2.

Materials and Components

2. MATERIALS AND COMPONENTS

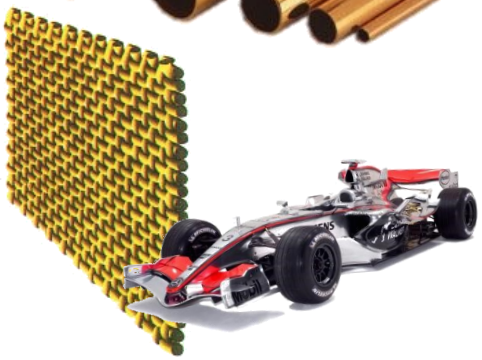
MATERIALS

NATURAL - DEFINITION

Natural material is derived from plants, animals or ore [ground]. It is possible to categorise natural materials into organic materials such as wood or fibres or inorganic materials such as stone, or ore. [metallic ore to produce metals such as copper, iron, lead and gold.

COMPOSITE—DEFINITION

When two or more materials are bonded or combined together it creates a composite material. Usually the new material has improved properties than the original materials. The main components of a composite material are the strengthening material and the bonding matrix [glue or resins]. Usually these type of materials have excellent weight to strength ratios. [Much stronger than other materials compared to the same weight]

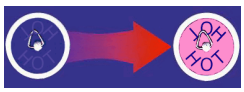


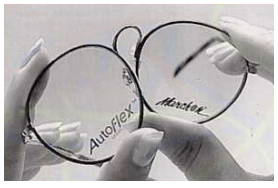
SYNTHETIC - DEFINITION

The term synthetic is used to describe materials that have been created by man via a scientific process. It is possible to mix materials or chemicals to create a new material. In some instances chemicals are mixed together to simulate or copy natural materials, the leather look for example.

SMART - DEFINITION

The term 'Smart material' is used to explain the properties of a special range of materials. Smart materials can react to its environment when introduced to outside stimuli without the interference of humans. These materials have given designers opportunities to design products that a few years ago would not be possible.





REGENERATED—DEFINITION

Materials that have been re used or processed into a different type of product such as wood waste processed into chipboard or MDF. This material would have different properties to the original material.

2. MATERIALS AND COMPONENTS

Working Properties of Materials

Different materials have different working characteristics. This is essential to the designer when selecting a specific material for a particular component that needs to perform in a certain way.

Listed are key characteristics materials will exhibit.

Conductivity

This is the ability of the material to conduct heat or electrical energy.

Strength

This is the ability of the material to withstand impact or force without deforming or breaking.

Elasticity

This is the ability of the material to bend or deform and return to its original shape.

Plasticity

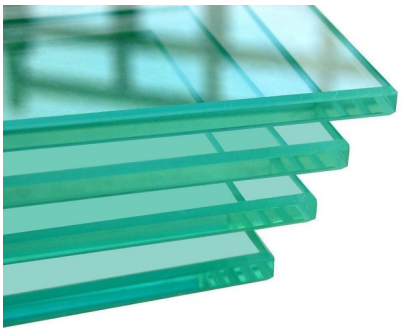
This is the ability of the material to permanently change its form or shape.

Malleability

This is the ability of the material to be deformed or bent in all directions without breaking.

Ductility

This is the ability of the material to be stretched without breaking.



Hardness

This is the ability of the material to resist scratches, indentation and withstand wear.

Toughness

This is the ability of the material to withstand sudden impact or blows without breaking.

Durability

This is the ability of the material to withstand constant wear.

NATURAL MATERIALS

Material Classification - NATURAL				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
Cotton	Absorbs sweat. Drapes well and is comfortable against the skin.	Machine-washable. Dry-cleanable. Good strength.	• T-shirts • Towels • Bed sheets • Socks	
Copper	Reddish pure metal. Non ferrous metal. Melting point of 1100°C. Good electrical conductivity. Good heat conductivity. Good resistance to corrosion.	Very malleable—can be bent and shaped over and over without breaking. Very ductile - can be stretched to a thin wire.	• Electrical wire • Saucepans • Copper water pipes	
Wool	Comes from sheep. Good thermal qualities. Good resistance to fire.	The fibres can be spun into yarns and knitted into garments.	• Jumpers • Wool Carpets	

NATURAL MATERIALS

Material Classification - NATURAL				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
Silver	Pure Metal. White lustre precious metal. Best metal for electrical and heat conductivity. Quite expensive. Tarnishes quite quickly.	Very malleable and can be shaped and bent to intricate shapes and forms.	• Jewellery • High value • Tableware • Electrical contacts • Plating of cheaper metals such as brass • Mirrors	
Silk	Natural fibre from the cocoon of the mulberry silk worm that can be woven into textiles. Natural shine and lustre with smooth texture.	Good absorbency that makes it comfortable to wear in hot climates - cooling effect. One of the strongest natural fibres but loses 20% of its strength when wet. Drapes well.	• Shirts and Blouses • Underwear • Pyjamas	
Linen	**Linen** is a textile made from the fibres of the flax plant. Valued for its exceptional coolness and freshness in hot weather.	Fibres woven into a textile. Highly absorbent and a good conductor of heat, hence comfortable to wear in hot weather.	• Underwear • Shirts • Trousers • Jackets • Blouses	

NATURAL MATERIALS

Material Classification - NATURAL				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
SOFTWOOD Red Cedar	High resistance to rotting and weather. Very expensive to buy.	Used for outside work, like furniture or sheds.	• Garden Sheds	
SOFTWOOD Scots Pine	Whitish/cream coloured wood with coarse grain pattern. Can have a lot of knots. Much cheaper than Hardwoods. Must be treated if used outside.	Quite easy to cut and shape. No good for carving because of its coarse grain pattern.	• Building Industry	

NATURAL MATERIALS

Material Clasification - NATURAL				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
HARDWOOD Ash	Excellent wood for turning on a lathe. Springy / flexible qualities .	Open-grained, tough and flexible.	• Because of its flexible qualities it's used for tool handles, hammer, spades, sledgehammers. • Turned work Bowls etc.	
HARDWOOD Oak	Very tough and durable. Good resistance to rot and damp environment.	Very hard and tough and difficult to cut and shape.	• High quality furniture interior and exterior. • Wooden flooring. • Fence posts and gates. • Because it is so hard it's very good for carving work.	
HARDWOOD Mahogany	Red / Brown in colour, with good quality grain pattern.	High quality finishes can be applied. Straight grained—easy to carve and work.	• High quality interior furniture.	
HARDWOOD Balsa	Very lightweight and soft.	Can be easily shaped and cut. Not suitable for traditional furniture.	• Model making. • Model aircraft because it so light.	
HARDWOOD Teak	Very Tough with a natural oily finish. Excellent resistance to damp environments and chemicals.	Teak has a very attractive straight grain and is resistant to moisture, fire and acid.	• Outdoor garden furniture. • Worktops for benches in laboratories.	

SYNTHETIC MATERIALS

Material Classification - SYNTHETIC *[Man made]*				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
Acrylic	Available in many colours as well as clear. Good resistance to chemicals. Scratches much easier than glass.	Can be brittle on impact but less likely to break than normal glass. Thermoplastic can be moulded and shaped with heat.	• Crash helmet **Visors** • Car Headlamp covers • Signs	
Epoxy Resin	Thermosetting polymer. Excellent electrical and heat insulation qualities.	Comes in two parts RESIN & HARDENER.	• Paint and coatings must be cured before use [Heated in a Kiln] • White powder coating on white goods [e.g. washing machines, dishwasher, fridges] • Adhesives [Araldite]	 
PTFE [Teflon] Accidentally created by Roy Plunkett in 1938	Type of Polymer made from chemicals.	Very low friction. Used as coatings on materials.	• Coating on non stick pans • Bearings or surfaces that come into contact	

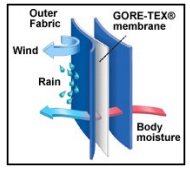
SYNTHETIC MATERIALS

Material Classification - SYNTHETIC *[Man Made]*				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
Polyamide (NYLON)	Sunlight resistance and excellent abrasion resitance.	Very tough and durable	• Bearings in machinery • Castors on portable equipment	
Cellophane	Obtained from natural cellulose wood pulp or fibre. Usually a thin clear film used for food packaging	100% Biodegradable. Can be waterproof but breathable at the same time.	• Sellotape or adhesive tapes • Food packaging • Sweet packaging • Because it is breathable	
Polypropylene	Thermoplastic polymer that is available in many colours. Very malleable, can be bent over and over without breaking. Suitable for creating natural hinges, folders or DVD cases. Very high tensile strength.	Can be moulded into shape.	• Ropes • Folders • DVD Cases • School chair body	
PVC [Polyvinyl Chloride]	Thermoplastic. Quite flexible.	Can be extruded into long profiled shapes.	• Window Frames • Guttering	

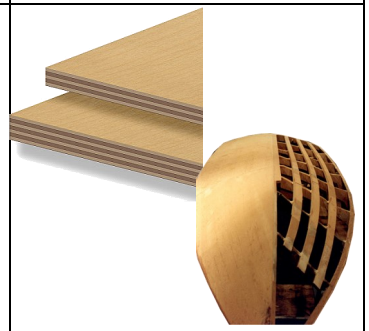
SYNTHETIC MATERIALS

Material Classification - SYNTHETIC *[Man Made]*				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
ABS	Very tough and durable Very rigid and stiff. High impact resistance. Good finish and colour range	Can be moulded into complex shapes. Can be recycled.	• Casings for Mobile phones • Casings for computers • Components for Dyson Vacuum cleaner	
Elastane [Lycra] ***[PERFORMANCE MATERIAL]***	A composite of synthetic materials devised by DuPont in 1959 to create a modern fabric that revolutionised the textiles industry. Elastane is recognised as its brand name – Lycra or Spandex. Usually it can be mixed with wool, nylon or cotton.	High Elasticity properties and is a material that can be stretched. Its possible to stretch the material up to 600% more than its original size before it will break. Very Light material. Resists absorption of sweat.	• Swimming suits [Fastskin] • Keep fit clothing • Cycling clothing	
Polyester	Made from natural occurring chemicals in plants, and is usually categorised as a Thermoplastic. Can be woven into sheets of fabrics. Can be processed and used as PET bottles [polyethylene terephthalate]. Very high tensile strength.	Less natural feel than natural fibres such as cotton. Less likely to wrinkle. Can be blended or mixed with other natural fibres such as cotton to achieve a more natural feel.	• Bed Linen • Shirts • Bottles • Curtains • Tarpaulins • Films • Safety belts	

COMPOSITE MATERIALS

Material Classification - COMPOSITE				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
Kevlar ***[PERFORMANCE MATERIAL]***	High resistance to impact. High resistance to abrasion	Made of woven fibre .	• Bullet Proof Vests • Fire Resistance clothing • Performance Tyres on bikes or racing cars • Protective motorcycle clothing	
Carbon Fibre	Made of Woven carbon fibres with Resin matrix to solidify form or shape. Higher strength to weight than steel.	Can be formed to complex forms and shapes.	• Canoe shells • Racing Car Body shells • Racing cycles	
Goretex ***[PERFORMANCE MATERIAL]***	A PTFE based polymer material that is waterproof, windproof and breathable. The material has minute pores [holes] 20,000 times smaller than water droplets so water can't penetrate the material. The pores are big enough for water vapour to escape [sweat] making the material breathable.	Waterproof - due to minute pores in the material which are much smaller than water droplets, water can't penetrate the material. Windproof – due to the layered construction, wind cannot penetrate the material. Breathable - The minute pores allow water vapour or sweat to escape through the material.	• Outdoor clothing	 

COMPOSITE MATERIALS

Material Classification - REGENERATED / COMPOSITE				
MATERIAL	**Material PROPERTIES**	**Material Characteristics**	**USES**	**Examples**
MDF Medium Density Fibreboard	Made of very fine waste wood particles bonded together under pressure with adhesive. Brown plain colour. Very heavy and dense. Smooth finish. Available in large sheets. Very stable will not warp or twist.	Can be finished and painted to a very high quality. Cannot be joined in traditional fashion. Very poor in damp or wet situations interior use only	• Carcassing of furniture—usually veneered to hide surface • Furniture • Shop displays	
Block board	Strips of wood stuck together side by side with the grain going in the same direction. Layers of veneer are stuck on top in opposite direction to give strength.	Available in large sheets. Cannot be joined in traditional ways. Can be veneered to give a high quality finish.	• Furniture	
Plywood	Layers of wood with grain of each layer at 90 degrees to previous layer. *[Laminated]* Available in large sheets. Very stable will not warp or twist. Very strong in all directions.	Cannot be joined using traditional methods. Can be veneered to give a better surface finishing. Can be bent or laminated to form shapes e.g. boat building.	• Drawer bottoms • Boat building	

REGENERATED MATERIALS

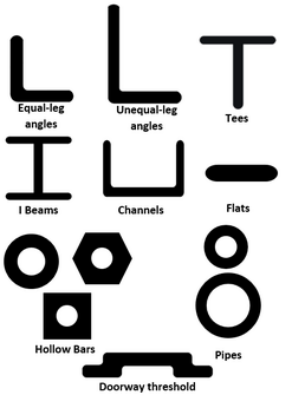
Material Classification - REGENERATED				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
Chipboard	Large particles of waste wood bonded under pressure with adhesive. Very cheap and available in large sheets.	Cannot be joined in traditional fashion. Very poor in damp or wet situations. Interior use only.	• Carcassing of cheap furniture • Usually laminated with melamin or Formica to improve appearance • Kitchen worktops	
Paper	Paper is a thin material produced by pressing together moist fibers, typically cellulose pulp derived from wood, rags or grasses, and drying them into flexible sheets. Strong in tension.	Available in differenet thicknesses [gsm] and in sizes A1, A2, A3 etc. Available in different colours	• Writing paper • Cleaning tissues • Packaging • Graphic Design • Photography	
Card	Cardboard is a generic term for a heavy-duty paper of various strengths, ranging from a simple arrangement of a single thick sheet of paper to complex configurations featuring multiple corrugated and un-corrugated layers.	Available in different thicknesses and sizes. Much stiffer and stronger than paper.	• Model making • Packaging	 

2. MATERIALS AND COMPONENTS

Stock Forms of Materials

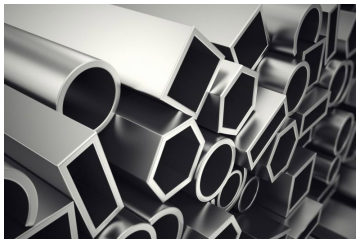
Metal

Materials are available in many different dimensions and profiles which are suitable for different applications.



Metal Stock shapes

Metals are available in sheet, flat and round bar, extruded profiles such as tube, box section, hexagonal and channels form, wire and ingots ready to be cast wire.



Wood

Natural wood is available in standard stock form in different lengths.

Manufactured boards [Bonded material] such as Plywood, MDF, Block board and chipboard are available in large sheet form e.g. - 1200mm x 2400mm suitable for large wooden panelling or large surfaces where the use of natural wood would be unsuitable or too expensive to use.

Forms of Wood

Plastics

Plastic materials are available in many different forms ready to be used or processed. Like metal and wood they are available as sheet form or as extruded profiles.

They are also in granules or powder form ready to be moulded or formed under heat.

Thermoset plastics are available in Resin and woven matting form that can be moulded into intricate shapes and forms over moulds.

Forms of Plastics

SMART MATERIALS

SMART materials are those that change in reaction to change in conditions in their surroundings or in their use when influenced by controlled factors - such as passing an electric currrent through them. Modern products increasingly use them as imaginative designers see the potential they offer. Shirts that change colour with changes in temperature and thermometers that are in the from of printed strips use thermochromic inks whilst photochromic inks respond to changes in light conditions.

Thermochromic ink on fabrics which changes colour when submitted to heat

Clothing also uses inks that have this characteristic and have patterns that change with altering light conditions.

Materials that respond to an electric current might be used as component parts of safety valves or as a part of a functional system that uses the change in shape with current to trigger some other process. These are 'shape memory alloys' (SMA).

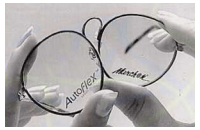
Thermoelectric materials again use electrical current but change temperature - in this way cooling or heating can take place and this effect is being used to design innovative products.

Polymers that change their shape with changes in temperature are sometimes called 'Intelligent gels' - It is only imagination that limits the products that might be created as more such materials are developed.

SMART materials have one or more properties that can be dramatically altered. Most everyday materials have physical properties, which cannot be significantly altered; for example, if oil is heated it will become a little thinner, whereas a smart material with variable viscosity may turn from a fluid which flows easily to a solid. A variety of smart materials already exists, and are being researched extensively. These include piezoelectric materials, magneto-rheostatic materials, electro-rheostatic materials, and shape memory alloys. Some everyday items are already incorporating smart materials (coffeepots, cars, the International Space Station, eyeglasses) and the number of applications for them is growing steadily. Each individual type of smart material has a different property which can be significantly altered, such as viscosity, volume, and conductivity. The property that can be altered influences what types of applications the smart material can be used for.

For some time now, scientists have been researching materials, which – equipped with sensors and controls – “behave” similarly to biological systems. Initial successes with these kinds of “smart materials” have already been achieved. As a result, materials could soon be available which repair themselves or adapt to certain environmental conditions autonomously.

SMART MATERIALS

Material Classification - SMART MATERIAL				
Material	**Material Properties**	**Material Characteristics**	**Uses**	**Examples**
SMA Shape Memory Alloy [NITINOL]	Returns to its original shape if deformed e.g. frames for memo flex glasses spring back into shape if the frames are bent or sat on accidentally.	Material remembers its original shape if deformed and will return to original state.	• Teeth Braces • Frames for Spectacles	 
Photocromic Glass	This Glass changes colour when subjected to light. Glasses that darken when in sunlight. Welding Masks that instantly darken when you weld.	The pigment in the glass will react to light and change its property and darken.	• Glass on welding masks that reacts instantly when welding • Lenses on expensive sunglasses	 
Thermochromatic Material	This material will change colour when subjected to different temperatures. For example kettles that change colour when hot. Children's spoons. Bath plugs for babies.	The change in colour happens at a determined temperature, which can be varied depending on the material.	• Smart colour pigment in plastics that react to heat	 

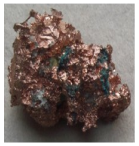
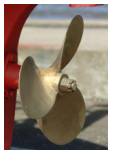
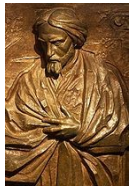
SMART MATERIALS

Material Classification - SMART MATERIAL				
Material	**Mechanical Properties**	**Material Characteristics**	**Uses**	**Examples**
Thermochromic Ink	Ink pigment that reacts to heat. This ink pigment can be used on products as indicators of heat.	Thermochromic ink in the material will change colour when material is subjected to temperature change.	• Ink on beer cans that show if the beer is cold. • Ink on eggs that change colour if egg has been boiled for long enough	 
Piezoelectric Materials	Material will deform when a small electric current is passed through it. It will also produce a small voltage when deformed.	This material can be ceramic or crystal (Quartz) based.	• Contact sensors • Alarms • Microphones and headphones	 

MATERIALS—ALLOYS

Material Classification - ALLOYS *[NON FERROUS]*

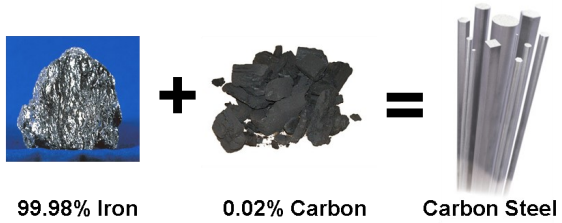
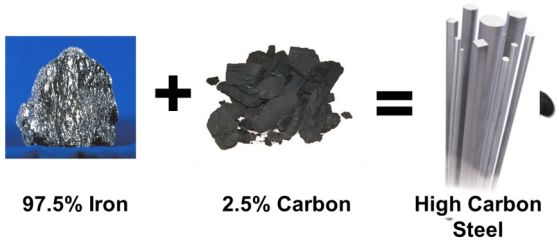
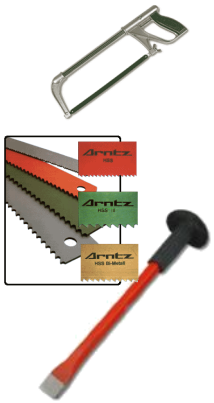
Alloys are METALS that are a mixture of components created to improve the properties of the original materials. For example STEEL is much stronger than IRON.

Material	Material Properties	Material Characteristics	Uses	Examples
DURALUMIN [Aluminium ALLOY]    94% Aluminium 4.4% Copper 1.6% Magnesium	Mix of Aluminium 94%, Copper 4.4% & Magnesium 1.6%	Much stronger and tougher than pure aluminium. Much lighter than steel. Very good resistance to corrosion. Very ductile can be drawn into a thin wire or rolled into foil.	• Saucepans • Aeroplane parts	 
BRONZE  +  =  88% Copper 12% Zinc Bronze	Used mainly for casting. Many artists use bronze to cast sculptures.	Very good resistance to corrosion. Melting point 900°C.	• Sculptures and castings. • Ship propellers • Bearings	 

MATERIALS—ALLOYS

Material Classification - ALLOYS *[FERROUS]*

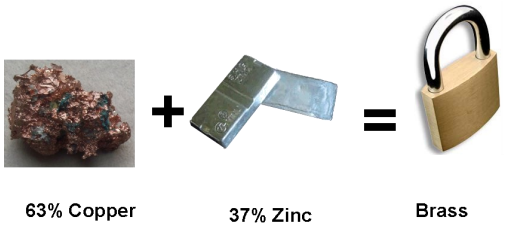
Alloys are METALS that are a mixture of components created to improve the properties of the original materials. For example STEEL is much stronger than IRON.

Material	Material Properties	Material Characteristics	Uses	Examples
LOW Carbon Mild Steel *[Ferrous Metal]*  	Most commonly used metal. Pure IRON mixed with CARBON to create Steel.	Very Tough and durable material. Can be shaped and cut with traditional tools. Will rust so must be protected in use [Paint or coating]	• Car Bodies • Nuts & Bolts • Building Industry • Nails • Frames	
High carbon steel *[Ferrous Metal]*  	Can contains up to 2.5% Carbon.	Due to the increased carbon content this steel is much harder than low carbon steel. Depending on carbon content this steel can be used to cut or shape other low carbon steel. Used for cutting tools.	• Due to higher carbon content, steel is harder so is used for cutting tools, blades, chisels etc	

MATERIALS—ALLOYS

Material Classification - ALLOYS *[NON FERROUS]*

Alloys are METALS that are a mixture of components created to improve the properties of the original materials. For example STEEL is much stronger than IRON

Material	Material Properties	Material Characteristics	Uses	Examples
Brass 	Mix of Copper and Zinc. Yellow Golden Non Ferrous metal. Very Brittle metal, will have to be heated if bent.	Very good resistance to corrosion. Excellent electrical conductor. Can be cast into complicated shapes.	• Fittings inside electrical plugs • Ornaments • Fittings on boats and ships	 
Pewter 	Alloy of Tin 90% Copper 4% Bismuth 2% and Lead 2%	Very low melting point 200°C Ideal for casting	• Cast ornaments • Jewellery • Middle ages tableware. Plates etc.	
Stainless Steel 	Much tougher than Low Carbon Steel and can be difficult to cut and bend.	Very good resistance to corrosion.	• Kitchen utensils:- • Cutlery • Saucepans • Sinks • Boat and ship fittings	

Finishing Materials

Mild Steel Brackets Plastic Coated

Most products need to be finished, **THREE** factors must be considered before carrying out the finishing product.

1. Function

What the product will do and what is it used for. For example, polishing or super finishing applications to provide low friction for bearing surfaces, raising fabrics to improve insulation properties. Polyurethane varnish on a coffee table— can place a hot cup on the table without marking.

2. Protection

Does the material or product need to be protected from its working environment, damp, heat, corrosion, dust etc. Anodising, electro-plating and stove enamelling provides protection against corrosion, fire-proof coating on fabric, wax coatings on fabric. Cars painted to avoid rusting.

Cotton Jacket with waterproof coating applied

3. Decoration/Aesthetics

Making the product look a certain way, a particular colour or texture that makes the product look good. Use of thermoplastic powder coating or painting, screen printing on fabric, painting a car blue, red or green. Different coloured iPods available.

Finishing Materials

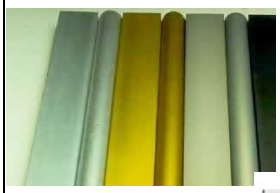
Finishing processes are important to the final quality of a product as they provide surface coatings and applications that can greatly enhance the function, protection and appearance of the product.

Car body sprayed with cellulose paint for protection and aesthetic purposes

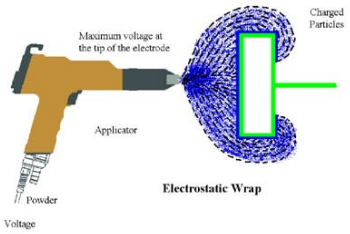
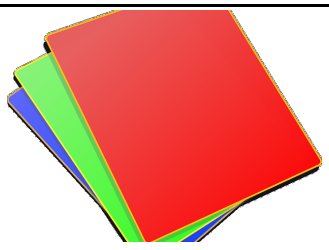
*Same product finished in different **AESTHETIC** qualities colouring etc*

Different colours will appeal to different people. [Personal Tastes]

Finishing Materials

AESTHETICS - SURFACE COATINGS	ANODISING
 	Electrical process of giving Aluminium a decorative coloured coating. Coloured coating on iPod.
PROTECTION - SURFACE COATINGS	**GALVANISING**
 	Mild steel dipped in hot molten zinc for a coating. Mild Steel Rusts when exposed to water, zinc does not. Good protection against rust and corrosion. Used for farm trailers, gates etc.
PROTECTION - SURFACE COATINGS	**VARNISH / TEAK OIL / WAX**
   	Garden bench – to protect against the weather Coffee table – Polyurethane varnish, hot cup, water resistant. Enhancing the grain makes the product look better.

Finishing Materials

PROTECTION & AESTHETICS - SURFACE COATINGS	PLASTIC COATING
 	**Plastic Coating** - Mild Steel heated and dipped in polythene powder. Gives good protection and is available in different colours so it will look good. Grips on pliers, plate racks etc.
PROTECTION & AESTHETICS - SURFACE COATINGS	**POWDER COATING**
   	**Powder Coating -** Electrically charged plastic powder that sticks to the metal. Then the metal is placed in a kiln so that the plastic coating cures and sticks to the metal.
PROTECTION & AESTHETICS - SURFACE COATINGS	**PAINT**
 	– Hammerite paint on gates Car body sprayed with cellulose based paint
SELF FINISHING MATERIALS	**SELF FINISHING**
 	No finish needs to be applied to these materials. Acrylic, stainless steel. Acrylic or Plastic based products—the colour is in the plastic pigment. Stainless steel for kitchen sinks.

2. MATERIALS AND COMPONENTS

JOINING MATERIALS

Joints can be **Permanent** or **Temporary**.

Permanent Joints

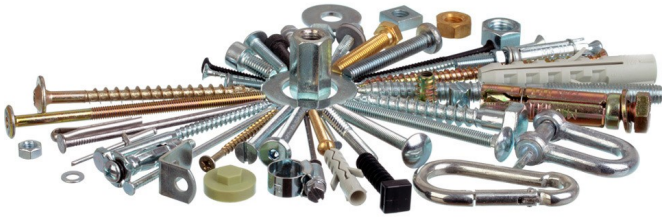
These types of joints cannot be taken apart. The following methods could be used to create such joints.

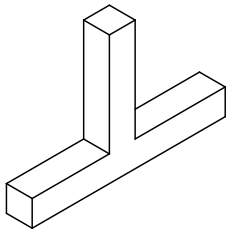
- Welding
- Soldering
- Brazing
- Adhesive [Gluing]
- Riveting

Temporary Joints

These types of joints can be taken apart, and are usually constructed using:-

- Nuts and Bolts
- Screws
- Clips
- Brackets

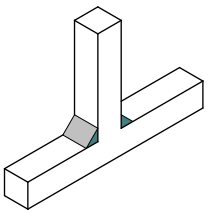


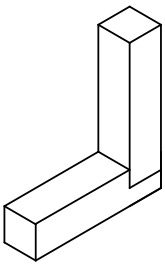


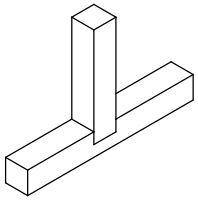
Brazing

Welding

Soldering

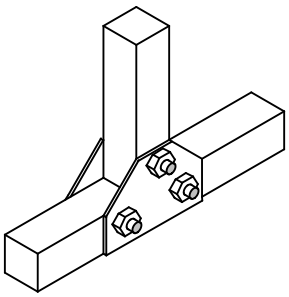




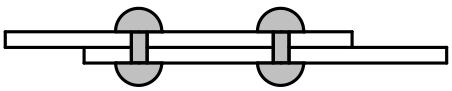


Permanent joints

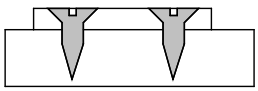
Nut & Bolt



Rivets



Screws



Nylon fitting

Temporary joints

2. MATERIALS AND COMPONENTS

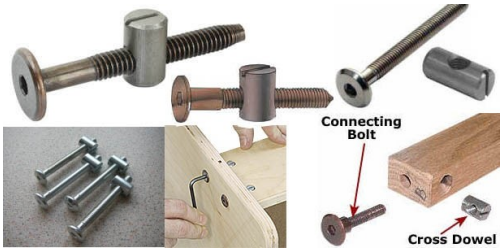
Fittings

Materials and components can be assembled or joined together using numerous types of fittings.

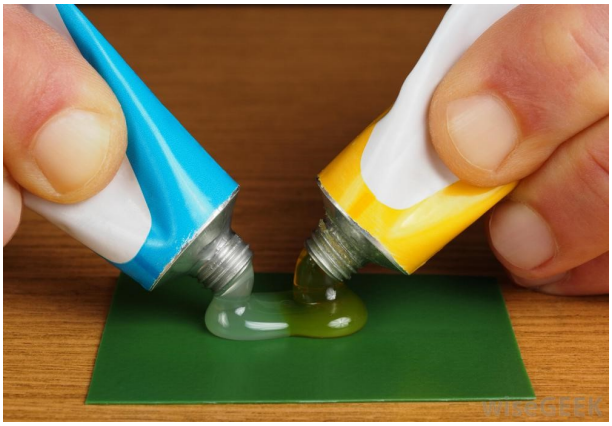
Many fittings can be disassembled so that components or parts can be replaced.

Other types of fittings can be permanent so therefore components or parts cannot be taken apart.

Both types offer designers advantages and disadvantages



Adhesives

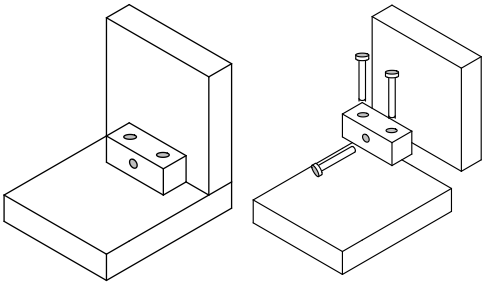


Many different types of adhesives are available on the market that are capable of joining a range of different materials.

Adhesive have different applications depending on materials that need to be joined and where the job will need to be used.

KNOCK DOWN FITTINGS

Knock-down fittings are those that can be put together easily, normally using only a screw driver, a drill, a mallet/hammer and other basic tools. They are **temporary joints** although many are used to permanently join together items such as cabinets and other pieces of furniture that are purchased in a flat pack.



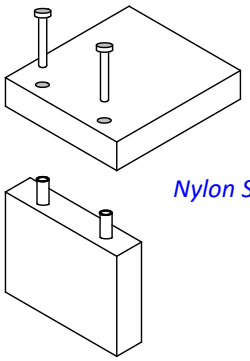
Nylon Corner Block

These have been developed for the flat pack market.

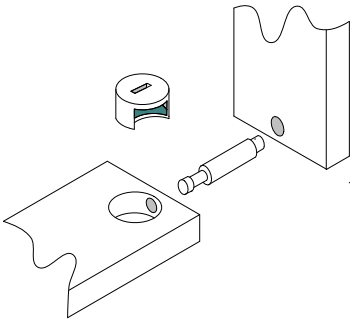
A number of stores sell furniture in flat pack form. Eg IKEA, MFI, B&Q etc.

Usually this type of furniture are made from chipboard which is either laminated with **melamine** [type of thermoset plastic, or Formica]. These are available in a number of different colours, depending on the customer tastes.

Also they are available covered in veneer, thin layer of wood, so that the furniture looks like real wood.



Nylon Screw plugs

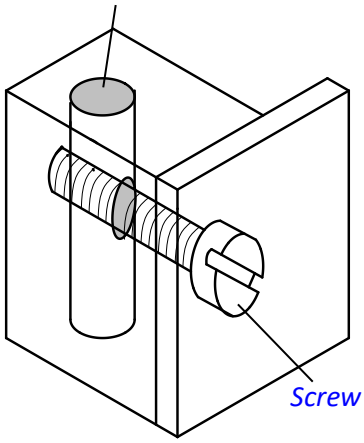


CAM action fitting

Advantages

- Furniture is much cheaper - the manufacturers don't have to pay anyone to assemble the furniture.
- Takes less space to store in the warehouse - saves money and therefore cheaper product.
- Transport costs are lower - able to carry more at one time, cheaper product to the customer.
- Customer able to take the furniture home with them straight away.

Cylinder with thread



Disadvantages

- Can be difficult to assemble - some people might struggle.
- Quality of product in some cases can be poor.