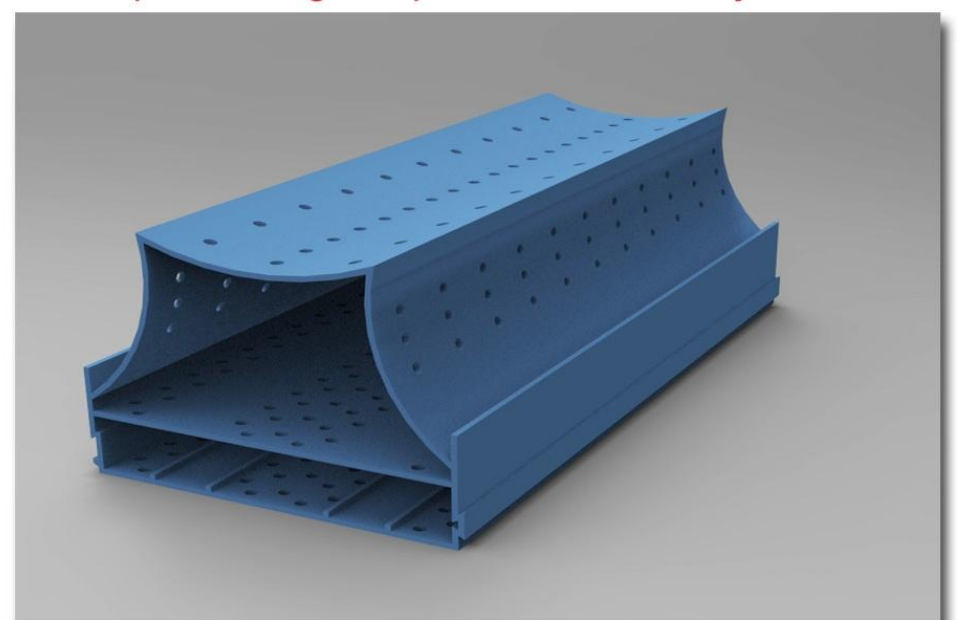
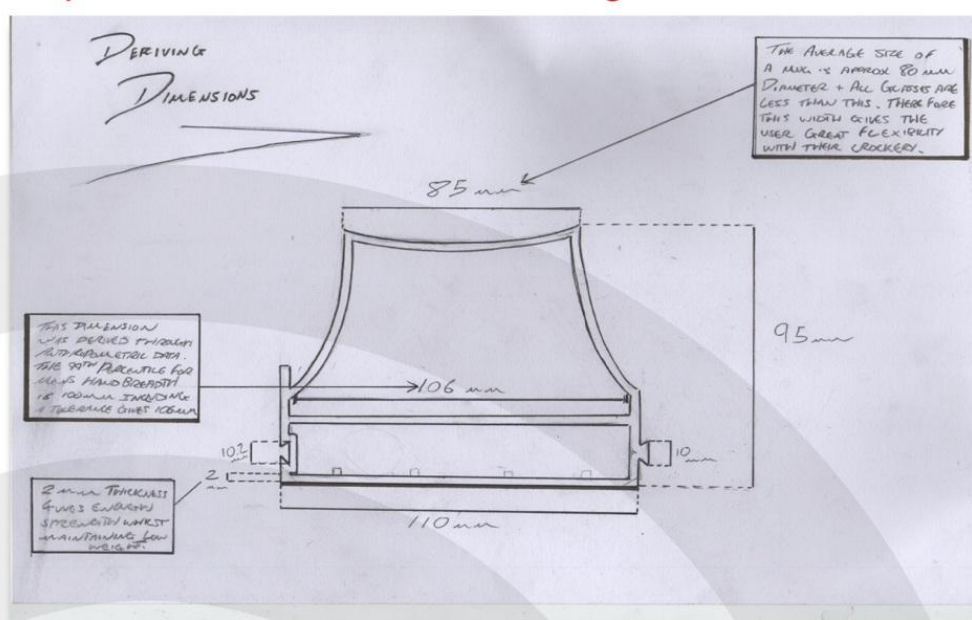
**Design for Manufacture:** This shows how I considered the manufacturing process. The left image shows features such as consistent wall thickness, to ensure successful extrusion as well as the milling process and how it shall drill the holes into the product. The right image shows how the product will be extruded in long lengths and then cut down to the correct dimension, this utilises the advantages of extrusion.



**Design for Assembly :** This shows how i considered the assembly method. Incorporating features to link electronics together and stabilise parts. This helps the user/worker assemble the product safely, quickly and accurately thus reducing cost and increasing quality.



The bottom left image shows how I derived the dimensions for the product. This was done through analysing accurate anthropometric data as well as researching average crockery sizes, whilst considering extrusions geometric limitations. The right image shows a rendered representation of the product. This helps me create detailed drawings in several views as well as presenting the product accurately.



**In summary :** The development of the product is going well and important criteria from the design specification is expected to be met. I am moving on currently with the 3D modelling of the product as well as finalising performance figures such as heating time, temperature and usability.