

# ASTRO LIGHTING

Graduation Design Portfolio  
Minor Project  
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2019-2020



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# **Astro Lighting**

Hotel Room lighting concept

Module: Graduation Design Portfolio  
23th September - 29th November

# Design Brief

The objective of this project is to design a suite of lighting for a hotel room. The suite of lights must consist of at least three pieces of light equipment and should carry a similar design language. This could be a selection of wall light, reading light, ceiling, table, pendant, and floor-standing lights.

In the third week of the project, a presentation will be given to people of the company, with an aim to spark a discussion about the current stage of the project, development, and concept Ideas. as well as the chance to receive feedback.

At the end of the project, all progress findings and critical reasoning must be documented and submitted in the form of a reflective journal. Along with a design piece in the form of a physical model that will closely resemble the desired final design of the product.



# Client

Astro Lighting is a relatively new company started by John Fearon and James Bassant in 1997. Established just 22 years ago the company now has well developed its name as a leading lighting design preference for clients all around the globe. Their work of expertise expands on many broad areas such as bathroom, interior, and exterior light design.



Img. 1-5





Img. 6,7

Astro's fundamental values revolve around functionality and design excellence. Minimalistic, clean and honest design language is evident in their portfolio of products. Their design seems to be highly influenced by the Bauhaus ideology, using straight lines, circles, and rectangles as a groundwork of their design, similar to the foundation course thought in the HfG's schools of design in Germany.

Looking at Astro's work one can see that functionality seems to be the key in their identity. The products are not overcomplicated most of them even being left to their bare minimum form, yet, demonstrating a simple communication of how they must be used without raising any hesitation in the buyer's or user's eyes.

Img. 8



# Competition

The light market is well packed with large companies, small and medium-sized studios, individual designers, and an enormous portion of resale brands.

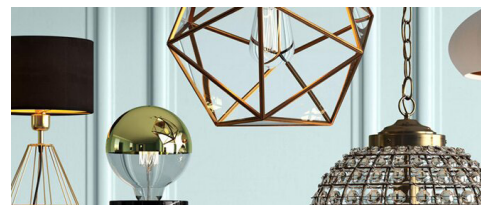
The biggest competition for brands like Astro are, of course, international giants such as IKEA. These large companies have very well developed marketing strategies targeting not only the single user market but also large purchase deals. We see more and more often practical sets of lights and furniture being ordered by hotels, public institutions, and private businesses from a single supplier such as IKEA. Because, this makes is very convenient for the purchasing institution, of dealing with one supplier they can rely on, while it also delivers quality on the more competitive prices.



Img. 9 IKEA Lighting



Img. 10 RONA lighting



Img. 11 Wayfair Lighting



Img. 12 B&Q Lighting



Img. 13 Menards Lighting

# Differences in Hotel Rooms

The differences in hotel rooms are mostly determined by one factor - purpose of the stay. Whether that is a vacation, business, travel or relaxation purpose this factor will determine the room's location, size, price range, and service.

**Boutique** - usually with a small room number, with exceptional details to the interior design making a unique and memorable stay. It can be classified as a mid-range option, however, with boutique hotels price range can fluctuate dramatically.

**Business** hotels tend to be located in a close distance to airports, stations, and large infrastructural connections. Or in the business district of the urban environment. They are generally used for an overnight sleepover.

**Spa** - Focusing on the guest's health and experience. They can be classified as luxury hotels, due to their exceptional service, location, and individual care. Because of that, they can also be quite pricy.

**Resort**- Designed for guests on a vacation for a short to medium length of stay. Mostly picked as a family option hotel. Also providing great seminaries and activities such as beaches, ski resorts, water sports, etc.

**Capsule** - Capsule hotels are becoming an extremely popular choice because of their convenience for day travelers, especially in big urban areas such as Tokyo. Although, they are a budget alternative the space and design of each capsule is very well considered to accommodate the essential needs of a traveler.



Img. 14 Butique- Hotel Norge, Bergen Norway



Img. 15 Buissness- Hilton Hotel, Stockholm



Img. 16 Spa-Hotel Bocage, Huahin Thailand



Img. 17 Resort- Four Seasons, French Alps



Img. 18 Capsule-InboxHotel St Peterburg Russia



Img. 19 Capsule-InboxHotel St Peterburg Russia



# Understanding Light

Light creates atmosphere and directly influences one's mood and can adequately dictate the image of the surroundings. It also affects people's perception of colour, texture, and feel. In a well-lit environment, people tend to be more open, comfortable and generally happier and this is due to the fact that in humans' history light has been a symbol of safety and security and substantially as it is one of the things we need to survive.

I believe, the positioning of a light setup should be driven by two essential aspects. First, by the involvement of the users and their intentions in a particular space, whether that is a working area, a kitchen, or relaxation premises. Second, the light setup should follow the design language of the living space, as light serves as a tool to create a meaningful accent or having one's attention drawn away. Therefore, creating an optical illusion of the space by enhancing its appearance.

Img. 20-22







Img. 23-27 Accent Lighting



## Factors to be considered

An extremely crucial factor is determining the room's facing direction. As north and south-facing room would demand a completely different level of limitation as well as colour range.

Another major consideration is the location of the hotel. For instance, on the same day of the year, the daylight colour in the UK is much "colder" in the electromagnetic spectrum compared to the sunlight colour in Southern Italy which falls more in the "warmer" side of the spectrum. Therefore, once the location is defined, a specific set of colour intense lighting should be considered and applied.

The room size will determine the level of intensity of light in the room as respectively, a bigger room would require more light in order to be lit-up and fill the living space with light accordingly.

Windows position and size of the windows, on the other hand, will determine the amount of light passing in the premisses.



My room in Sheffield is facing a building build-out of yellow limestone. I noticed while laying in my bed when the sunlight is being reflected by the building the lumination I get in my room becomes much warmer than the tone of the actual sunlight with richer tones of orange and yellow. However, during the late hours of the day, my room gets direct sunlight due too the sun's cycle, this time, the lumination of my room is in the cold spectrum, as the sunlight in the north part of the globe has a distinctive cold-greyish appearance for the most time of the year.

A good example of how the colour temperature can be affected and possibly controlled by exterior bodies is the city of Bath. With its well-known Bath Stone made of oolitic limestone with which most of the old buildings in the city centre were constructed. This local limestone has a warm honey colouring nuance and because of that, the reflection of the light bouncing from the walls of the buildings gives the city a much warmer degree of lumination than most towns in England. In fact, because of that visual illusion, one can get Bath mistaken with a city in central France rather than England.

For comparison I have put a picture of the central street passages of Sothapmthon and Bath during a relatively similar period of the year.



Img. 28 Bath, Southwest England



Img. 29 Southampton, Southeast England

# User's Viewpoint

Looking from the eyes of the user is a vital construction segment for the design process of every designer.

There are few things a user expects in a product in order to be satisfied, and these things can be very easily identified by putting oneself in the user's shoes in the desired situation. Nonetheless, executing that correctly is the challenge and that's where a good designer can make a significant difference.

Considering the environment stated early in the brief of a hotel room I can assume the primary focus should be aiming to create **purposeful lighting** in the room. Another way to describe a "purposeful lighting" would be: creating a thoughtful set of lighting which serves its purpose rather than creating an aesthetical piece of work that might look great but not be able to serve its function.

In a hotel environment, people's inability to understand and operate the set lighting might be the biggest problem a designer could face, which leads to confusion and dissatisfaction in the user's perception of the product. Even further, they could also harm themselves in the process of trying to operate with the product. In an ideal scenario, the user would never need to interact with the lights in the room and will only either leave them on or off. Unfortunately, in most cases, this isn't possible and in such cases, I believe the designer should aim to design a product with **minimal user interaction**.

Considering user interaction is inevitable, the design language of the product must have elements that ensure an **easy communication** of the products' application to the user. That way, when the user is about to interact with the product for the first time these elements will guide him efficiently which will ultimately improve the user's experience. For instance, that could be arrows on a flat surface of the product displaying where the user can increase or decrease the light intensity.



Img. 30 **North facing** room "Guarda Golf Hotel" Switzerland



Img. 31 **South facing** room "Grand Hotel Royal Sorrento" Italy

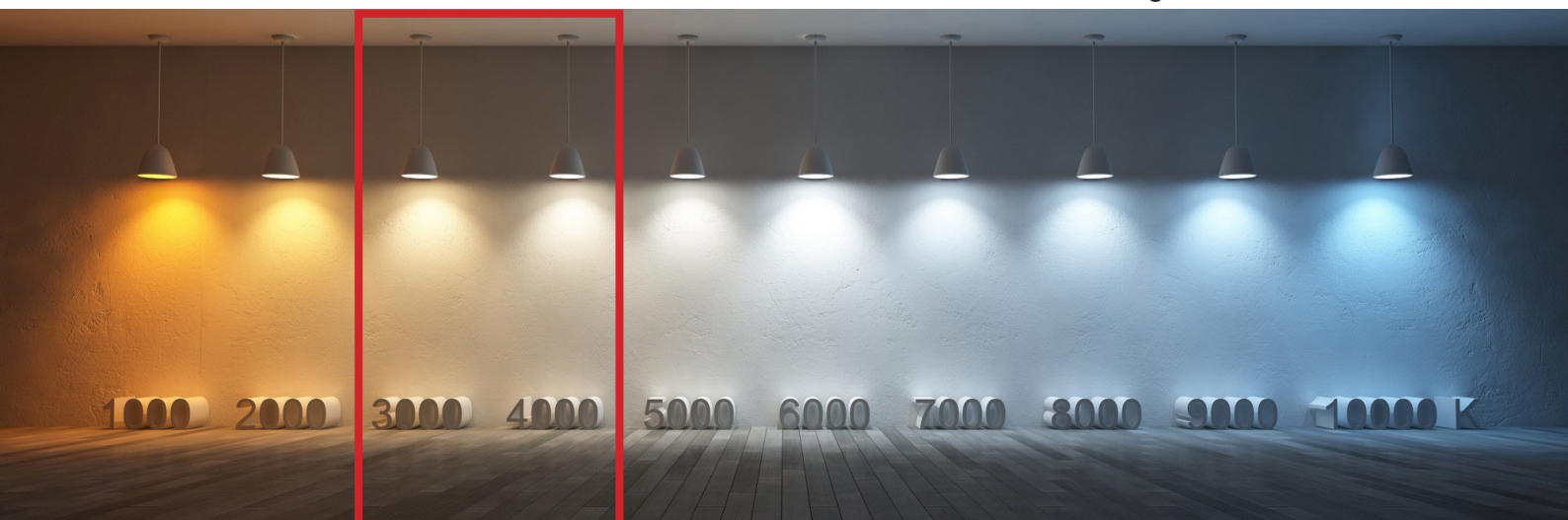


## Room's Location and Arrangement

For the location of the room, I have decided to be in Southern/ Central England, which tends to have light wavelengths with lower frequencies. That means the colour temperature in this part of the Globe tends to be in the cold spectrum and can be classified as “cool” or “natural”.

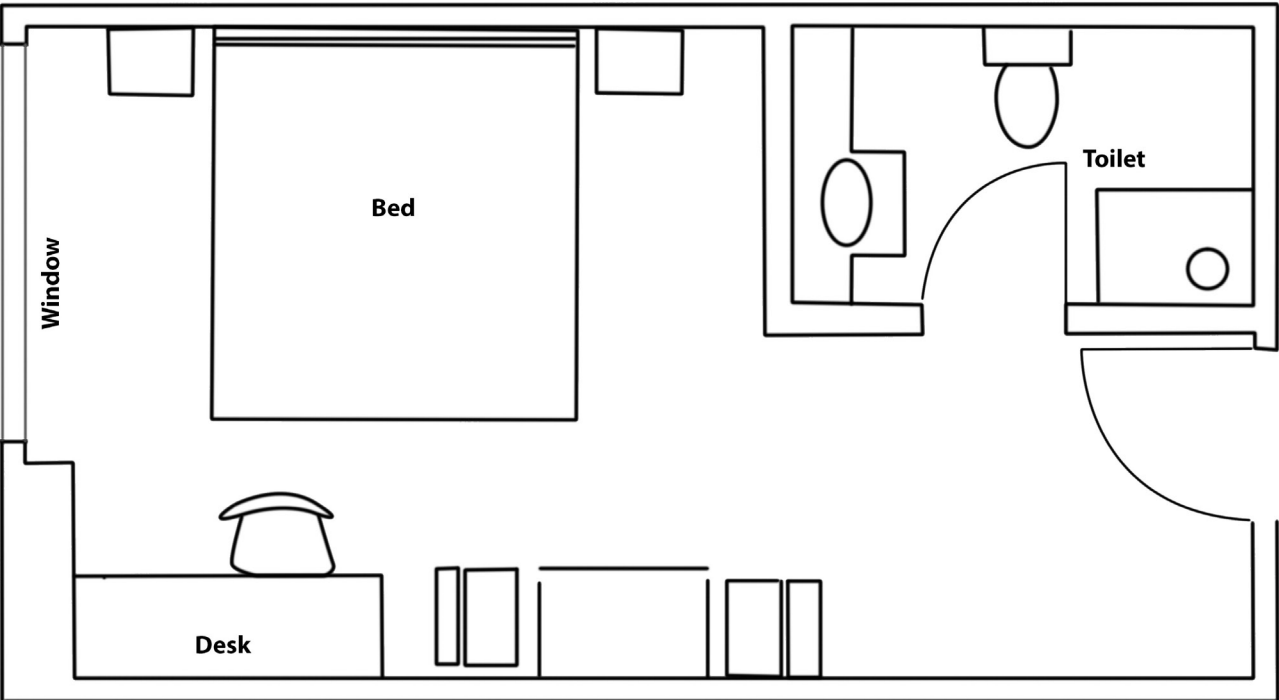
The reason why I selected such a location is because I wanted to create a contrast with the color temperature of the artificial set of light and the natural sunlight of the place. Therefore, All of the light pieces have a color temperature between 3000 to 4000 kelvins.

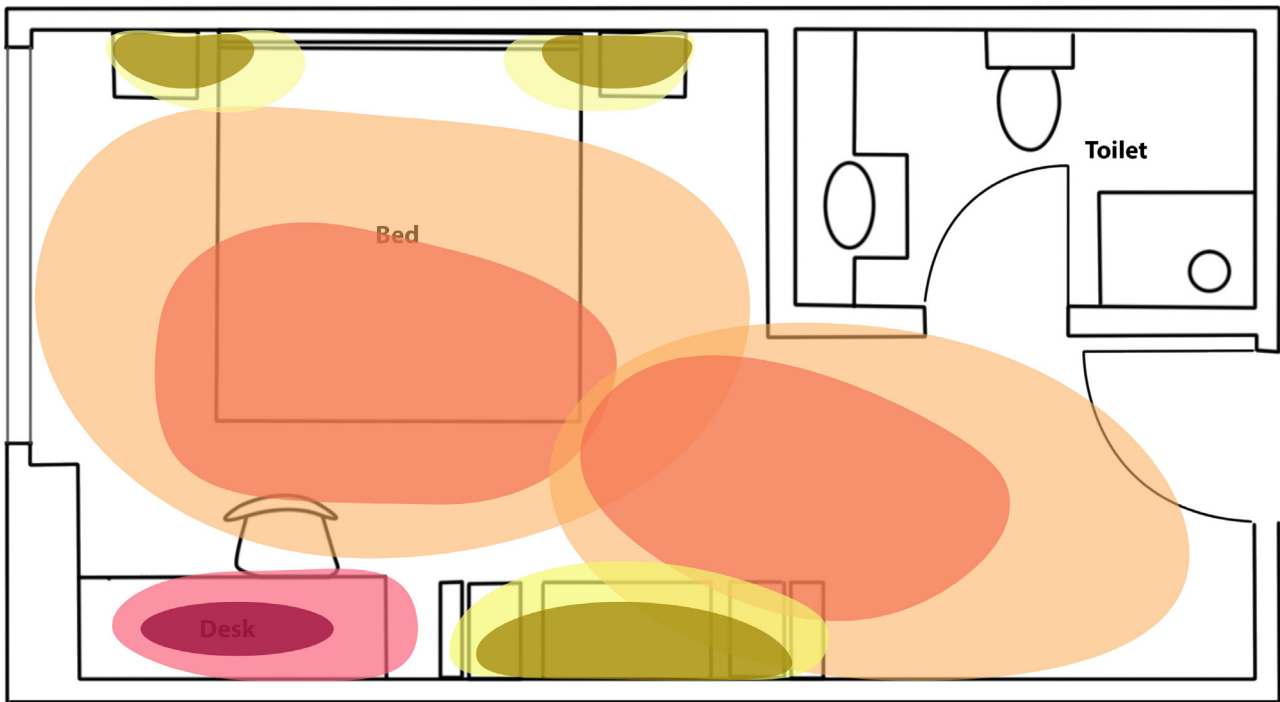
Img. 32



To have a better understanding of the hotel room, not only hypothetically but also visually I outlined a general plan the hotel room which I was going to work around as a reference.

**Location:** South/Central England  
**North Facing Window**



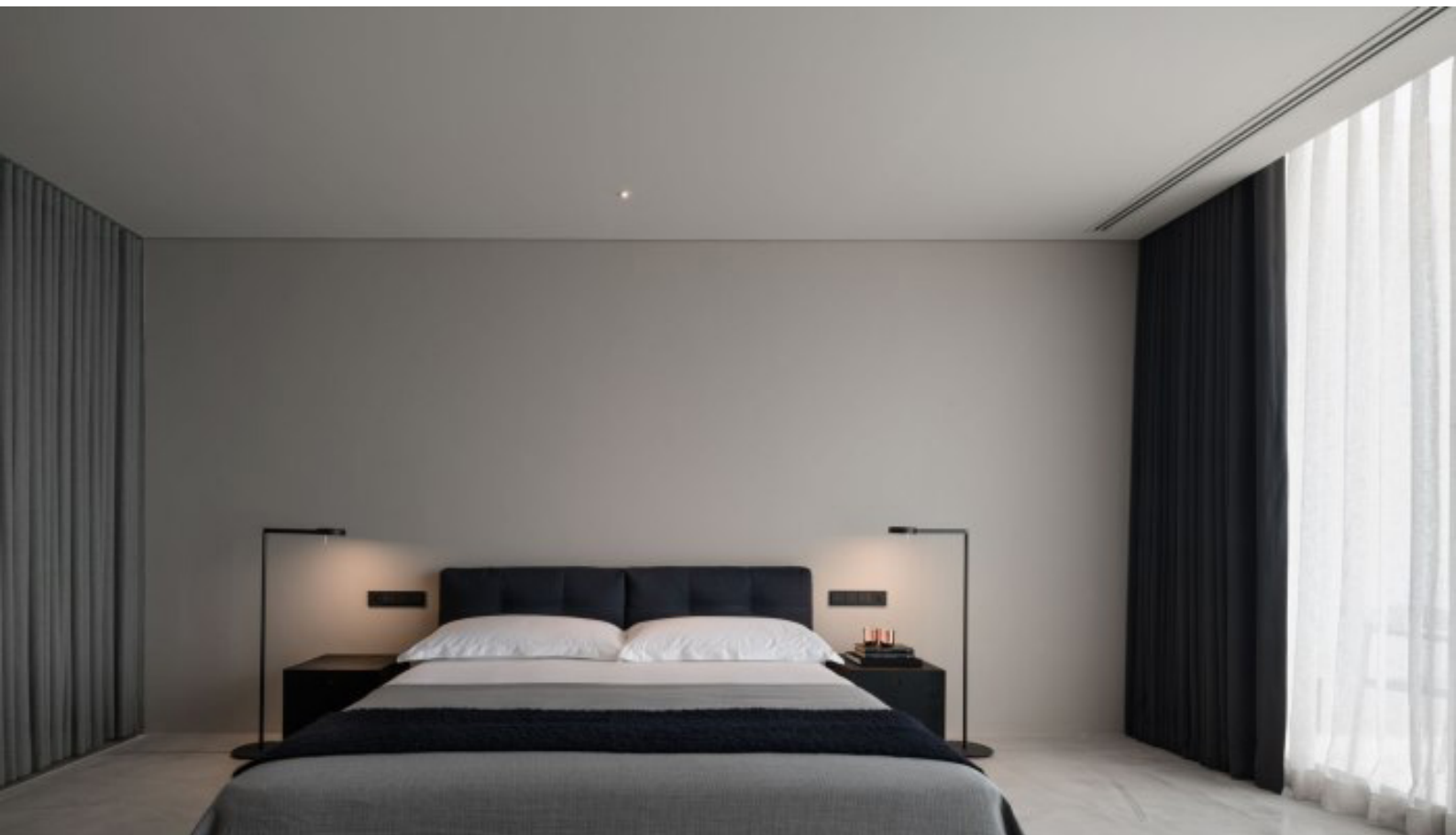


- **Ambient light** - Ceiling lights
- **Accent light** - Wall lights
- **Task light** - Desk light

In addition to the room plan, I also outlined the spread of the light of the three selected types of lights in the room (ceiling, wall, and desk). That provided me with a general overview of the effect of the light setup in the room.

The hotel will be a mid-high end, business/spa type hotel.

Img. 33



# Human Interaction and Involvement

People who will use the light and everything they might do with it

- Easy and simple communication of how the product works
- Effective coverage of the user's needs and expectation
- Examination of the user journey

People who will maintain and replace the product

Although hotel lighting usually is expected long life, product failures should be considered and must be very well described how to be handled. For instance, part or light source replacement.



# Greener Lighting

When it comes to types of light in hotels the choice is pretty much narrowed to two main options: LEDs and fluorescent lights. However, fluorescents are becoming more outdated and are being replaced by LEDs.





The main reason why hotels are transitioning into LED systems is because of their energy efficiency. An LED light installation can reduce the electrical expenses as much as 40% of the overall electrical bill and also have a much longer lifespan than traditional lights such as incandescent or halogen lights which were the most widely used type of lighting not far ago. LEDs also have a longer lifespan. Therefore, replacement and performance checks are done rarely.

They also are much more affordable. Another reason why the hotel runners are making a change to full LED installation is cutting the air conditioning costs. During the summer months of the year, gas-based lights can overheat and generate significant amounts of heat that can also affect the airconditioning bills. On the other hand LED lights tend to perform quite well when they have been left on for a long time without generating striking heat levels.

## LED Lifetime Characteristics

Compare and contrast the lifespan and power consumption for the available light bulb options.

\*Source: energy.gov

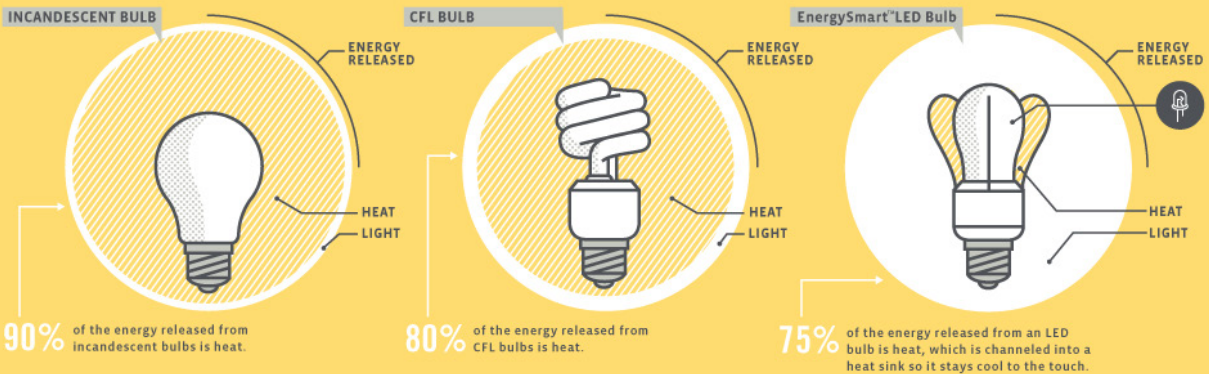
				
	Incandescent	LED	CFL	Halogen
<b>Lifespan (hours)</b>	750-2,000	35,000-50,000	8,000-10,000	3,000-4,000
<b>Power Consumption</b>	100 W 75 W 60 W 40 W	16-20 W 9-13 W 12 W 8-9 W	23-26 W 18-20 W 13-15 W 10-11 W	70-72 W 53 W 43 W 28-29 W

Img. 34-35

LEDs (or light-emitting diodes) are small sources of light that work when the movement from electrons illuminate semiconductor material. This longer lasting technology is usually found in traffic lights and exit signs, but now consumers can find options like LED light bulbs and even Christmas lights. Companies like GE are working to make LED technology more affordable and practical for homes. The Department of Energy estimates that rapid adoption of LED lighting in the U.S. over the next 20 years can reduce lighting electricity demand by 33% by 2027.

### LED Benefits

- Directs light more efficiently
- Has compact size
- Resists breakage
- Long lifetime
- Turns instantly on
- No infrared or UV emissions



### What's The Estimated Lifetime For Common Light Sources?



# Lighting Standardisation in a Hotel Environment

Just like in many other areas the hotel environment also has a general guide for Lighting standardisation or “CIBSE Code for Lighting” provided by the European Standard Commission in October 2002 which is also adopted by the British Standard. The Hotel environment is covered in the “Indoor workplaces” section of the guide.

The document covers the lighting requirements of indoor workplaces considering health and safety elements and also providing specific standardisation. In addition to that, it specifically discloses that the Standardisation guide is not restrictive of a designer’s implementations outside the set norms, and may not provide specific solutions for certain situations.

maintained illuminance- $E_m$  ; Unified Glare Rating limit-UGRI ; colour rendering indices-Ra

Graph I

5.2 Restaurants and hotels					
Ref. no.	Type of interior, task or activity	$E_m$ lx	UGRL	R <sub>a</sub>	Remarks
5.2.1	Reception/cashier desk, porters desk	300	22	80	
5.2.2	Kitchen	500	22	80	There should be a transition zone between kitchen and restaurant.
5.2.3	Restaurant, dining room, function room	-	-	80	The lighting should be designed to create the appropriate atmosphere.
5.2.4	Self-service restaurant	200	22	80	
5.2.5	Buffet	300	22	80	
5.2.6	Conference rooms	500	19	80	Lighting should be controllable.
5.2.7	Corridors	100	25	80	During night-time lower levels are acceptable.

In summary, the document looks into certain criteria and aspects of lighting such as Daylight, Recommended illuminances, Luminance distribution, Colour aspects and appearance where one can look up for reference and comparison.

I have taken every aspect of my design in consideration with the European Standard, as my genuine intention is to design a light piece as it would hypothetically be assessed by the “CIBSE Code for Lighting” criteria.

source: [https://lumenlightpro.com/wp-content/themes/lumenlightpro/assets/EN\\_12464-1.pdf](https://lumenlightpro.com/wp-content/themes/lumenlightpro/assets/EN_12464-1.pdf)

**Table 2 — Minimum shielding angles at specified lamp luminances**

Lamp luminance $\text{kcd} \times \text{m}^{-2}$	Minimum shielding angle	Colour appearance	Correlated colour temperature $T_{CP}$ K
20 to < 50	15°	Warm	below 3300 K
50 to < 500	20°	Intermediate	3300 to 5300 K
≥ 500	30°	Cool	above 5300 K

Graph 2

**Table 3 — Lamp colour appearance groups**

Colour appearance	Correlated colour temperature $T_{CP}$ K
Warm	below 3300 K
Intermediate	3300 to 5300 K
Cool	above 5300 K

Graph 3

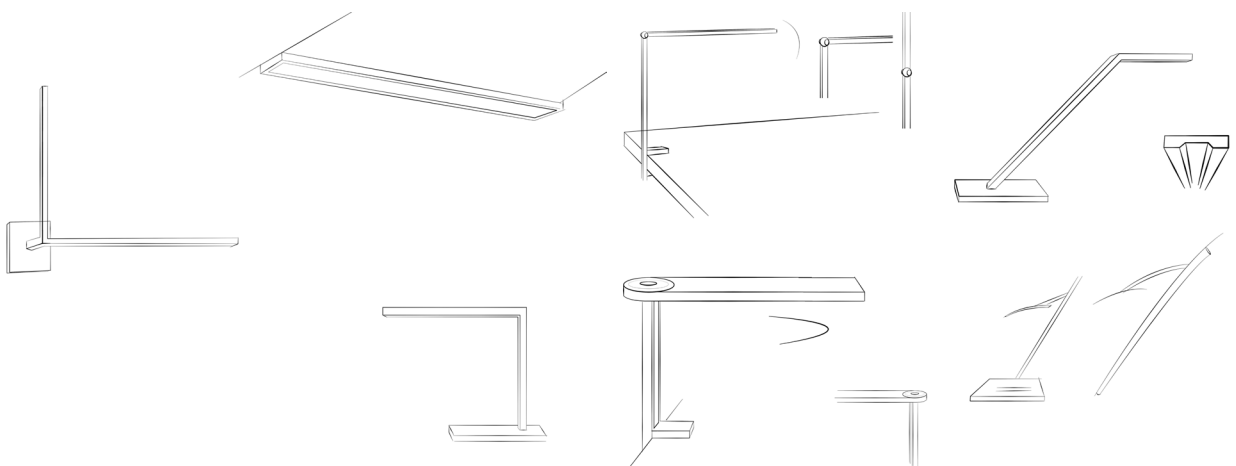
Graph 4

Illuminance (lux)	Activity	Area
100	Casual seeing	Corridors, changing rooms, stores
150	Some perception of detail	Loading bays, switch rooms, plant rooms
200	Continuously occupied	Foyers, entrance halls, dining rooms
300	Visual tasks moderately easy	Libraries, sports halls, lecture theatres
500	Visual tasks moderately difficult	General offices, kitchens, laboratories, retail shops
750	Visual tasks difficult	Drawing offices, meat inspection, chain stores
1000	Visual tasks very difficult	General inspection, electronic assembly, paintwork, supermarkets
1500	Visual tasks extremely difficult	Fine work and inspection, precision assembly
2000	Visual tasks exceptionally difficult	Assembly of minute items, finished fabric inspection

# Design Development

# First Ideas

Initially, my first ideas derived from the design language used in the existing Astro products. In my mind, I envisioned a set of lights having very straightforward design elements which I believed could help one to perceive the same elements already established by the client's design with my vision of a concept.



Img. 36-38 Inspirational images and first sketches





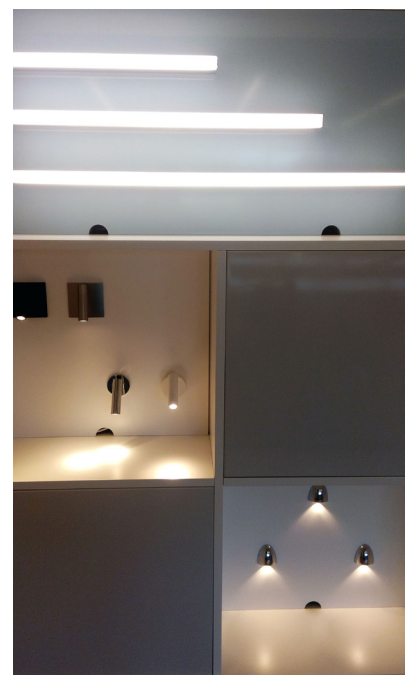
# Astro Visit. Reflection and Future Directions

In the third week of the project, I got a chance to visit and present my ideas to the client.

The visit had an overall substantial impact on my current project development and direction. James Bassant and a design engineer of the company supported the presentation with feedback on the present ideation stage. The feedback I was given had a generally strong impact on my future project development and direction.

They both shed light on my project with a critical analysis and advise on my ideas by highlighting some concerns as well as some positive ideas.

Astro Visit

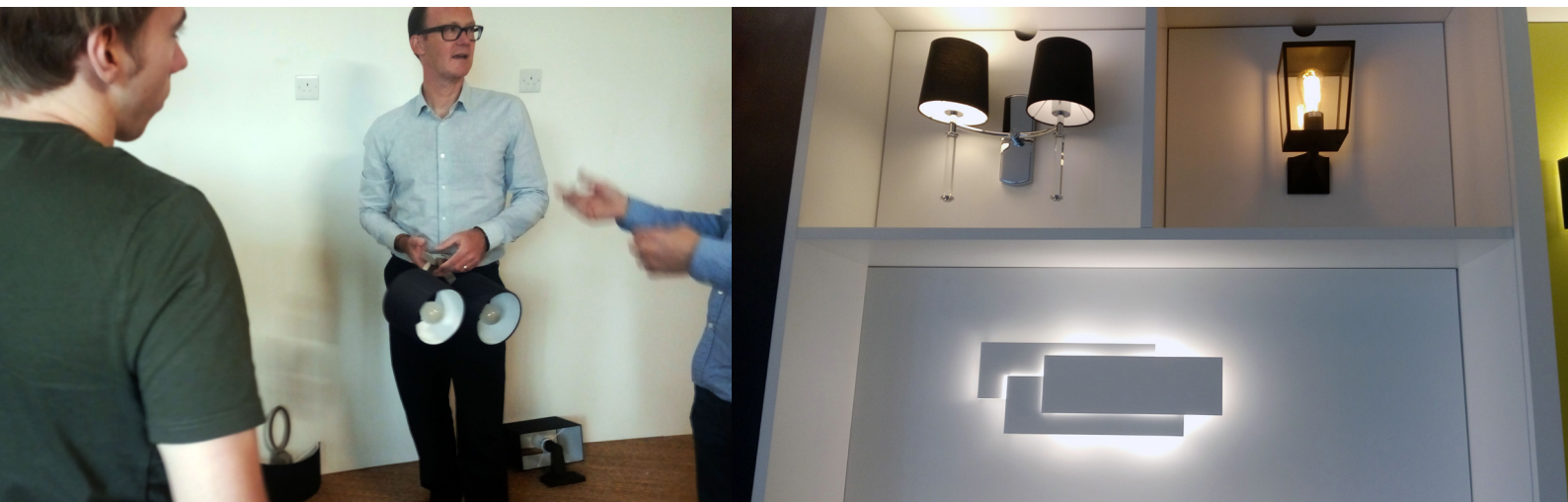


Mr. Bassant's main concern was connected with the individuality of my idea (specifically the desk light) rather than the execution. He mentioned a few examples of similar designs that were overlapping my initial concept. He, however, suggested not changing the concept or the design interpretation but rather creating and outlining the unique qualities of the product. Following with a statement that aiming for a minimal design should go hand in hand with outstanding attention to detail as one will focus on the detail if the body of the product is stripped to its minimum.

The engineer also supported Mr. Bassant's statement and suggested an interesting light designer whose work I can use as a reference for an inspiration into my design. In the late stages of the project development, this designer played an important role as a source of inspiration for the design of my wall light.

Overall, after the meeting, I have shifted my initial ideas of my product's design to adapt a way to communicate a unique yet minimal design language.

Astro Visit





# Inspiration



## Same Direction, New approach

In general, I preserved the core idea of minimalistic elements implemented in my concept, and I also had a clear idea in my head of putting my own twist to the concept. All that achieved with a prime focus on displaying exquisite detail and finish on the final product.

Img. 39-41





To achieve and display outstanding detail and finish efficiently, I started looking for inspiration and specifically how certain products convey unique emotion and connection with the user which is accomplished through the feel, finish and overall character of the product's surface.



Img. 42-46



Additionally, I wanted to apply a notion of individuality into the design. Thinking of highlighting the product's form and making it "Stand out" from the environment.

These images later in the project worked as a pivot point for me to develop the "floating" effect for the final wall light design.

Img. 47-49



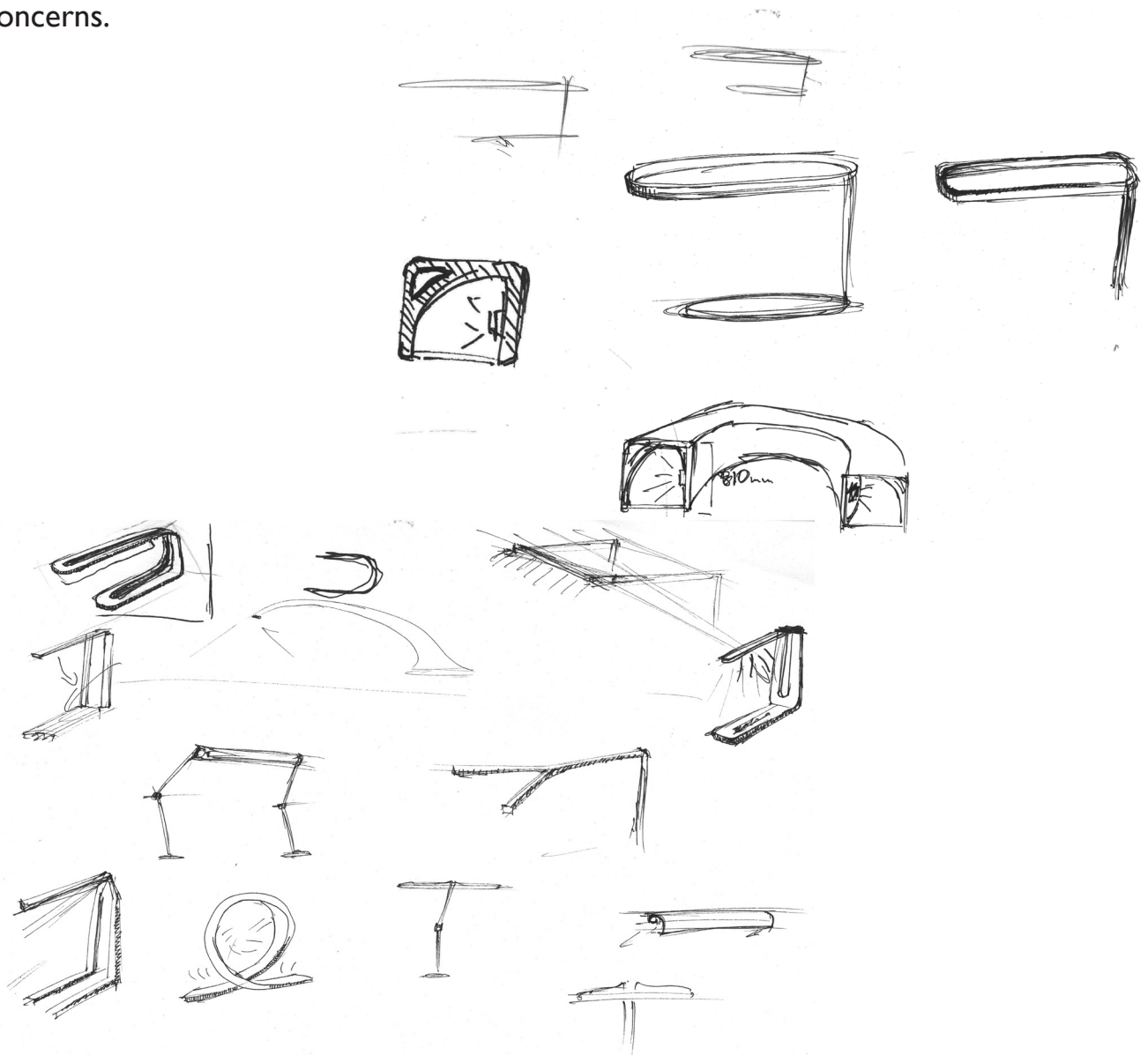


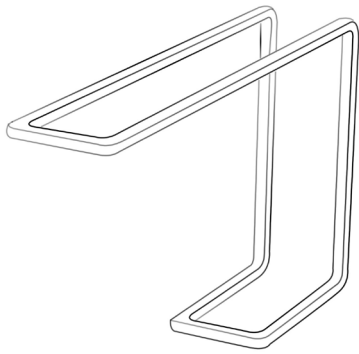
Img. 50-53



# New Ideas

Overall, I kept the same concept for the design of the whole set. But this time I initiated an experimental stage of sketching. Playing with forms of related basic elements around the core idea seemed like it started a kickoff of the new ideation phase. Not only for the visual aspect of the product but also for delivering some solutions for further electrical fittings and light concerns.



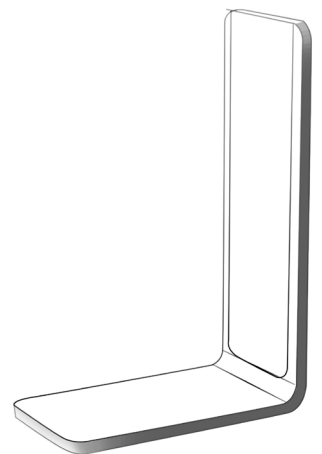
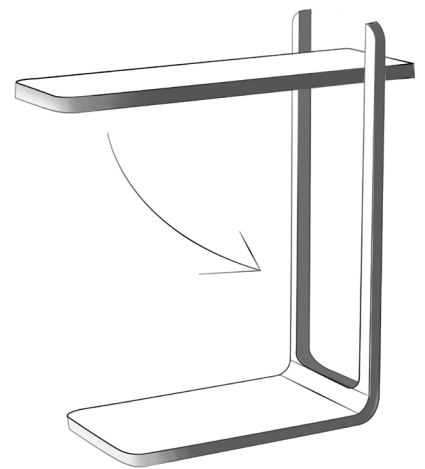


Sketch 1 "Body outlines"

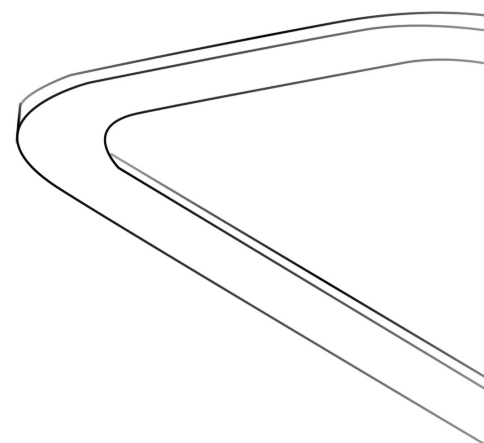
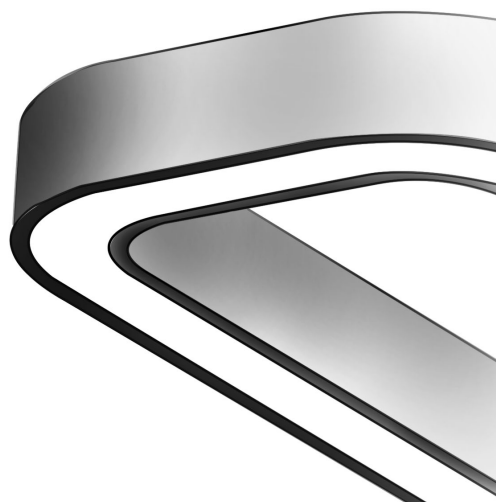
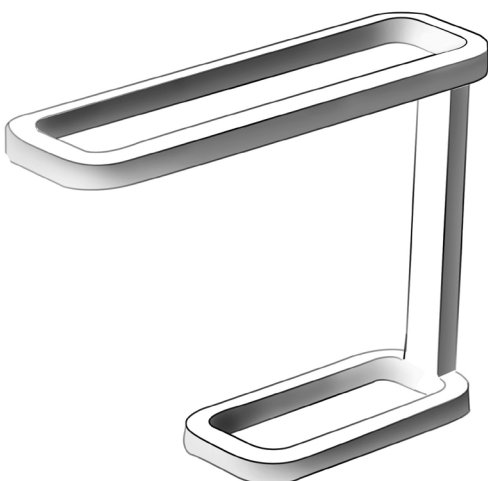
At this stage, I decided to develop a table/desk light into a physical product. I looked into some ways of improving the affordance, functionality, and shape of my first ideas.

Two Ideas stood out of the rest with some promising features. (Sketch 1 "Body outlines")- having only outlined as a solid body of light and (Sketch 2 "Top Flip")- a top part that can be flipped open or slotted into the main body of the light creating a fluid shape. The largest obstacle with both of these concepts was the passage for the electrical parts. As both ideas were virtually impossible to be constructed in a workshop for such a short period. The last interpretation was an ellipse-shaped top light. Unlike the other two ideas, the ellipse head had one single part as a middle/vertical section which made the fitting of the electrical wiring a much easier task.

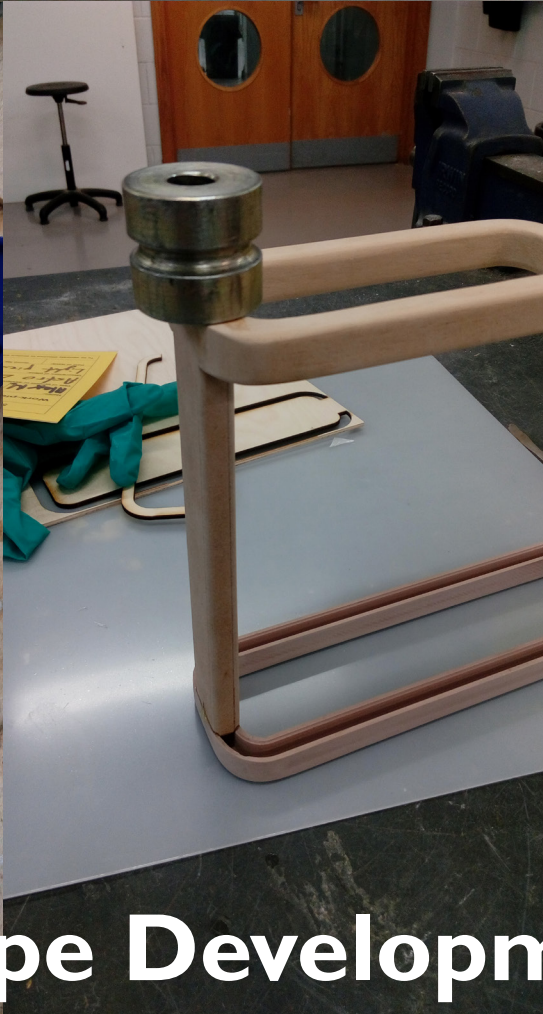
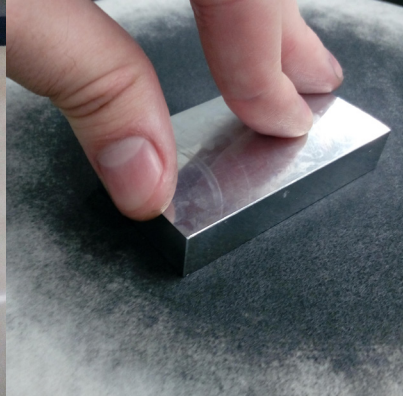
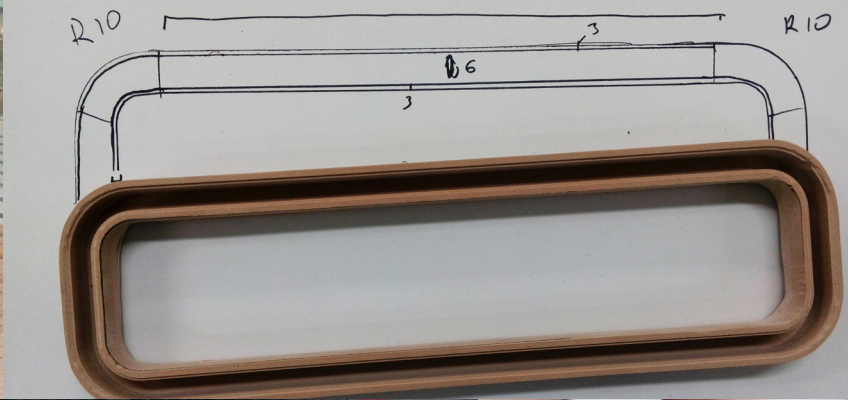
Sketch 2 "Top Flip"



Sketch 3 "Eclipse Head"







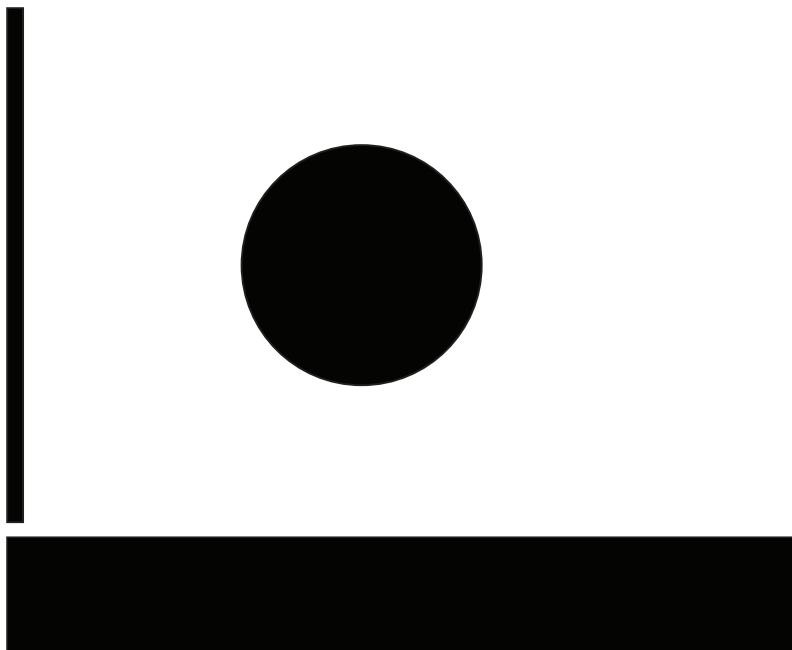
# Prototype Development



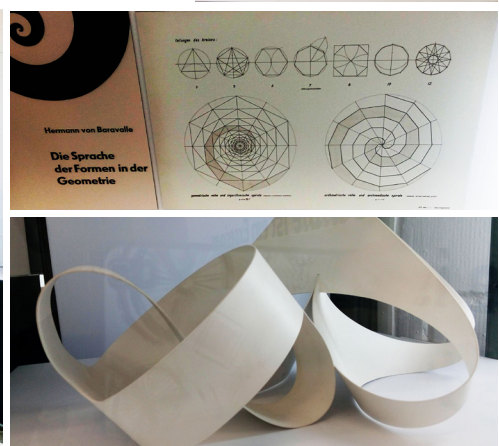
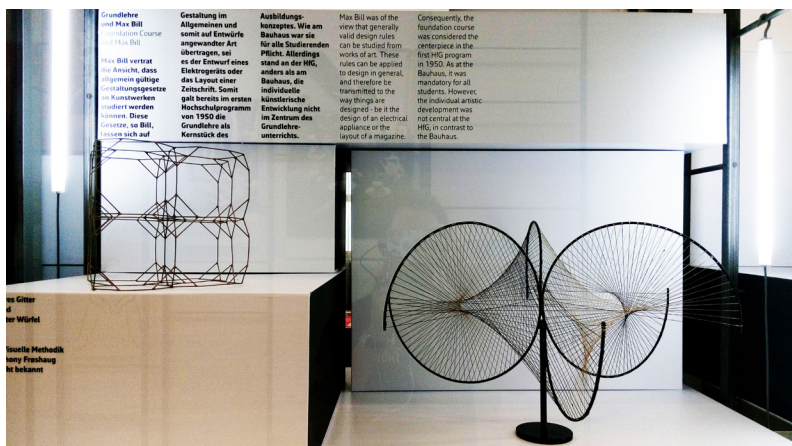
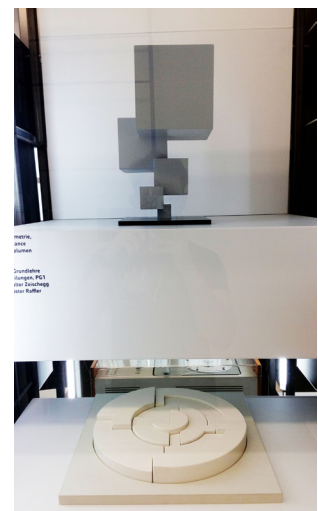


# Implementing Basic Elements in the Design

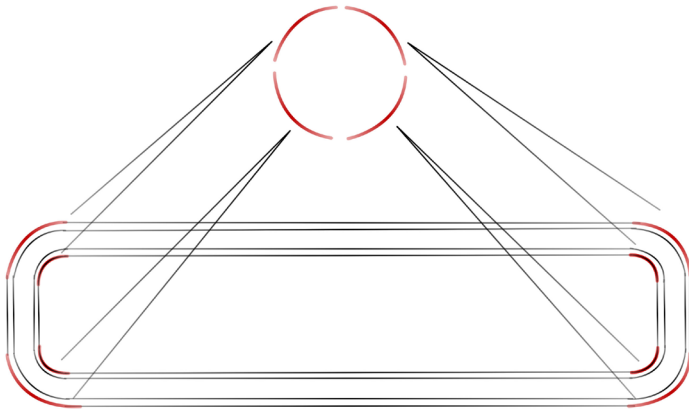
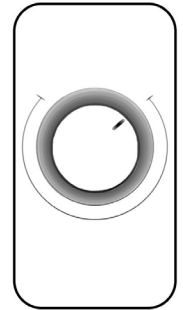
I used and implemented basic geometrical shapes as the essence in my design such as squares, straight lines, and rectangles. Similar techniques used in the foundation course of the early Bauhaus design schools in Weimar, Ulm Dessau, etc. My design possesses the bare minimum amount of material, yet it contains the full functional aspect of the product.



HfG Ulm Archive, Germany



I believe the design should not be overcomplicated if there's no particular need for that. Although the top compartment of the light seems to be constructed as a complicated shape by elements demanding certain radiuses and taking different turns. It is still virtually based only on basic geometrical shapes. Even some of the small details of the dimmer switch for an example were build using this philosophy.



# Materials and Manufacturing

- 1. Matt Sandblasted Aluminum
- 2. Sandblasted/Frosted Opal Acrylic
- 3. 4,7 Watt LED Light strip
- 4. Matt Sandblasted Aluminum
- 5. ABS Plastic (injection moulded)
- 6. Stainless steel



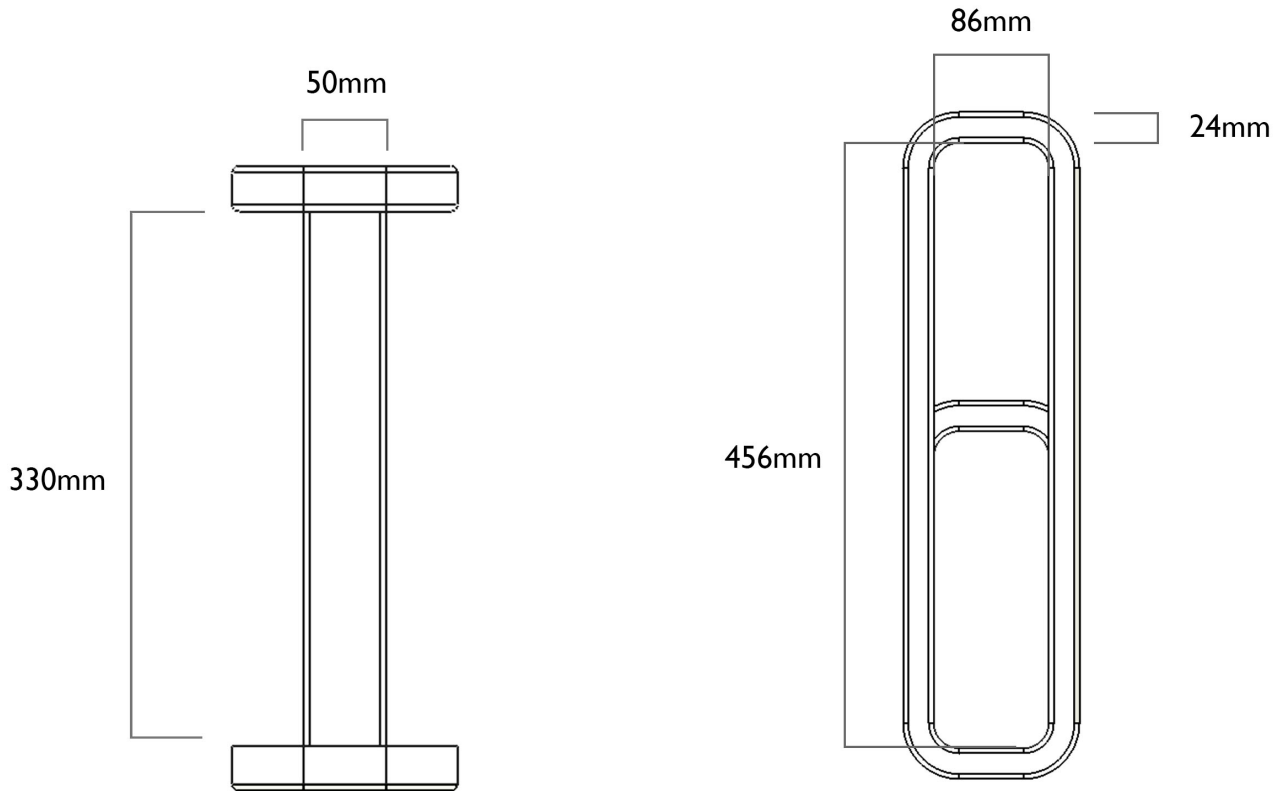
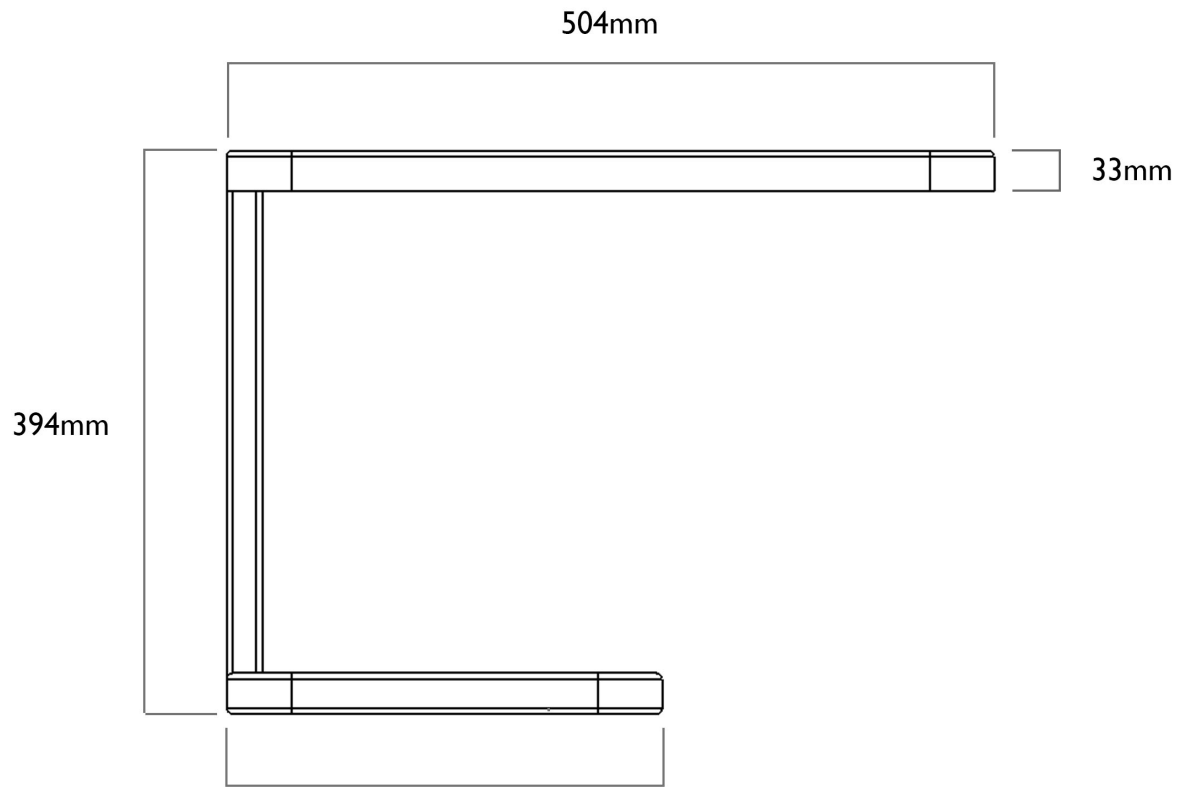
Die casting will be the major manufacturing technique. The body of the light will be die-casted in two separate pieces.





For manufacturing, it will be used an anodized aluminum as a prime material for the bodies not only of the table light but for the whole set. A light matt finish which will be achieved by sandblasting the surface of the anodized aluminum.





## Finish and Feel

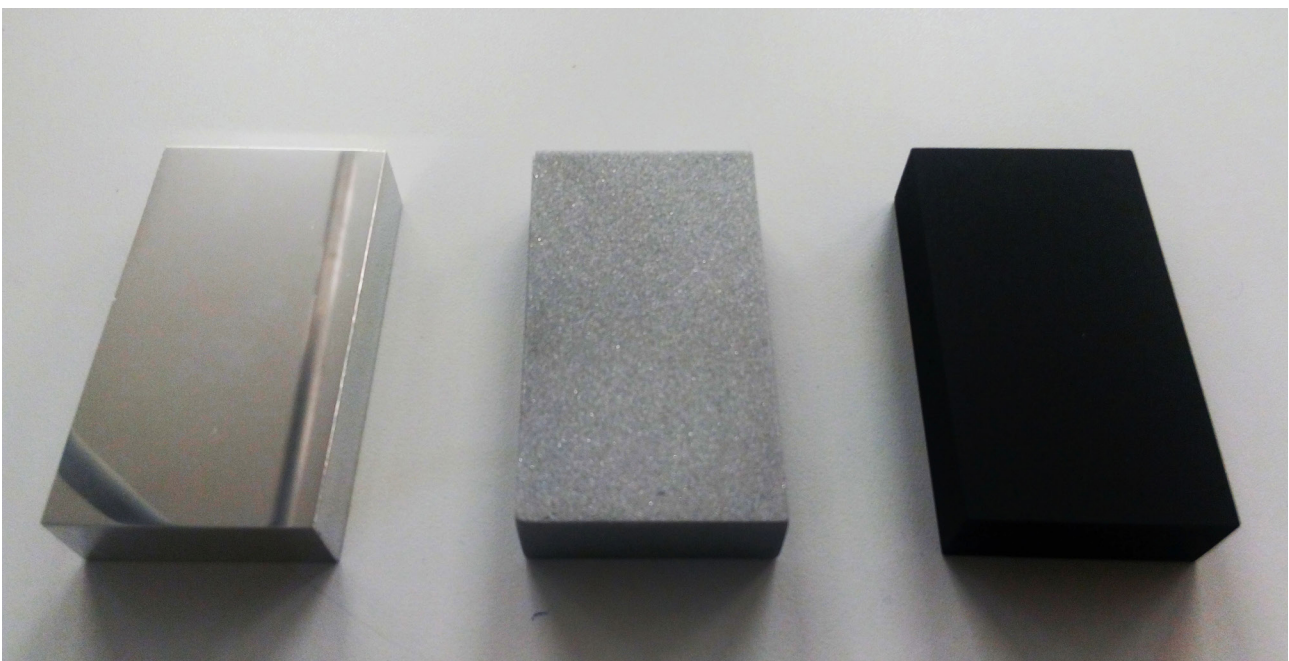
Undoubtedly, a great product comes with exceptional attention to detail. The final finish is a vital and major aspect in my design and I aim to deliver an exceptional user experience through the user's somatic senses. Thus, I experimented with some blocks of aluminum trying to recreate the feel of a final material finish. That helped me make solid decisions on the effect of material over the user.

As my initial vision of the finish was a light matt texture, sandblasting a block of aluminum ( in the middle) instantly struck some light over the process of getting a matt textured finish.

However, doing a polished aluminum

provided surprisingly valuable data for the final decision taken. While polishing the aluminum block I have noticed that the structural qualities of it are quite "soft" compare to other metals and I quickly came to a conclusion that if the aluminum block is being kept under the sandblaster for a longer period of time it will penetrate deeper into the surface which will ultimately give a better control of achieving a certain depth of penetration.

For the final test, I sandblasted both surfaces of a block following by a single coat of black matt paint.



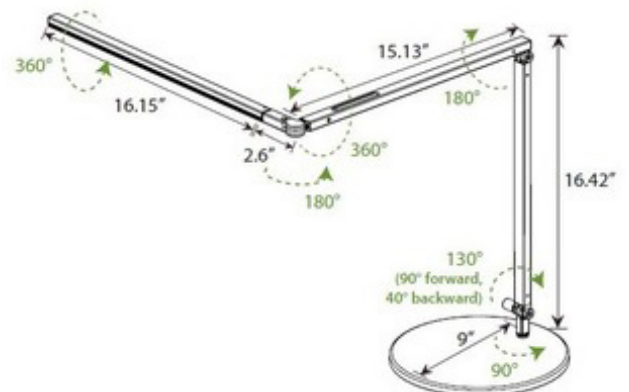
# Flexibility and Affordance

While researching on desk lamps, I came to realise that lamps that can provide light in multiple directions have at least two joints that act like axis points, which allows them to rotate in pretty much every direction.

Lights with two or more rotational joints usually can be found in places such as offices, workshops, and industrial sites and this is because these places require specific and sometimes unconventional light requirements. These lights are also often sold in large quantities because of their definitive purposes and use cases.

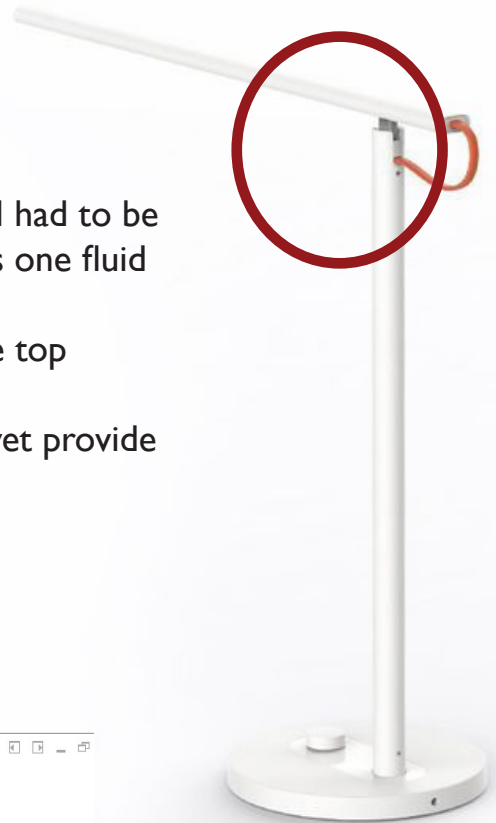


Img. 54-55 Double Joint

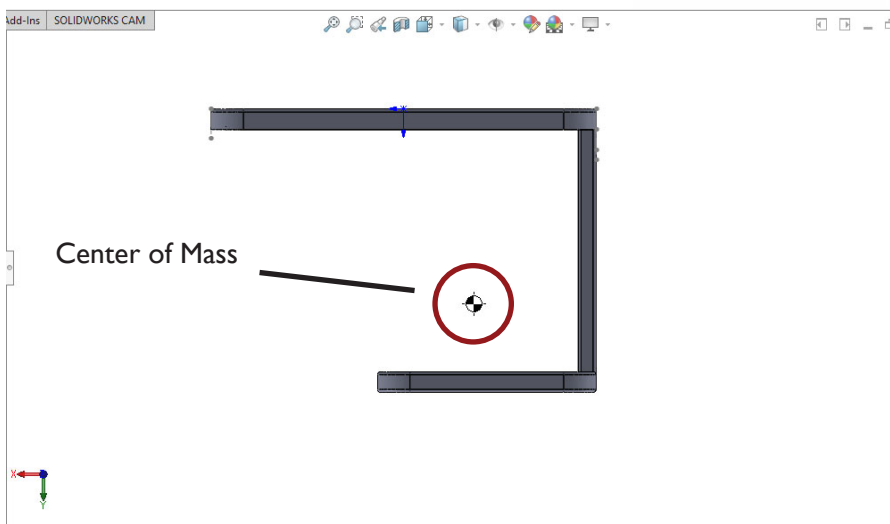




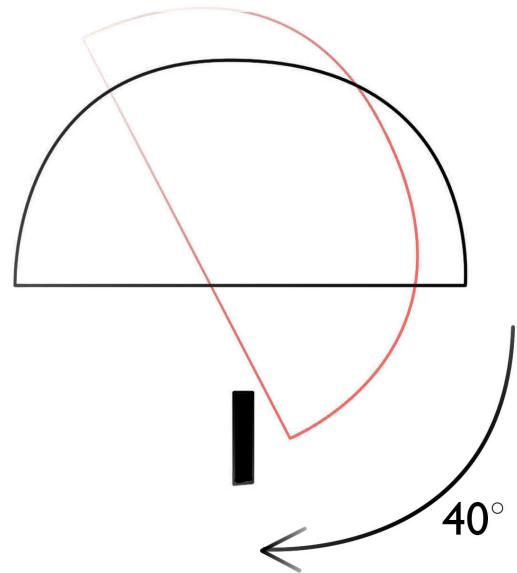
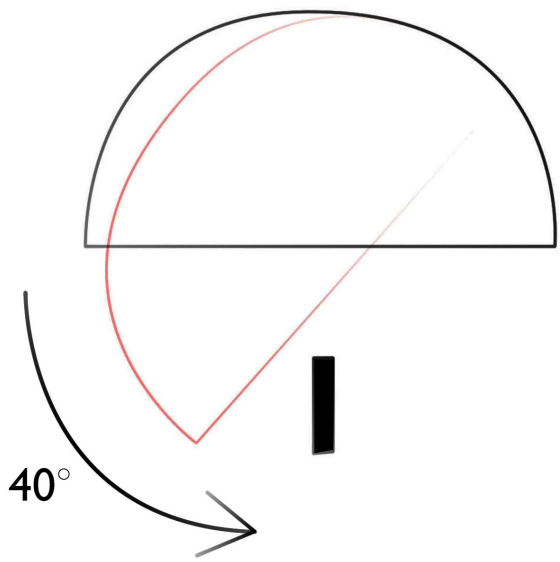
In order to preserve the design language of my light, I had to be more creative since the shape my design resembles is one fluid piece of work, without any external joints. Because of that, I added an internal joint between the top compartment and the rest of the body. That way, I managed to preserve the fluid shape of the design, yet provide flexibility in the top region of the light.



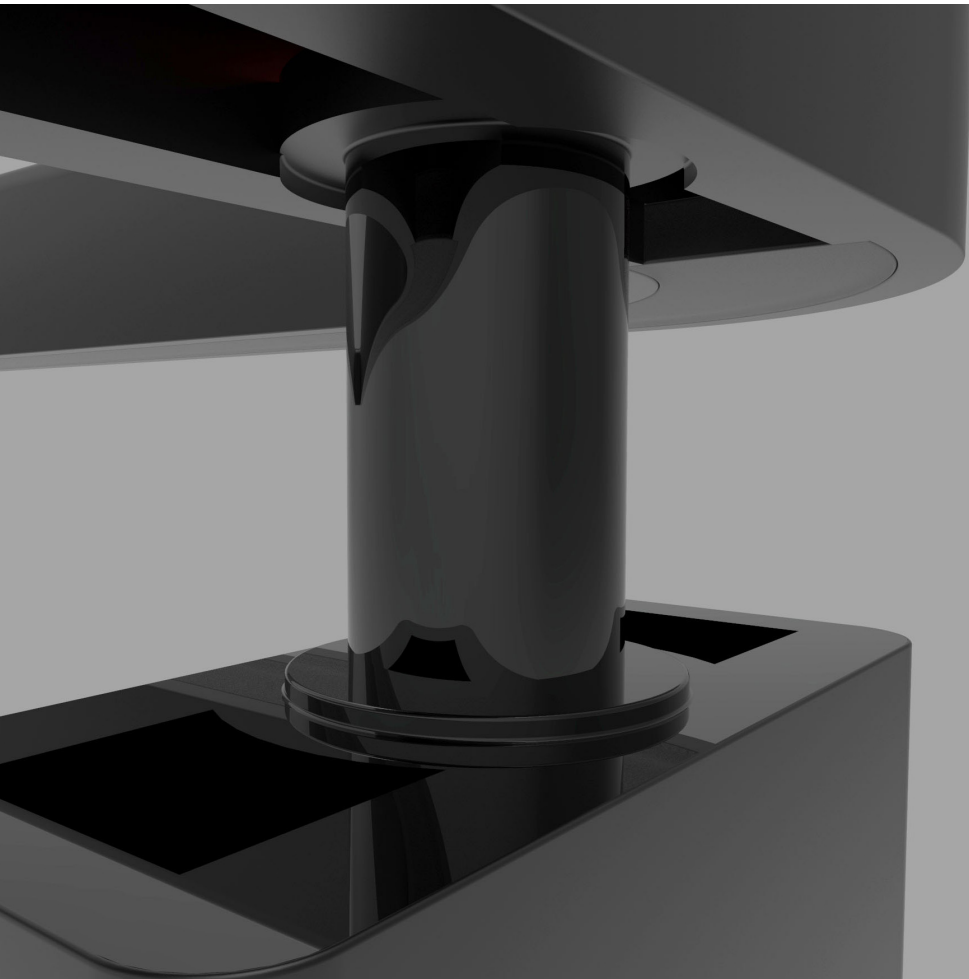
Img. 56 Single Joint



Doing a physical prototype showed me that the model would not tilt or fall even if pressure is applied. Nonetheless, I simulated the material type, mass, and properties to calculate the position of the Center of the mass of a real model in Solidworks. Surprisingly, the simulation showed an almost perfect balance point, low enough to balance out the light accordingly.



The adjustable feature allows the top compartment of the light to rotate in 80 degrees in total.

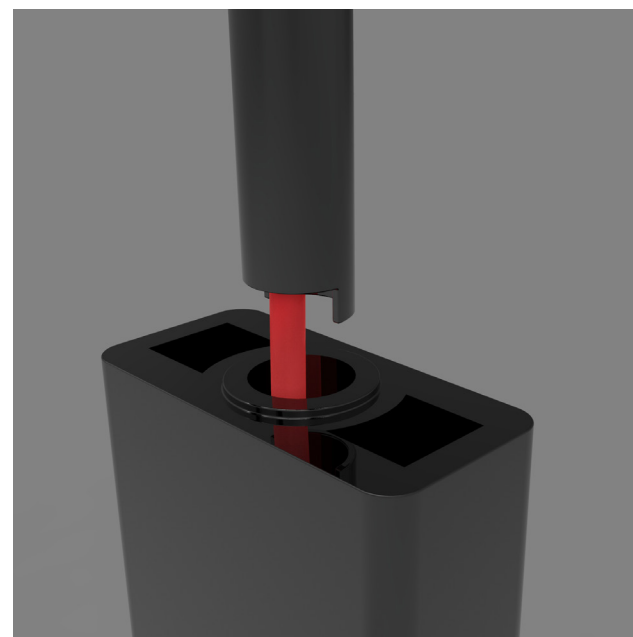


The joint allows rotation of the head of the light parallel to the base. The top compartment has a hollow extrusion which perfectly slots into the hole opening of the vertical part of the light.

I have to mention the section where the joint parts are slotted together won't be applied any textured finish as this would create a friction and will potentially damage the mechanism.

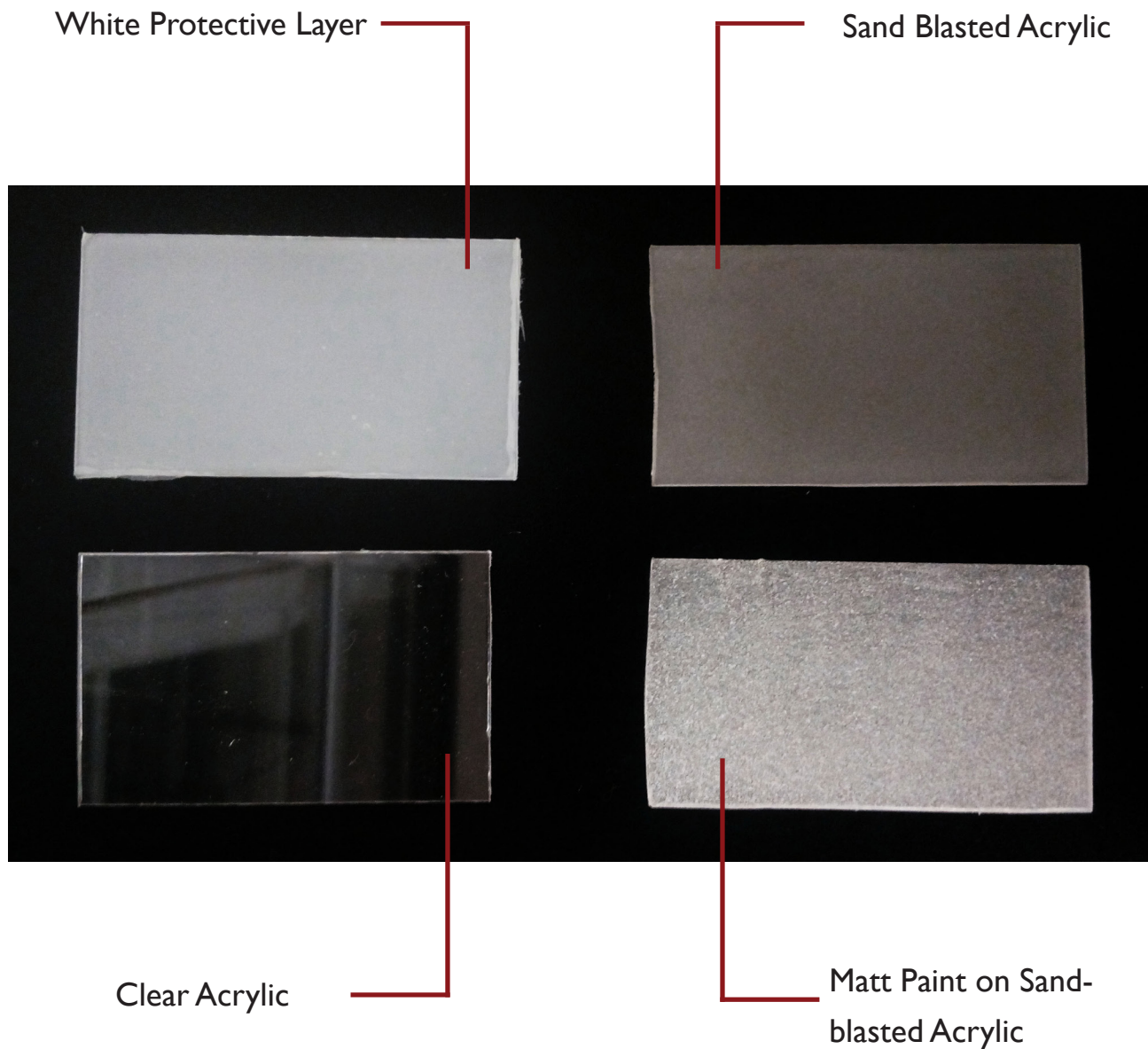
The joint serves not only as a rotation axis but also as a passage tunnel for the wires and light strip.

The wiring and light strip are well hidden in the middle and top sections of the light. The light strip is located on the inner wall of the top compartment positioned vertically. That way, the light is partly absorbed by the surface facing opposite the light strip creating soft and smooth light flow. The wiring, on the other hand, is located inside the vertical section of the lamp passing through the hole opening of the joint and exiting at the back opening.



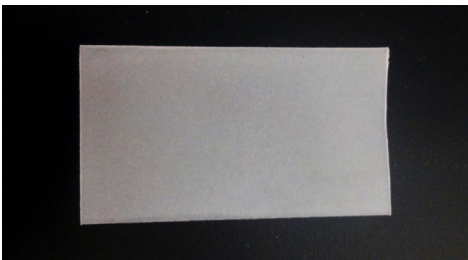
# Light Flow (Diffuser)

To assess the effect of the light passing through the surface of the defuser I cut small samples of plastic and then I applied several different finishes.





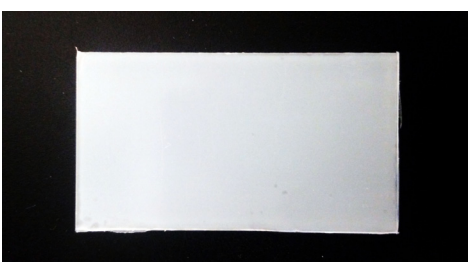
First, I tested the effect of clear plastic over the LEDs. Conceivably, it had no effect whatsoever once it faced the light.



Second, I sandblasted both sides of another sample and this time the flow of the light was visibly affected by the sandblasted plastic giving a fluid transition of light by the bright spots of the LEDs.



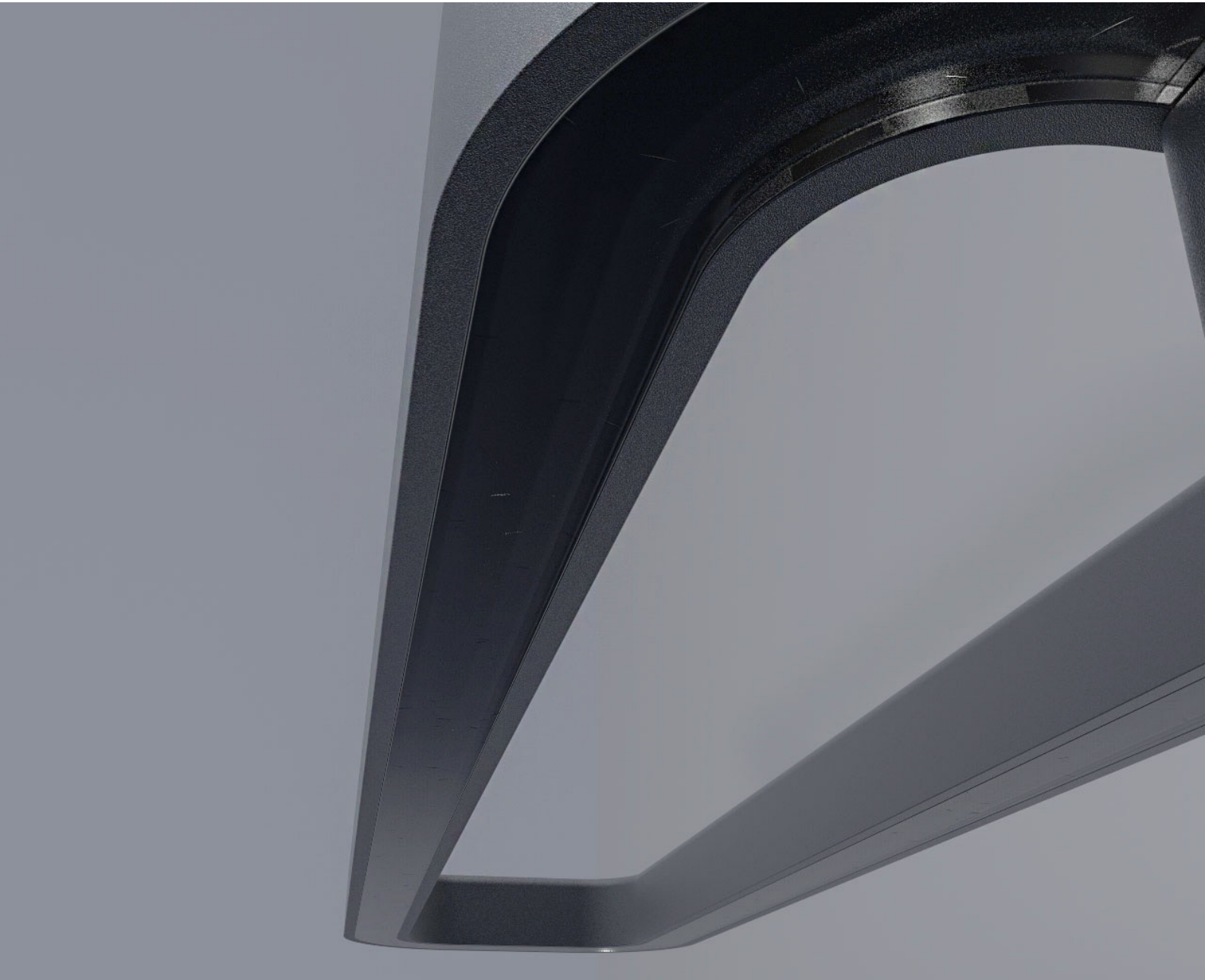
In the third test, I applied two coats of paint on a single sandblasted surface. The result seemed quite promising, the problem was that some spots used to block more light than others, creating an even transition over the surface.



Last, I left one of the protective layers on the acrylic, which gave a milky-translucent look of it. Unfortunately, it had almost no effect on the bright LEDs.



From my test I have concluded for the final material of the defuser will be used Sandblasted/Frosted Opal Acrylic. The sandblasting provided the best results diffusing the light.



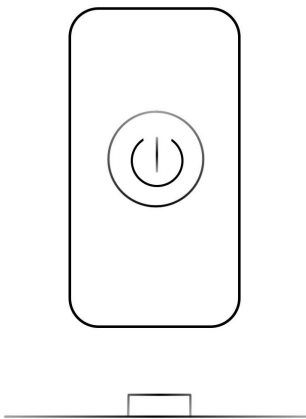
# Dimmer Communication Design

The dimmer switch took a big chunk of the design development process of the project during which I spend a lot of time in consideration and development. Throughout the process, the communication design of the dimmer switch was broken down into 4 development stages :

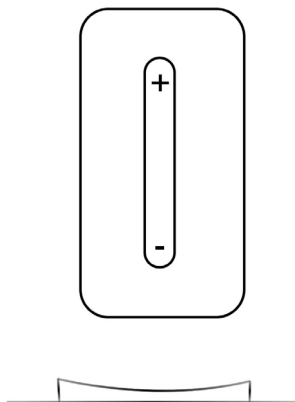
1. Button communication (positioning, types of buttons, sizes)
2. Indication (display of the indication bar)
3. Texture, feel, material finish and user interaction
4. Color coding

Img. 57

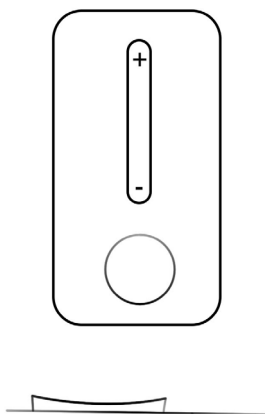




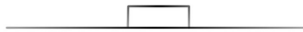
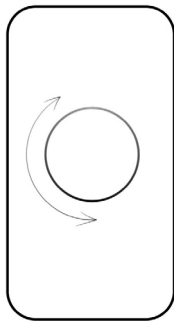
My first thought was the traditional “on/off” button with its well-recognised symbol on the top of the button. It is an overall efficient and well-recognised way of switching the tool on and off.



Since the light will be in the warm spectrum, I realised it would be better if the light has a **dimmer to control the intensity** of the light. As sometimes warm light might be “less visible” for the human eye compare to 4000+K lights. For this reason, I implemented a large button with an increase and decrease option for the intensity of the light source. Of course, if the minus is held for long enough the light switches off completely.

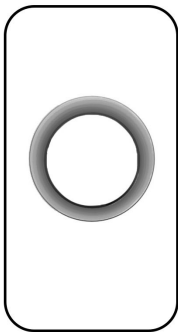


The control of the light could also be separated into 2 buttons. The power button (bottom) would still be the main one and a dimmer control which would be left as an option.

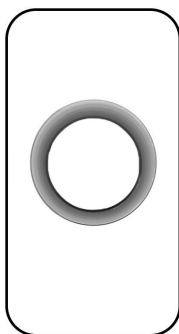


Having two buttons but only one of them would be used in the majority of the time would not be very functional from a manufacturing and user's perspective.

This is why I came back to the idea with one single dimmer switch. Located in the center and coming out of the surface as an extrusion.

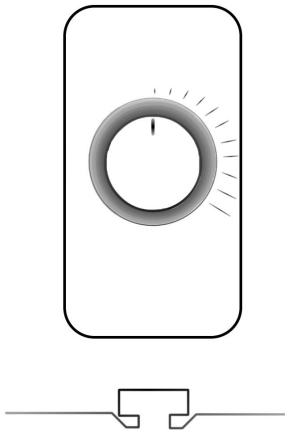


Since the shape of the controls was defined I looked closer into the rest of the body of the switch of my latest idea. Near the edge where the switch and the surface meet I added a small angle gap. When the user holds the switch his fingers will be pointed down towards the surface and contact might occur which will be quite unpleasant when twisting the switch. This is why I have put a slight "dent" around the switch's surface to accommodate the user's fingertips without having any interactions with the surface.

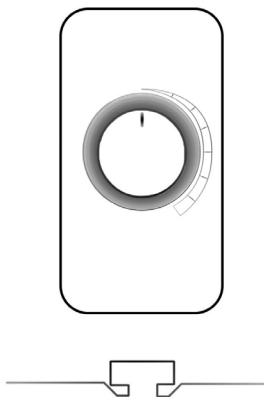


In my final proposal, the only significant change prior to the last one was making a clean separation of the switch with the rest of the body. I decided that separating the button from the surface as a single piece would be more efficient to be manufactured.

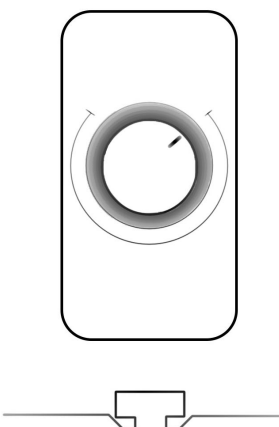
During the final stage of defining the switch's design and elements, I got around some ideas of rationally displaying the light intensity indication.



Straight lines with an ever-increasing length in a rotational action along the center axis of the switch. That is a commonly used way of showing an action of an “increase”.



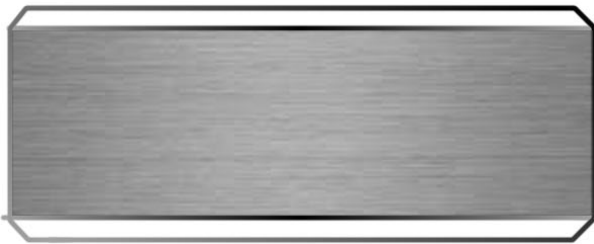
Here I used the same elements, but this time the lines are supported with directional lines on the sides, creating small reference sections. Similar designs are used on thermo-emitting devices such as ovens and thermostats.



The final design consisted of a single line with a start and an end indication of 280 degrees. The only thing I left as an indication was a minimum and a maximum hints on both ends. I realised, the user is most likely not to read or find use of the intensity sections as shown in the previous designs. The user's only demand is the light to be on and running, not really carrying how many lumens are illuminating at certain times. Yet still being able to regulate the intensity by himself.



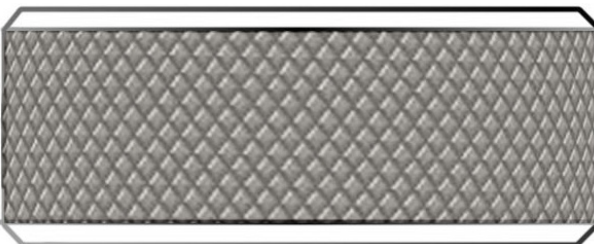
## Texture, Material finish and User interaction



Brushed metal texture is often used for switches in kitchen appliances, and is generally an elegant way of showcasing a texture. However, in my eyes, a shining finish wasn't something that was going to fit in the design composition.



Matt texture initially seemed like the right choice. Considering the finish of the whole set. But if anything, I needed to create a texture contrast as this part would probably be the part which the user will mostly engage with.



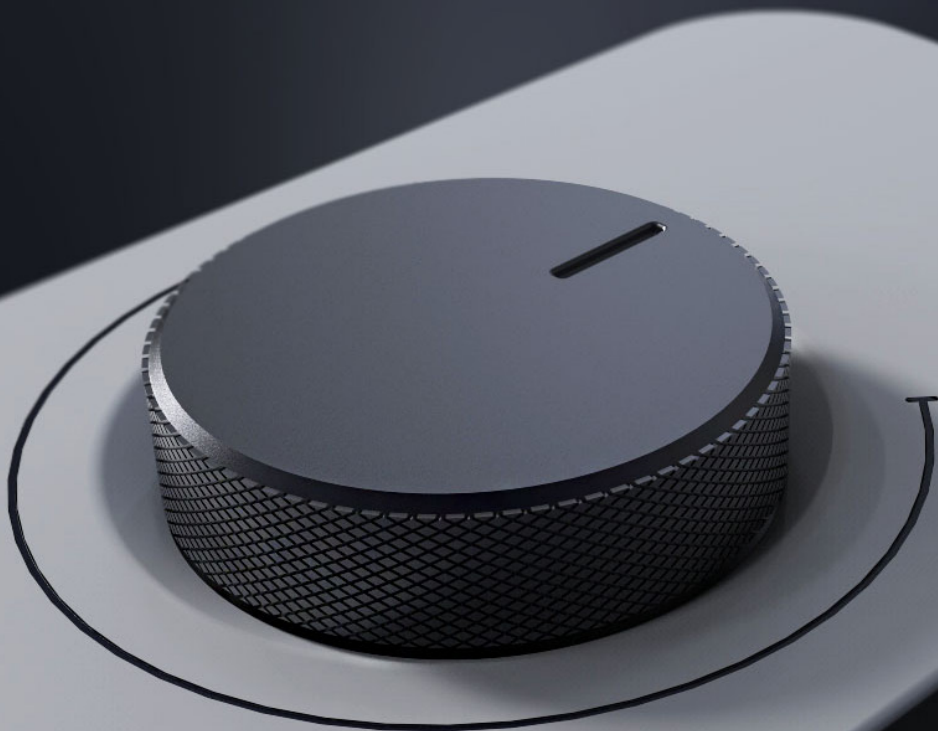
Humans naturally connect a certain feel with past experiences. When thinking of a twisting motion first thing that comes to mind is a bottle cap. To communicate the type of action that is required to operate the switch from its first use I decided to use this well-established method and add a grip-like area on the outer surface of the dimmer.



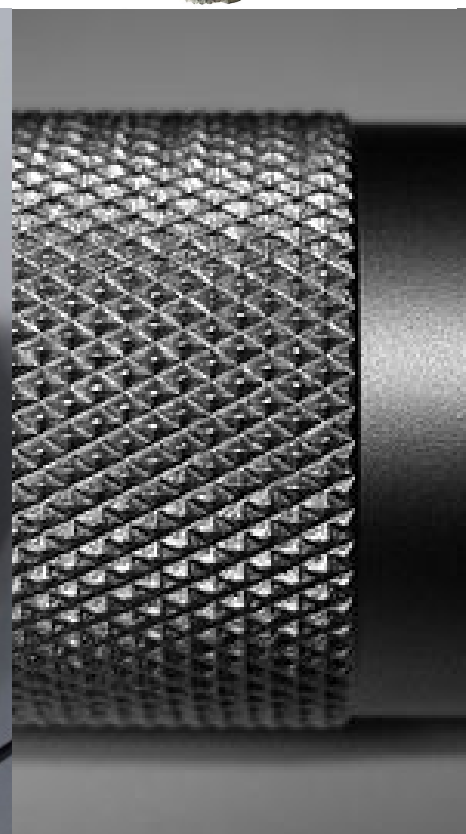
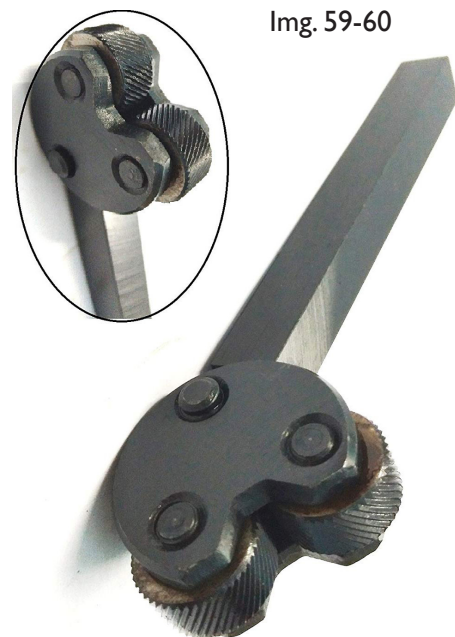
Img. 58

Although the body of the dimmer is an ABS plastic the switch would be manufactured and machined out of stainless steel.

The reasons why stainless steel would suite better is first, it will give the feel of weight and stability (especially if being used often) as well as a natural feel of solid metal. In addition, the user would feel the contrast of the plastic and metal finish when put next to each other. Second, the steel component is much more reliable. If the switch would have been made out of plastic it would start to wear out and even wobble with time.



Diamond Knurling will be the manufacturing process used to achieve the texture on the stainless steel button. The texture effect is accomplished by using knurling wheels rollers (img. 59) taking material out while rotating in two opposite directions creating a net-like pattern on the surface. Diamond knurling is particularly well known and used for everyday objects. It provides a better grip area which is often hard to achieve with smooth surfaces.



Another noticeable characteristic of the dimmer is the colour coding.

The body of the dimmer is the only part left as a contrasting element in the composition. The body of the light, the cable and the switch follow the same dark-grey colour scheme while the body of the dimmer is composed in contrasting bright colour shade (and Visa-Versa).

All things considered, the dimmer will be the component of the lamp which will be mostly interacted with. Including all previous design decision taken, colour coding is the last step of drawing one's attention to the dimmer.



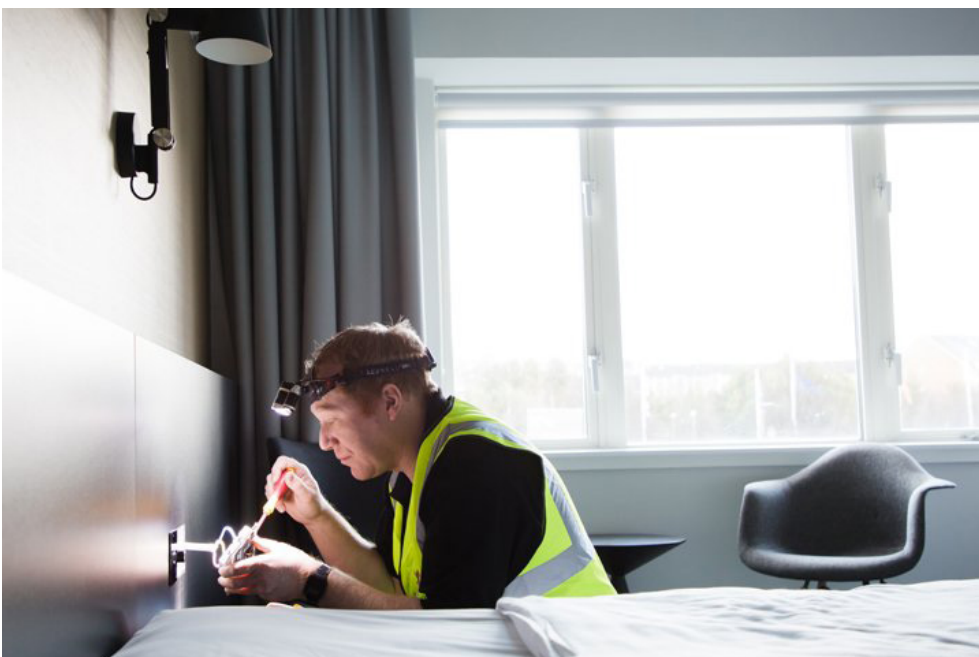
# Maintenance and Safety

The design of the table light was developed based on the “European Standard Guide” and it covers all major safety requirements (including electrical consideration). Nevertheless, failures and misuse are sometimes inevitable and I have taken into consideration

A key feature of the design was making the assembly of the light form only 2 components, this allowed the electrical compartments to be fully accommodated and enclosed inside the assembly.

In an event of electrical failure wires and internal parts can be easily accessed by separating the top component with the rest of the light (where the joint locks in place). The lamp, of course, must be unplugged from the electrical socket before any action is taken!

If any of the major two components have been damaged, the damaged component of the light can be purchased separately (as they will be manufactured as separate parts anyhow).



Img. 61



# Specifications

Main Material: Aluminium

Finish: Matt (Sandblasted)

Location: Interior

Type of Light source: LEDs

Dimensions: H: 394 L: 504 W: 134

Adjustable: Yes

Rotation Adjustable Angle: 80 degrees

Dimmable: Yes

Colour temperature: 3200K

Light intensity: 160 Lumens

Wattage: 4.7W

Weight (estimation): 1,1kg

Defuser material: Sandblasted/  
Frosted Opal Acrylic



# “L” & “I” Shaped Wall Light

## “I” & “L” Shape Wall Light

The designer mentioned by the Astro Lighting engineer during the visit in the 3rd week of the project was a vital inspiration point in the final design piece I generated. Michael Anastassiades is a designer specialising in high-end lighting objects. His methods of work have a very exceptional way of deliberately expressing the minimal designs of his products with craftsmanship and detail. Although his work seems quite simple at first glance, all

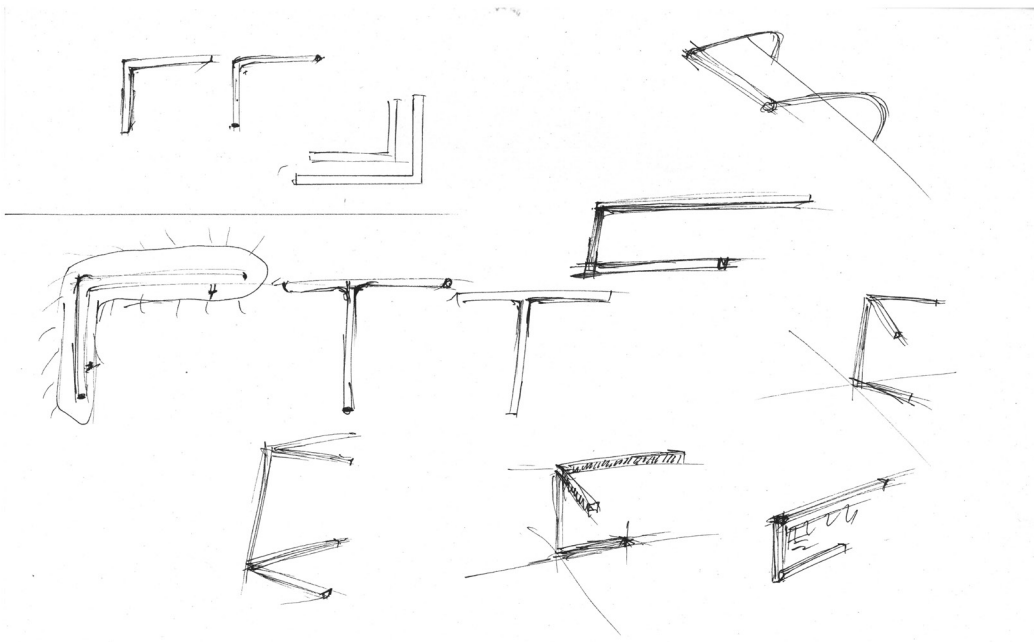


the lights produced in his studio are handcrafted and marked with an exclusive stamp for originality and quality.

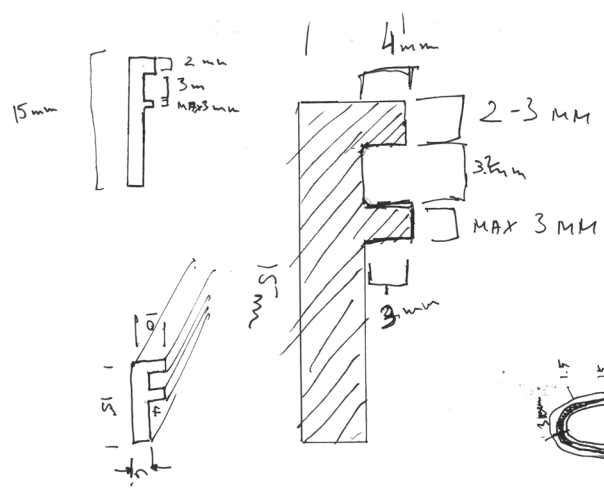
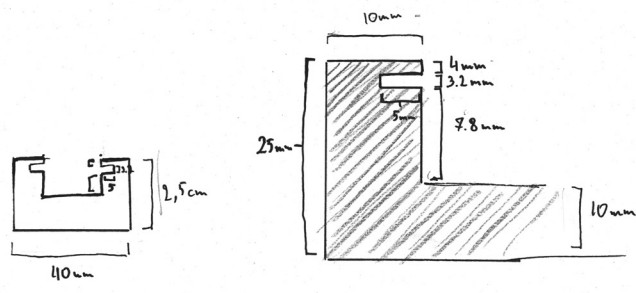
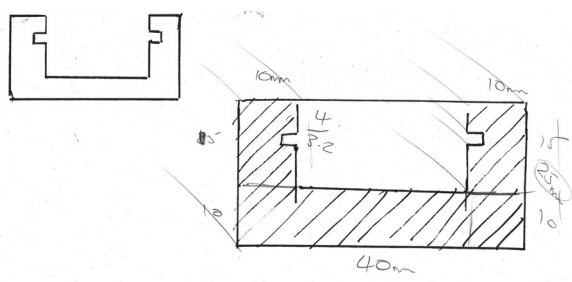


Img. 62-67



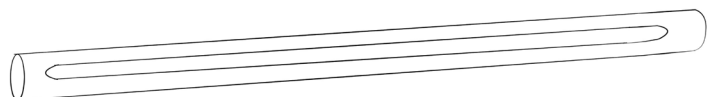
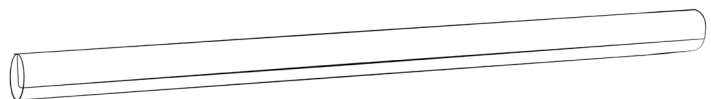
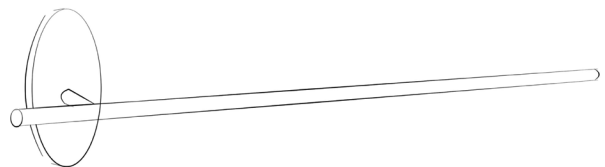
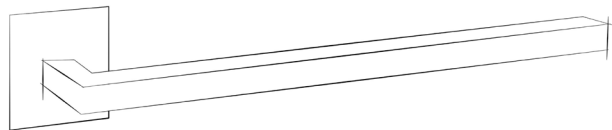
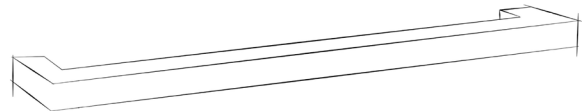
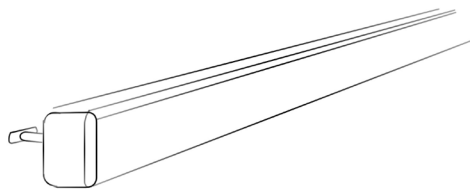
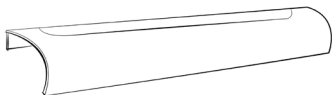
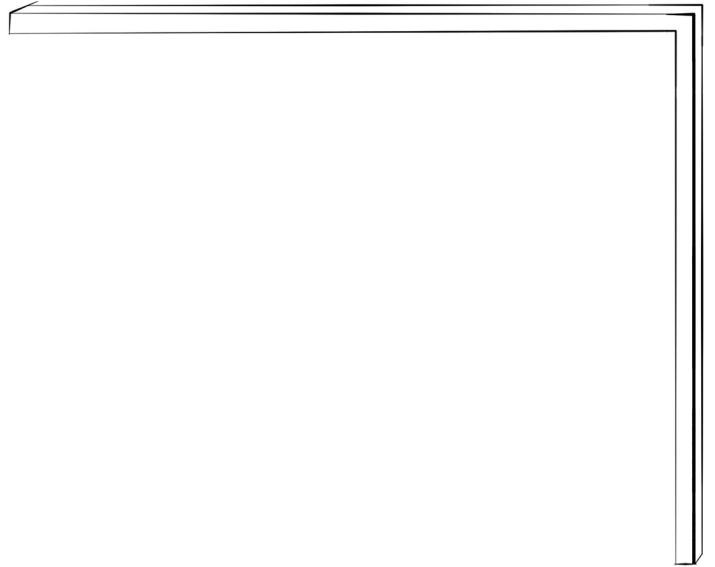


Initial Ideas for construction and fittings



FFH

The idea of the wall light was to be positioned on a short distance from the wall creating an interesting splash of light over the wall and highlighting the outline of the lamp.



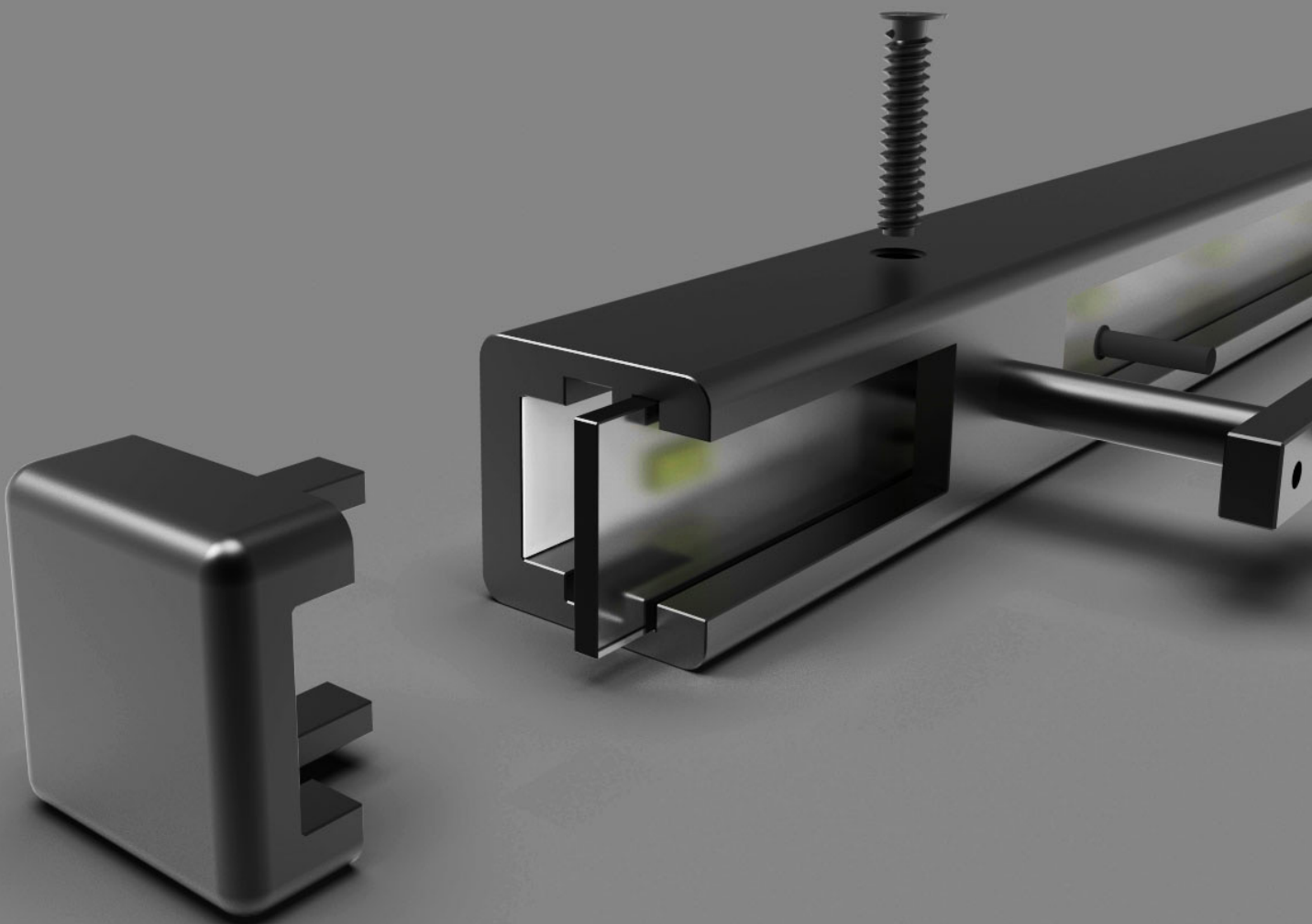
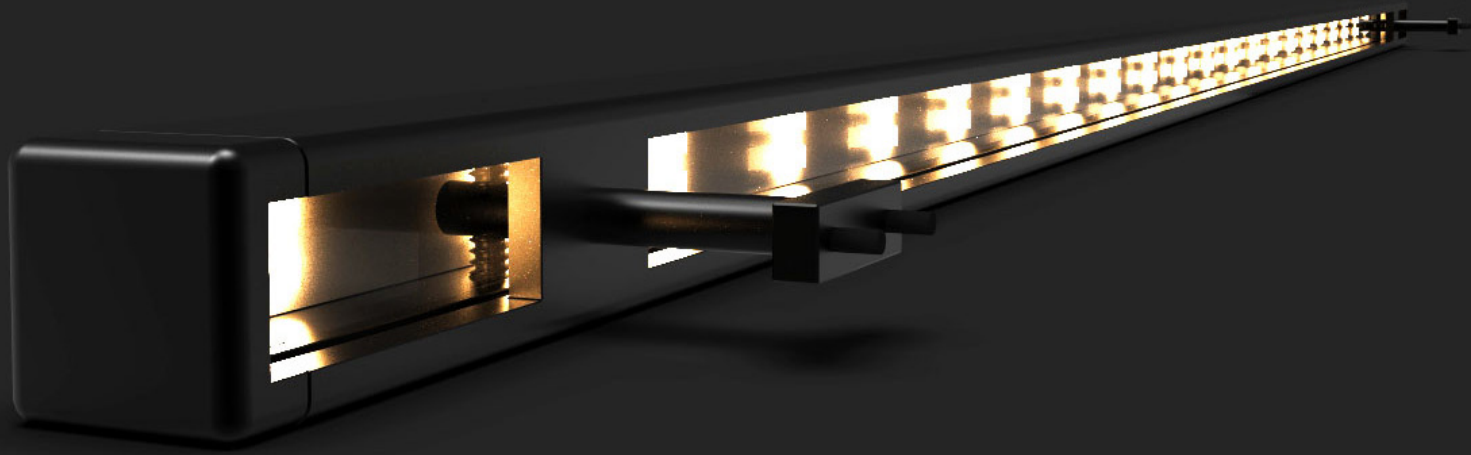


## Floating Effect. Affordance. Stats

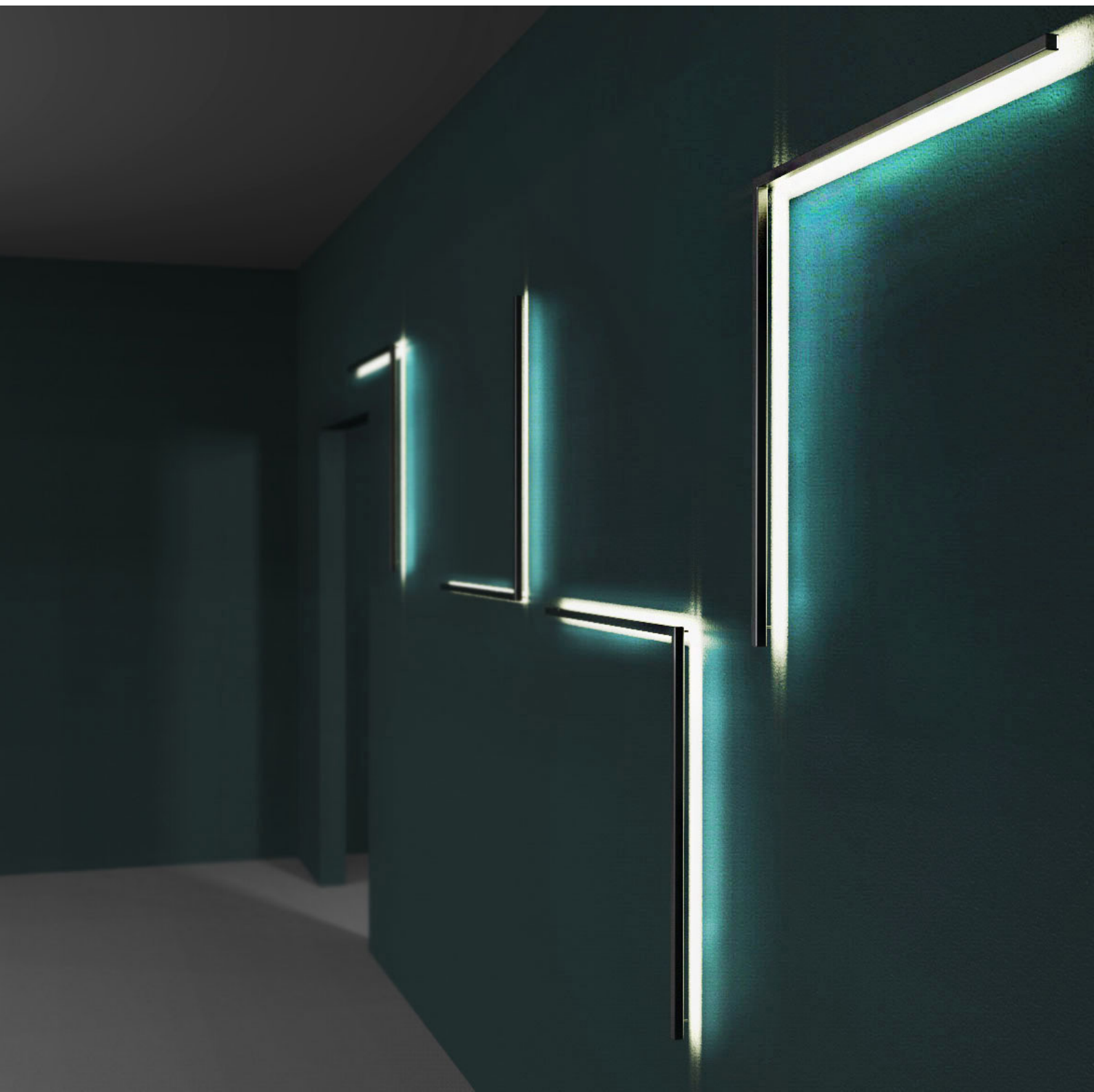
To achieve the illusion of “floating” next to the wall I thought of a resourceful way of disguising pins and screws which are the connecting pieces located right in the mid-horizontal section of the light. You can see on next page image how the crews “clamp” the body of the light to the pins which are then connected to the wall. That way the body of the light hangs on the pins leaving a small 5-8cm gap from the wall.

The maintenance of the wall light was made quite simple. By adding an opening part on the side of the light, resembling a simple lip and groove feature, one can have full access to the LEDs, screws, diffuser and all the internals by simply removing this small part. The wiring of the light travels through the pins as they are hollow from the inside.

Colour temperature - As the desk light, the wall light is aiming to make a contrast of my selected environment. The colour temperature remains the same at 3200 Kelvins. The colour intensity however here is much higher - 600 Lumens.



Because the light can be mounted in any position and direction I also see a potential for it as a “self-expressing piece”. The “invisible” mounting feature provides the user with a chance to play and arrange the light as desired creating unique shapes, forms and patterns.



# Specifications

Main Material: Aluminium

Finish: Matt (Sandblasted)

Location: Interior

Type of Light source: LEDs

Dimensions: H: 90 L: 1500 W: 85

Adjustable: no

Rotation Adjustable Angle: N/A

Dimmable: Yes

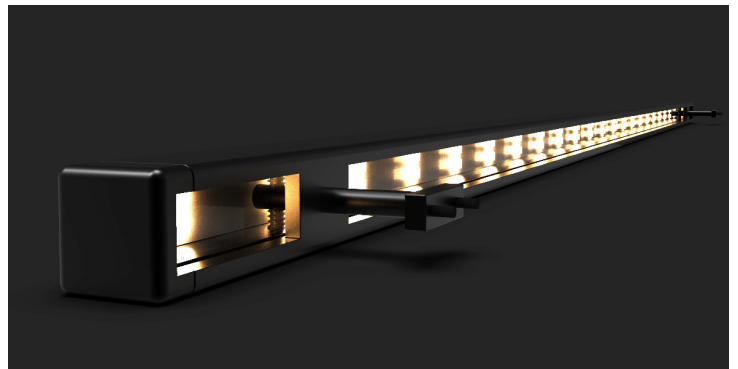
Colour temperature: 3200K

Light intensity: 600 Lumens

Wattage: 15 W

Weight (estimation): 3,8kg

Defuser material: Sandblasted/  
Frosted Opal Acrylic



# Ceiling Light



The ceiling Light follows a very similar almost identical design as the table light. The bodies of the light will again be die-casted and made from anodized aluminum parts with the same sandblasted matt finish.

The light consists of two identical components that are installed separately. Since it is recessed light the installation will be done only by an electrician. The LED driver is slotted inside the fitted compartment.



# Specifications

Main Material: Aluminium

Finish: Matt (Sandblasted)

Location: Interior

Type of Light source: LEDs

Dimensions: H: 263 L: 1750 W: 182

Adjustable: no

Rotation Adjustable Angle: N/A

Dimmable: Yes

Colour temperature: 3400K

Light intensity: 700 Lumens

Wattage: 17 W

Weight (estimation): 3,1 kg (each)

Defuser material: Sandblasted/  
Frosted Opal Acrylic



# Bibliography

## Online Sources:

A simple guide to hotel lighting levels. (2019, May 7). Retrieved from <https://www.savemoneycutcarbon.com/learn-save/brief-guide-to-lighting-levels-in-hotels/>.

The Ultimate Guide to Hotel Lighting. (n.d.). Retrieved from <https://www.lampshonline.com/advice/ultimate-guide-hotel-lighting#hotel4>.

Spectral Distribution Chart. (n.d.). Retrieved from <https://eye-lighting.com/lighting-technology-education/general-lighting-basics/spectral-distribution-chart>.

(n.d.). Retrieved from <https://www.ledvance.in/news-and-stories/stories/hotel-lighting-guide/index.jsp>.

Fane, T. (2019). Different Types of Hotels, Where to Stay? | Business and Leisure. Retrieved 29 November 2019, from <http://www.travelsage.co.uk/different-types-hotels-stay/>

Hotel Interior Design, Part 2: The Psychology of Lighting | Fohlio. (2019). Retrieved 29 November 2019, from <https://www.fohlio.com/blog/hotel-interior-design-part-2-psychology-lighting/>

EUROPEAN STANDARD. Light and lighting - Lighting of work places - Part 1: Indoor work places (2002). Brussels.

## Graphs

Graph 1 EUROPEAN STANDARD. Light and lighting - Lighting of work places - Part 1: Indoor work places (2002). Brussels.

Graph 2- EUROPEAN STANDARD. Light and lighting - Lighting of work places - Part 1: Indoor work places (2002). Brussels.

Graph 3- EUROPEAN STANDARD. Light and lighting - Lighting of work places - Part 1: Indoor work places (2002). Brussels.

## Images

1. [Image]. Retrieved from <http://www.astrolighting.com>
2. [Image]. Retrieved from <http://www.astrolighting.com>
3. [Image]. Retrieved from <http://www.astrolighting.com>
4. [Image]. Retrieved from <http://www.astrolighting.com>
5. [Image]. Retrieved from <http://www.astrolighting.com>
6. [Image]. Retrieved from <http://www.astrolighting.com>
7. [Image]. Retrieved from <http://www.astrolighting.com>
8. [Image]. Retrieved from <http://www.astrolighting.com>
9. [Image]. Retrieved from <https://www.noon.com/egypt-en/industriell-globe-pendant-lamp-beige-white-24-centimeter/N22209510A/p>
10. [Image]. Retrieved from <https://www.rona.ca/en/electrical-and-lighting>
11. [Image]. Retrieved from <https://www.wayfair.co.uk/lighting/cat/lighting-c234985.html>
12. (n.d.). Retrieved from [https://www.lighting-direct.co.uk/dar-achates-9-light-ceiling-pendant-gold-and-agate.html?utm\\_source=google&utm\\_medium=cpc&utm\\_cam-](https://www.lighting-direct.co.uk/dar-achates-9-light-ceiling-pendant-gold-and-agate.html?utm_source=google&utm_medium=cpc&utm_cam-)

paign=shopping&customer\_tax\_visibility=2&gclid=CjwKCAiA\_f3uBRAmEiwAzPuaMxsIhEWR-fH\_f-no4\_N6OplGgUhcE-XDcL-P5R4h6w4H9X9AFe4DyNhoC8h4QAvD\_BwE

13. (n.d.). Retrieved from <https://www.diy.com/departments/lighting/indoor-lights/DIY579437.cat>

14. Retrieved from [https://www.wallpaper.com/travel/norway/bergen/hotels/hotel-norge#pic\\_254045](https://www.wallpaper.com/travel/norway/bergen/hotels/hotel-norge#pic_254045)

15. Retrieved from [www.hilton.com](http://www.hilton.com)

16. Retrieved from <https://hotelbocage.com/en/>

17. Retrieved from <https://www.fourseasons.com/megeve/accommodations/>

18. Retrieved from <https://inboxhotel.com/>

19. Retrieved from <https://inboxhotel.com/>

20. Retrieved from <https://trendecors.com/2018/09/16/30-inspirational-decorations-with-led-lights/>

21. Retrieved from <https://archinect.com/firms/project/150134665/refurbishment-for-eduardo-laura-enzo/150135809>

22. Retrieved from <https://www.bocadolobo.com/en/inspiration-and-ideas/charismatic-modern-bedroom-design/>

23. Retrieved from <http://www.ariyonainterior.com/accent-lighting/>

24. Retrieved from <http://www.ariyonainterior.com/accent-lighting/>

25. Retrieved from <http://www.ariyonainterior.com/accent-lighting/>

26. Retrieved from <https://luckythink.com/living-room-lighting-ideas/>

27. Retrieved from <https://www.flickr.com/photos/ivacukic/6516142841/>

28. Retrieved from <https://www.express.co.uk/travel/articles/891863/friendliest-city-in-UK-revealed-bath>

29. Retrieved from <https://www.dailyecho.co.uk/news/11884517.southamptons-unhealthiest-road-above-bar-street-among-worst-in-country/>

30. Retrieved from [https://en.tripadvisor.com.hk/LocationPhotoDirectLink-g198810-d1590856-i300982957-Guarda\\_Golf\\_Ho](https://en.tripadvisor.com.hk/LocationPhotoDirectLink-g198810-d1590856-i300982957-Guarda_Golf_Ho)



tel\_Residences-Crans\_Montana\_Canton\_of\_Valais\_Swiss\_Alps.html

31. Retrieved from <https://www.royalsorrento.com/en/rooms/superior-suite/>

32. Retrieved from <https://thegreensunshineco.com/think-beyond-white-led-and-bulb-grow-lights-kelvin-and-color-temperature/>

33. Retrieved from <https://wisont.wordpress.com/2017/02/09/hotel-bocage-huahin-by-dbalp/#jp-carousel-10308>

34. Retrieved from <https://www.rcelectric.org/energy-efficiency/lighting/>

35. Retrieved from <https://wiki.metropolia.fi/pages/viewpage.action?pagelId=132844741>

36. Retrieved from [https://www.allmodern.com/lighting/pdp/tregenna-595-led-floor-lamp-orn11552.html?piid=34392748&utm\\_medium=Social&utm\\_source=Pinterest](https://www.allmodern.com/lighting/pdp/tregenna-595-led-floor-lamp-orn11552.html?piid=34392748&utm_medium=Social&utm_source=Pinterest)

37. Retrieved from [https://www.wayfair.com/lighting/pdp/orren-ellis-uffington-63-led-floor-lamp-orn11577.html?utm\\_medium=Social&utm\\_source=Pinterest](https://www.wayfair.com/lighting/pdp/orren-ellis-uffington-63-led-floor-lamp-orn11577.html?utm_medium=Social&utm_source=Pinterest)

38. Retrieved from [https://www.1stdibs.com/furniture/lighting/sconces-wall-lights/tube-wall-light-made-brass-led-light-hand-crafted-designed-chicago/id-f\\_7242333/](https://www.1stdibs.com/furniture/lighting/sconces-wall-lights/tube-wall-light-made-brass-led-light-hand-crafted-designed-chicago/id-f_7242333/)

39. Retrieved from <https://lemanoosh.com/publication/auto-draft-53/#.WEZ-bj3gBpQ.pinterest>

40. Retrieved from <https://i.pinimg.com/originals/e2/f1/a4/e2f1a4d75ce95eca07d2641c1eae67fe.jpg>

41. Retrieved from <https://lemanoosh.com/publication/auto-draft-225/#.VK3X15D4Pms.pinterest>

42. Retrieved from <https://www.pearlcreative.com/de/work/beurer-stylepro-hc50-haartrockner>

43. Retrieved from [https://lemanoosh.com/wp-content/uploads/Nytec\\_Watch\\_Rendering\\_02.jpg](https://lemanoosh.com/wp-content/uploads/Nytec_Watch_Rendering_02.jpg)

44. Retrieved from <https://takeovertime.co/post/89141305093/via-gerhardt-kellermann>

45. Retrieved from <https://www.behance.net/gallery/5184789/Cuba>

46. Retrieved from <https://www.hepartshome.com/products/an->

nular-led-pendant-light-chandelier-lighting-ambient-light-led-integrated-dimmable-with-remote-control

47. Retrieved from <https://www.wallpaper.com/art/ron-gilad-takes-us-on-a-tour-of-his-new-show-at-the-tel-aviv-museum-of-art#84133>

48. Retrieved from <https://reinoudoudshoorn.nl/sculptures/>

49. Retrieved from <https://anamorfosis.tumblr.com/>

50. Retrieved from <https://www.breyi.com/4287/the-importance-of-interior-lighting-design-in-life/41/>

51. Retrieved from <https://www.instagram.com/p/BvkFRwpjPnn/>

52. Retrieved from <https://www.shadesoflight.com/products/energy-efficient-modern-balance-beam-led-island-chandelier>

53. Retrieved from <https://www.ylighting.com/mumu-led-linear-suspension-pendant-light-by-seed-design-SEDP149479.html>

54. Retrieved from [https://www.2modern.com/products/z-bar-led-desk-lamp?variant=1243809108&utm\\_source=Pinterest&utm\\_medium=Social&utm\\_term=1243809108](https://www.2modern.com/products/z-bar-led-desk-lamp?variant=1243809108&utm_source=Pinterest&utm_medium=Social&utm_term=1243809108)

55. Retrieved from [https://www.2modern.com/products/z-bar-led-desk-lamp?variant=1243809108&utm\\_source=Pinterest&utm\\_medium=Social&utm\\_term=1243809108](https://www.2modern.com/products/z-bar-led-desk-lamp?variant=1243809108&utm_source=Pinterest&utm_medium=Social&utm_term=1243809108)

56. Retrieved from [https://www.amazon.es/Xiaomi-Smart-LED-Lamp-Desk/dp/B01JIGCG4O/ref=sr\\_l\\_18?ie=UTF8&qid=1500565640&sr=8-18&keywords=desk+lamp](https://www.amazon.es/Xiaomi-Smart-LED-Lamp-Desk/dp/B01JIGCG4O/ref=sr_l_18?ie=UTF8&qid=1500565640&sr=8-18&keywords=desk+lamp)

57. Retrieved from <https://www.dowsingandreynolds.com/product-category/light-switches-plug-sockets/white/>

58. Retrieved from <https://www.shutterstock.com/video/clip-20046664-hands-opening-bottle-fresh-mineral-water-->

59. Retrieved from [https://en.wikipedia.org/wiki/Knurling#/media/File:Knurling\\_closeup.jpg](https://en.wikipedia.org/wiki/Knurling#/media/File:Knurling_closeup.jpg)

60. Retrieved from <https://www.amazon.com/Pivot-Knurling-Brand-Knurls-Holder/dp/B01MYAW7QX>

61. Retrieved from <https://www.novussolutions.co.uk/services/reactive-maintenance/hotel-and-leisure>

62. Retrieved from <http://www.hubfurniture.com.au/brands/michael-anastassiades>

63. Retrieved from <http://www.hubfurniture.com.au/brands/michael-anastassiades>

64. Retrieved from <http://www.hubfurniture.com.au/brands/michael-anastassiades>
65. Retrieved from <http://ankerco.com/brands/michael-anastassiades>
66. Retrieved from <http://ankerco.com/brands/michael-anastassiades>
67. Retrieved from [https://www.madeindesign.co.uk/prod-arrangements-3-led-pendant-3-elements-h-140-x-l-170-cm-by-flos-refarrangements3.html?esl-k=sem-google|nu|c325975629976|m|k744073975|29|p|t|dc|a6086|34|4|0|g|680429030&gclid=Cj0KC-QiA5dPuBRCrARIsAJL7oejMYm2zQLI\\_lffgk|68|Lwlu\\_cnusfSCO-j4BjfE7bm4gLTlWdeTNB4aAmHlEALw\\_wcB](https://www.madeindesign.co.uk/prod-arrangements-3-led-pendant-3-elements-h-140-x-l-170-cm-by-flos-refarrangements3.html?esl-k=sem-google|nu|c325975629976|m|k744073975|29|p|t|dc|a6086|34|4|0|g|680429030&gclid=Cj0KC-QiA5dPuBRCrARIsAJL7oejMYm2zQLI_lffgk|68|Lwlu_cnusfSCO-j4BjfE7bm4gLTlWdeTNB4aAmHlEALw_wcB)

