Product Description:- Angle Poise Lamp

For my material Analysis I have chosen my current desk angle poise lamp. I don't know who manufactures the lamp, or where you get it from. Although by the manufacturing techniques I believe that this is a cheap product that was designed for mass production.

Product:- Angle Poise
Cost:- £25.00 (approximate)

Intended market segment:

Application

The application of this product is for desk use, It is designed to sit on a desk and you can use the base for storage of small office items such as paper clips and pens.

Gender

I would say that this product doesn't have a set specific gender type, It has more of a general office feeling, a very utilitarian feel, as if its not meant to appeal to a gender but be seen more as a useful object. If anything the black, and racing read, and visible outer springs will make this product attract a male audience, which believes function should come first.

Age group

I would say that this lamp is aimed at a middle age / working audience. It mainly aimed at the business and the utility market, and is all about the usefulness of the lamp. So it tries' to appeal to the widest age group that would need to use a angle poise lamp.

Price

This lamp is a very low range at only £25 it offers the full functionally of the more expensive angle poise lamps, but doesn't have the same aesthetic. This lamp is really at the entry level of angle poise lamps.

Break down of materials in Angle poise lamp.

Part analysis of angle poise lamp *(not including screws and nuts etc.)*					
Part	Sub part	Amount	Material	manufacturing technique	Color
Power Cord	Cable	1		Extruded	Black
	Plug	1		Injection molded	White
Base	Top plastic	1	ABS	Injection molded	Black
	Middle (weight)	1	Cast Iron	Sand casted	*No finish,*
	Base.	1	ABS	Injection molded	Black
Lower Swivel	Swivel part / holder	2	ABS	Injection molded	Black
Lower support (bars)	102mm Springs	2	Steel	Polymer Powder Coating	Black
	Hollow square section	2	Steel	Extrusion, then Polymer Powder Coating	Black
	Plastic Nodes (for spring)	2	ABS	Injection molded	Black
Middle swivel	Swivel part / holder	2	ABS	Injection molded	Black
	Fastening nut	1	PP	Injection molded	Black / Red
	Fastening screw cover	1	ABS	Injection molded	Red
Higher Support (bars)	102mm Springs	2	Steel	Polymer Powder Coating	Black
	Hollow square section	2	ABS	Injection molded	Black
	Plastic Nodes (for spring)	2	ABS	Injection molded	Black
Higher Swivel	Swivel part / holder	2	ABS	Injection molded	Black
	Fastening nut	1	PP	Injection molded	Black / Red
	Fastening screw cover	1	PP	Injection molded	Red
	Male twist swivel	2	ABS	Injection molded	Black
Lamp head	Rear of lamp	1	PP	Injection molded	Matt Black
	Rear of lamp handle	1	PP	Injection molded	Black
	Lamp shade	1	Steel	Spinning, then Polymer Powder Coating	Gloss Black
	Holder insulter	1	Phenolics	Compression molding	Dark Grey
	Internal holder insulator	1	Phenolics	Compression molding	Off white

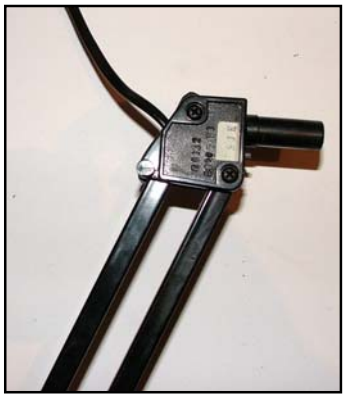
Power Cord

The plug is just a standard component, it isn't special to the lamp at all and doesn't posses any quality to the product. This leads me to think that this is a cheap product.

Base

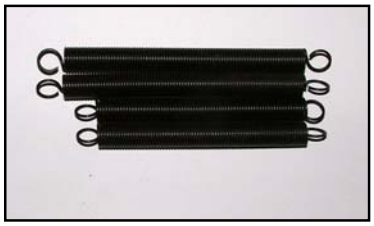
The base is made up of 3 parts, the two top comments are injection moulded ABS, the weight that makes this lamp so sturdy is a lump of Cast Iron, Although these are all cheap materials, the cast iron gives the product a weight, giving it a feeling of quality.

Lower & Middle Swivel



There are 3 of these components, they allow for the lamp to be tilted and moved to different angles as the user wants. They are a very simples injection moulded. With a couple of nuts and bolts which hold the tubular steel in place. The middle section has had a little bit of styling, and the work done on the middle holder nut that keeps the middle section together gives a mechanical look, and the red gives styling, yet tells the user not to touch as undoing the red part will mean that the product will fall apart!

Springs and Metal Tubular section.



These are key to keeping the lamp standing up in one piece, they also give them a certain feel, as the balance has been worked out just right, so it's a pleasing part of the product to change the angle, and the light will always stay in its new position.

Top of light. (Shade, top swivel, handle, bulb holder, rear of light)

Starting from the left, the rear part of the lamp is made from PP, and this is a very stripped down and functional design. Its soul purpose to to help bulk up the bulb enclosing. Although it also has a secondly purpose of a handle, as the handle that is on top of the lamp doesn't really serve a worthy purpose, and I may remove it in my new design.

The pivot component that allows the light to be tilted is the same as the other 3 on the product. At the very top there is a two part connecter that is used for side ways movement of the lamp. This component it screwed into the top.

The lamp shade is made from a spun metal sheet which has been power coated or maybe just sprayed. This just simply screws into the rear of the lamp. There is one problem with this and that is that the PP isn't heat resistant enough so it had detracted. The choice of material or fixing method will be revised in my new design.

The internal part of the lamp is pretty ugly and it consists of a thermo set plastic, within the Phenolics category, the s choice is properly purely from a function use as this component heats up quite a lot.

How Materials contribute to the product values.

ABS

Colour:- Black, I think that solid gloss and matt black used on this product really lifts it from the cheap and badly made construction. Black gives a good product image and it complements other bland office furniture.
Touch:- The areas that are made out of ABS have a strong and study touch, and at least feel durable.
Manufacturing technique used:- All of the ABS is made in a two part injection mould, It is all made to adequate clearances, and they give a feeling of quality.

Polypropylene

Colour:- In this product the polypropylene is a matt black, and a gloss white. The gloss red gives the product a visual lift, and gives you a warning where it is use on the swivel components, as if you undo these nuts the lamp will fall apart. It also gives you the message that it moves. These colours give a bit more life to the product, implying that more time has been spent on design, thus increasing its perceived product value.

The matt black that is used for the rear of the lamp head, gives an understated quality and it complements the gloss of the painted lamp shade.
Touch:- The smaller components don't really get touched so this isn't a key aspect of them, but the rear of the lampshade. Even though its not designed for it get touched a lot. The Polypropylene has a almost soft and tactile touch to it, It makes you want to play with the lamp, to me this gives the product a higher value as someone will be willing to use this lamp a lot.
Manufacturing technique used:- In the rear of the lampshade it has been made by a two part injection mould, It has a intricate back to the product that allows venting, but the design of the fins in this product give it an increased value.

Phenolics

Colour:- I don't think there was a design choice in the colour, It looks as if they are just the basic stock colour as you can hardly see these products once the product has been assembled.
Other:- The only thing that Phenolics give to this product is the reliability of the material, as it Is excellent at standing up to high temperature. The ability for this component to be so durable defiantly increases the product quality.

Steel

Colour:- The steel components have been sprayed and has a black colour. This gloss complements the rest of the product and gives it a businesses and enhances the feel of the product.

Touch:- The gloss surface of the material give it a cold and solid feel. The surface finish lifts a basic material and gives the product a better image. Increasing its product value.

Springs

The springs being on the outside of the product really lifts the product quality in my option. It gives it a very 1980s high tech office feel.

Cast Iron

The cast iron in this product isn't seen as its covered by ABS, Its weight gives that angle poise lamp the weight. This extra weight gives the ABS a feeling of quality , and I believe this adds to the whole of the product value, as a flimsily weight base would portray a flimsy image.

Re designing Angle poise lamp for my market sector of Teenage girls.

Intended market segment:

Application

This product will be reallocated to a young female audience. So the application will be used in there rooms, mainly on a dressing table, or bed side table, possibly used on a desk if the consumer has a desk. The use of the lamp will still be used for lighting up areas, such uses will be

- Reading
- Light to
    - Put on make up
    - Do hair
- Ambient lighting
- Bed time lighting
- Do homework by

Re-Design: Bedroom use, for a variety of uses.
Before: Desk use, Small office storage paperclips and pens.

Gender

The new angle poise will be targeted at young females.
Re-Design: Female (very "girly")
Before: Unspecified but very utilitarian, so male.

Age group

The market group will be 11-15, It's a very influential market group as they have just started to be in control of part of there finances. This market segment is a high buyer of "stuff", so if this lamp is attractive enough that will make a sale, although the utility of the lamp will make it appeal to a wider audience.
Re-Design: 11-15, but will appeal to parents to buy for daughters.
Before: Middle Age, people working.

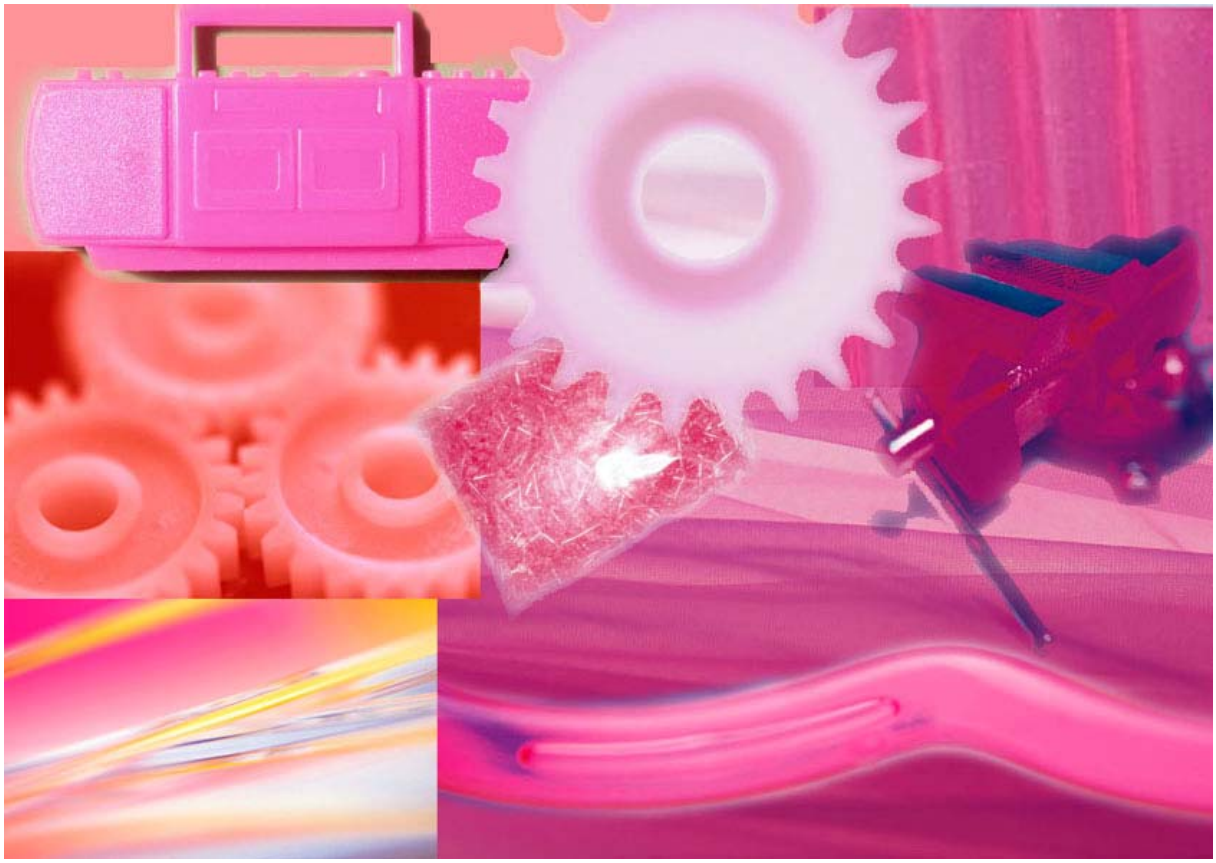
Price

After some research I have decided to set a £10 (£9.99) retail cost for the lamp. Cutting the initial product costs in half. This should make the lamp a better item for people on a impulse buying trip.
Re-Design: £9.99
Before: £25

Approach to designing new product.

User mood board.

Material mood board.



Summary of approach.

User mood board

This is used to give me a good idea of how to approach the design of the new angle poise lamp. Most of the information that I want to say is on the user board. So when I come to reallocation the materials if I make a design change I will try to make it fit in with this mood board.

Material mood board

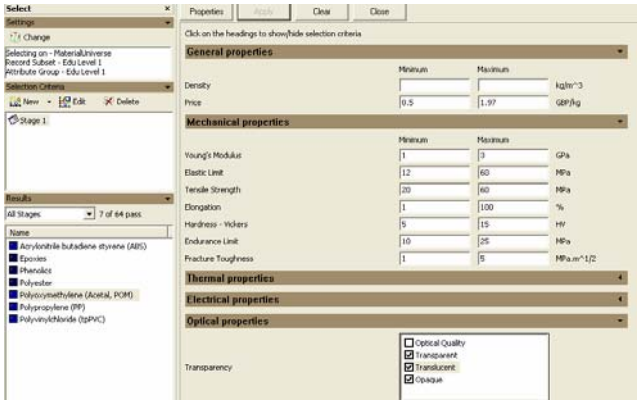
This board is a bit more descriptive although the board only gives a poetic notion of what materials I plan to use. I will now try to set some parameters of materials, which I will then use CES edupack to find and select the optimum material.

Re-specifying Material used before.

ABS (all of the fixings that hold the lamp together movement of the lamp)

I plan to replace ABS with a new material that is

- Pink
- See through / transparent aesthetic.
- Possibly cheaper
- Yet have equal physical properties.

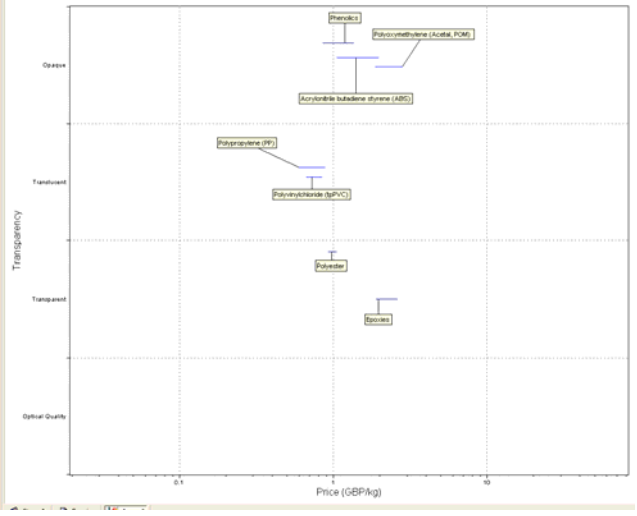


I have used CES to put in the same *Physical properties,* and same *price.*

But as I wanted this component to be *transparent* looking, so I checked all areas in optical quality's. This left me with 7 materials, So I put it into a graph to see which was the cheaper, and which one could be see through.

From this graph and looking in CES, I am going to chose Polypropylene to replace ABS. This is because of it being cheapest, and the ability for it to be transplant.

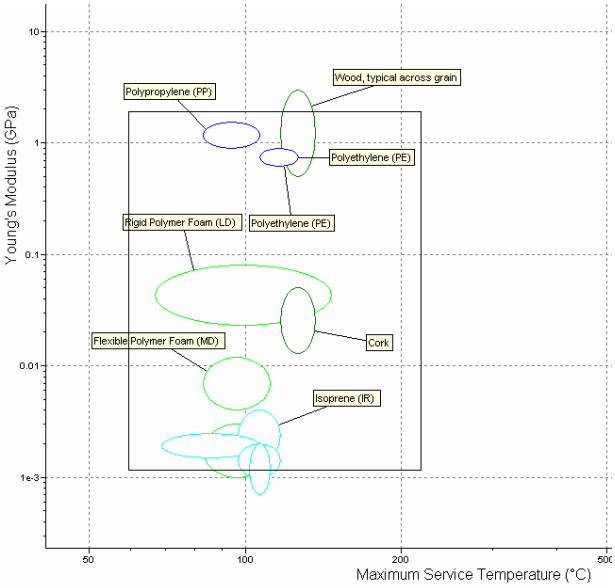
To give it its pink colour, I plan to use a mica-filled polypropylene. As this allow for the colouring of my product.



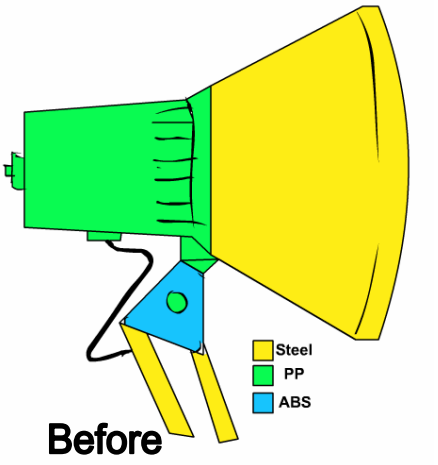
Polypropylene (Small highlight of colour, and different material for rear)

I plan to replace Polypropylene with a new material that is.

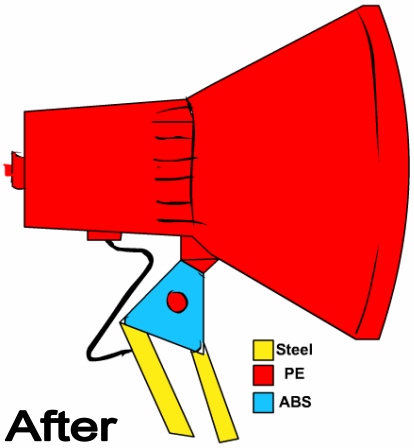
- A different colour.
- Better Heat resistance.
- Transparent
- Equal electrical and physical properties.
- (Rear of lamp, Able to take higher temperatures than the current PP)



From this graph you can see that within the requirements of price and maximum and minimum service temperature, that PED is the better material to use, as it can *be coloured,* It can also take 40 more degrees than PP, this will make a better choice of material for the rear of the lamp. PE is in a equal price range, if a little more expensive, but its worth it as it will give the product more longevity. I also propose as the join that held the steel shade to the lamp was falling apart I plan to replace this as just one component. **As seen in the images below**



This shows that I plan to make the whole of the lamp head from PE, as this will give me a good thermal properties, and the transparent will give a glow of colour.



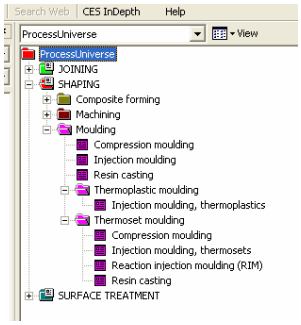
Phenolics (The internal parts that hold the light fixings)

I plan to replace Phenolics with a new material that is.

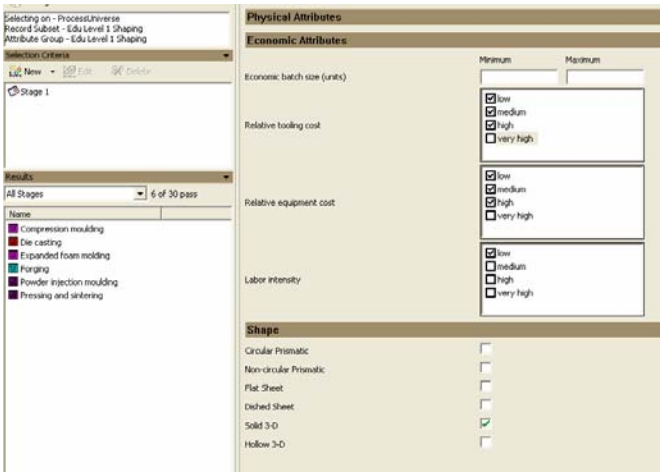
- Equal in heat, physical and electrical properties.

As this is a hidden component and running the requirements thought CES there isn't any better Phenolics, If I knew exactly what type on Phenolics group the current lamp is in I could try to specify it better.

I plan to change the way in which it is produced as currently it's a two part moulded, as currently It looks as if its injection moulded, but this has meant that they have had to make it into two components.



The lists of processes are all able to be used with Phenolics, I did a search for all of the material processes; I decided that the main area that I want to look for is a cheaper manufacturing process. The results of are in the screen shot of the limit stage below.

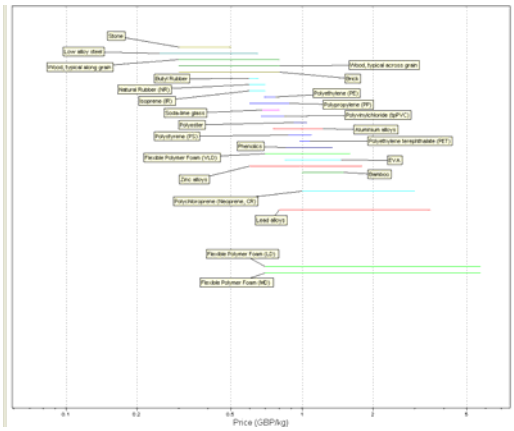


From this I have decided to use compression moulding, as this has the lowest labour intensity and thus cost. Even though it won't give a excellent surface finish this isn't a problem as this component isn't seen.

Steel (the long bars that allow movement of the lamp)

I plan to replace Steel with a new material that is.

- Cheaper
- Colourful
- Better aesthetic.
- (Lamp Shade) I plan to replace the steel lampshade with a material that will absorb temperature better, and let light out of the side, giving a more ambient than the purely direct light of the current lamp) **The lamp shade has already been assigned a new material, under the reassignment and reconsolidation of the rear of the lamp and is now made out of Polyethylene.**



The key things to note here is that Steel is one of the cheapest materials, but as a result of extrusion and power coating finish, this extends manufacturing time and cost. I will try to find a material that only has one moulding finish which once taken from the mould needs no extra finishing.

I have decided to use a thermoplastic, as these will give a good quality of finish and won't need any painting or coating to protect it.

I have decided to make it using Polymer Extrusion. This is the polymer equivalent of the current steel extrusion

I plan to use a the shape on the left as a Die, I plan to use Polypropylene, as This will streamline the amount of different materials I have this will help make my product cheaper to produce.

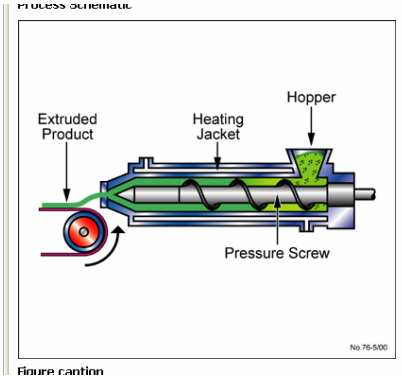


Figure caption

Springs

I plan to replace springs with a new material or component that,

- Will have equal elastic limit,
- See if there is a material that can do it in another way, with a younger aesthetic.

For this It was quite a simple process I just searched CES for “springs”, This brought me up only one plastic which was Polyoxymethylene, I picked using plastic material to make the springs match in with the rest of the product. The springs will be out sourced so I will try to find a manufacture that is currently making springs out of Polyoxymethylene to save on manufacturing costs.

Cast Iron.

To see if there is a better material for this job, but after exploring CES, Cast Iron seems the most appropriate material as it’s the cheapest for its weight. As you can see I plotted a graph to demonstrate this, The reason why it has a gradient line selection is because if the material is a lot cheaper, but less dense. It can have equal qualities to a dense but heavy material. Although as this product is going to be transparent, I am going to chose to still use cast iron, but half the amount of the current lamp, as currently there is over use of the cast iron.

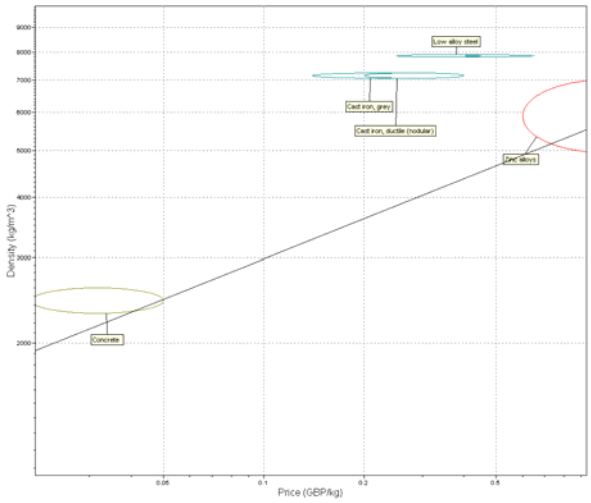


Table of new materials.

Part analysis of New angle poise lamp *(not including screws and nuts etc.)*					
Part	Sub part	Amount	Material	manufacturing technique	Color
Power Cord	Cable	1		Extruded	White
	Plug	1		Injection moulded	White
Base	Top plastic	1	PP	Injection moulded	Solid Pink
	Middle (weight)	1	Cast Iron	Casted	*No finish,*
	Base.	1	PP	Injection moulded	Solid Pink
Lower Swivel	Swivel part / holder	2	PP	Injection moulded	Transparent Pink
Lower support (bars)	102mm Springs	2	Polyoxymenthylene	(separate made component)	Pink
	Hollow square section	2	PE	Polymer Extrusion	Transparent Pink
	Plastic Nodes (for spring)	2	PP	Injection moulded	Transparent Pink
Middle swivel	Swivel part / holder	2	PP	Injection moulded	Transparent Pink
	Fastening nut	1	PE	Injection moulded	Transparent Pink
	Fastening screw cover	1	PP	Injection moulded	Red
Higher Support (bars)	102mm Springs	2	Polyoxymenthylene	Polymer Powder Coating	Pink
	Hollow square section	2	PP	Polymer Extrusion	Transparent Pink
	Plastic Nodes (for spring)	2	PP	Injection moulded	Pink
Higher Swivel	Swivel part / holder	2	PP	Injection moulded	Transparent Pink
	Fastening nut	1	PE	Injection moulded	Pink
	Fastening screw cover	1	PE	Injection moulded	Red
	Male twist swivel	2	PP	Injection moulded	Transparent Pink
Lamp head	Rear of lamp	1	PE	Injection moulded	Opaque Red
	Lamp shade		PE	(and now is one component)	
	Holder insulter	1	Phenolics	Compression molding	Grey
	Internal holder insulator			(and now is one component)	

What the new product will look like.

How the new materials give the product its new product values.

Polypropylene

Polyoxymethylene

Polyethylene

Phenolics

Cast Iron

Comparing the two products Side by Side.

Conclusion of New Product, and its material choice.