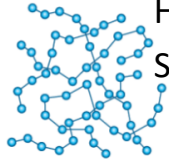


Thermoforming Examples:

Polymers

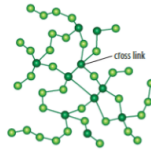
- Can be reheated and reshaped
- Can be recycled



Acrylic, PVC,
HIPS, HDPE,
Styrofoam

Thermosetting Examples:

Polymers



- CAN'T be reheated or reshaped
- CAN'T be recycled

Urea
formaldehyde,
polyester resin

1

acrylic







Tough, easily cleaned, food safe
Widely available
Easy to cut & finish
Can be shaped using heat
Self finishing

Can be scratched easily
Breaks easily if dropped

How to cut acrylic:

2

1. with these hand tools:

Coping Saw		A saw with a very narrow blade stretched across a D-shaped frame, used for cutting curves in wood
Sand-paper		A low grade abrasive material used to smooth woods and plastics
Wet and dry paper		A high grade abrasive material used to achieve a high quality finish
Vice		Used to hold work in place when sawing and filing

The adhesive you use to glue acrylic together is Tensol Cement



Life Cycle Analysis of a Carrier Bag

1. Raw materials (crude oil) is extracted from the ground with oil pumps and rigs. An oil leak can devastate local wildlife



2. Factories use energy and create pollution to make the bags



3. The carrier bag is created and transported to the shops it will be sold



5a. Reused. The person uses the bag every time they go shopping.



5d. The bag ends up in rivers and oceans. It will break down into microplastics and fish will mistake it for food.



4. In use



5b. Recycled. Taken to a factory to be washed and reprocessed into material that can be made into new products



5c. Bin and landfill. The bag will sit in landfill for 500+ years as it cannot biodegrade

2. with CAD/CAM:

Step 1: create the design on 2D Design computer software









Step 2: put the correct colour, size and thickness of acrylic on the laser cutter bed and ensure the lid is closed




Step 3: program the laser cutter for the right settings for speed and power

Step 4: turn the extraction on and run the program. You must not use the laser cutter without proper extraction because of the fumes!

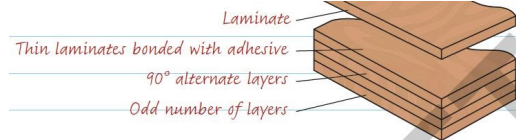
Step 5: after it has finished, take out your items



Name	What are they known for?	Why are they influential?
Alessi 	<ul style="list-style-type: none"> • Designer and mass producer of functional but visually appealing homeware and kitchen products 	<ul style="list-style-type: none"> • Uses famous designers, such as Philippe Starck, to create iconic kitchen products, such as the spider-like Juicy Salif lemon squeezer and retro kettles, setting a stand-ard for other homeware companies
Apple 	<ul style="list-style-type: none"> • Producer of consumer electronics and software using cutting-edge technologies, e.g. iPad, iWatch, iPod, iPhone, iTunes 	<ul style="list-style-type: none"> • Ground-breaking design: products looked completely different to anything before • Breaking with tradition and legacy, Apple's iPod made digital music mainstream • A loyal customer base
Heatherwick Studio 	<ul style="list-style-type: none"> • Around 200 designers, architects and makers have worked on projects from perfume bottles to Routemaster buses and Singapore University buildings. Famously designed the London 2012 Olympic Flame Cauldron 	<ul style="list-style-type: none"> • Stretches the boundaries of materials, craftsmanship and artistic thinking, showing that products and buildings can be unusual, experimental and interesting
Joe Casely-Hayford 	<ul style="list-style-type: none"> • Noted for his original but wearable designs that push barriers of conformity, made by master craftspeople using traditional English tailoring methods 	<ul style="list-style-type: none"> • Sets standards for British tailoring that combines style with character and is popular with celebrities like Lewis Hamilton and Benedict Cumberbatch
Pixar 	<ul style="list-style-type: none"> • Among the first to develop computer-animated feature films 	<ul style="list-style-type: none"> • Uses new techniques and technologies to make popular and successful films, including Toy Story and Finding Nemo
Raymond Loewy 	<ul style="list-style-type: none"> • 'The father of modern design' • Emphasised the importance of combining simplicity with functionality, working with more than 200 companies on designs ranging from refrigerators to planes, trains and spacecraft 	<ul style="list-style-type: none"> • Introduced the idea that if two products have the same price, function and quality, the products with better aesthetics will be more popular • His designs are recognisable today, including the Coca-Cola bottle, Le Creuset Coquette dish and logos for Shell and BP
Tesla, Inc. 	<ul style="list-style-type: none"> • Produces electric cars that don't compromise on power or quality, have zero emissions, are affordable and can be charged at home 	<ul style="list-style-type: none"> • Leads electric car design and technology, including the Tesla Model X SUV (2016)
Zaha Hadid 	<ul style="list-style-type: none"> • Integrated geometric forms with expressive, sweeping fluid forms • Promoted architecture as a visual art form, with buildings intended to give aesthetic pleasure 	<ul style="list-style-type: none"> • Overcame racial and gender barriers to establish an architecture practice that has designed more than 1000 iconic buildings worldwide

E.g. oak, beech ash Hard-woods E.g. mahogany		Timbers from deciduous trees that lose their leaves in winter. They produce expensive, close grained woods.
E.g. pine Soft-woods E.g. cedar		Timbers from coniferous trees that have needles and cones. They produce cheaper woods with lots of knots.
Manufac-tured Boards E.g. plywood, MDF		Boards that we make from scraps of other timbers e.g MDF, chipboard,




Plywood is made up of layers of veneers glued at 90 degrees to each other:



Manufactured boards (from recycled timbers) are better for the environment because:

- it means no new materials need to be made so less trees are being cut down meaning less deforestation.
- it stops waste timber going to landfill as it is used for other materials
- less energy is needed to manufacture
- pollution is reduced as there is less transportation and factories involved in processing

Potential advantages of recycling and reuse
Less waste material to go to landfill
Reduces the demand for new raw materials
Helps reduce global warming caused by emissions from processing raw materials
Can reduce the need for transportation and mining
Jobs can be created in the recycling industry
Money is saved as the materials are used for a second time
Potential disadvantages of recycling and reuse
The recycling process can be complex when separating materials
Not always cost efficient, as a lot of energy is needed to transport, process and reassemble recyclable materials
The recycling process may produce waste and pollutants, creating more environmental problems
Jobs created in recycling industry may be low quality
The quality of the recycled material may be inferior

Renewable energy sources
Solar Wind Hydroelectric
Tidal Biodiesel Biomass
  
Advantages: More environmentally friendly Some can be stable and a reliable source (e.g. tidal)
Disadvantages: Some can vary (wind) Can be expensive to set up Some only available in certain areas

E.g. cast iron Ferrous Metals E.g. stainless steel		Metals which contain iron and will rust and will attract a magnet
E.g. copper Non-ferrous Metals E.g. aluminium		Metals which DO NOT contain iron and will NOT rust and will NOT attract a magnet
E.g. ferrous alloy: stainless steel Alloys E.g. non-ferrous alloy: brass, bronze		Metals that are a mixture of two or more metals or elements to make a new metal with improved properties

Aluminium needs **bauxite ore** to be extracted. The extraction sites create a lot of **noise and pollution** and destroy natural **habitats**.

Smelting or electrolysis is used to get aluminium from the bauxite. This needs a lot of **electricity**. These factories are usually powered from **non-renewable** sources like coal, oil and gas which we

Stainless steel is an alloy. It is ferrous (because it contains iron) but **does not rust** because of the mixture of metals in the alloy. This means it can be washed easily and used repeatedly.

It is used for items like surgical equipment and kitchen cutlery because it is **tough** (so will not break on impact), **hard** (so cannot be scratched or dented), and it **resists wear** (so can be used for a long time).