

Introduction of new segment in LED lighting

Project Guide- Mr. Sandeep Thombre

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M.Des (Industrial Design)

IDC, IIT Bombay



June 17, 2014

PROJECT COMPLETION CERTIFICATE

This is to certify that Mr. Akshay Narayan Hargude (13651) worked as Project trainee in our organization as a part of his academic curriculum from 6-May -2014 to 6-June-2014.

As a part of his project study he worked on "Introduction of new segment in LED Lighting" and has successfully completed the same.

His contributions are noteworthy and he has also exhibited lot of enthusiasm to learn new design techniques.

We wish him success in all his future endeavors.

Best Regards,

For Tata Elxsi Limited

Shriram T Manager - Human Resource.

TATA ELXSI

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April 22, 2014

Akshay Hargude IDC IIT Mumbai

Dear Akshay,

This is further to your project assignment in our organization as a part of your academic curriculum requirement with our design and development center at Pune from

6th May 2014 to 6th June 2014 under the following terms and conditions.

- 1. You will be paid all inclusive stipend of Rs. 8,000/- per month for the period of 1 Month and w.e.f. 6th May 2014 to 6th June 2014
- 2. During the period of assignment you shall administratively report to Mr. Sandeep Thombre and carry out all aspect of project assigned to you.
- 3 Information pertaining to the company's operations shall remain secret and safeguarded by you both during and after your tenure of assignment with us.
- 4 Breach of any of the above conditions will render you liable to termination of your assignment without notice.
- 5 The company is not obliged to offer you permanent employment on the completion of the assignment and you shall not be entitled to or can claim any benefits applicable to employees of the company.

Please sign the duplicate copy of this letter in token of your acceptance of the terms & conditions contained herein.

We wish you all success in your assignment.

Cordially,

for Tata Elxsi Limited,

Philip K Mammen VP & Head - Human Resource

TATA ELXSI

Registered Office ITPB Road Whitefield Bangalore 560 048 India Tel +91 80 2297 9123 Fax +9.1 80 2841 1474 www.tataelysi.com





Internship place



I did my summer internship of one month at Tata Elxsi, Pune.

Company Details-

Address- Giga Space IT park, No. 201, 2nd floor

Alpha-1 building, Viman nagar

Pune- 411014

Phone- +91 206606 0033 Fax- +91 206606 0015

Mr. Sandeep Thombre Sr. Design Manager (ID) Tata Elxsi, Pune sandeepthombre@tataelxsi.co.in



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The summer internship, as part of my academic requirement, was completed at Tata Elxsi, Pune during the period, 6th May to 6th June, 2014. Tata Elxsi is a design company that blends technology, creativity and engineering. During the internship, I was involved in multiple projects ranging from packaging to product design.

Due to the short nature of my internship, my involvements in the projects were more or less limited to the ideation phase only. In all the projects, I was part of a team and credit for the works presented here also goes equally to the other team members.

Acknowledgement

This summer internship project undertaken by me at Tata Elxsi, Pune has been an unforgettable experience which will go a long way in improving my understanding of industry and industrial design as a whole. I am deeply indebted to Mr. Sandeep Thombre, Sr.Design Manager (ID) Tata Elxsi, Pune, for providing me the deepest insight and guidance through the internship.

I am also grateful to Mr. Dipesh Parmar, Industrial Designer (ID) Tata Elxsi, Pune, for sharing with me his experience in Industrial Design and guiding me through the internship.

I am also thankful to the faculty of IDC, IIT Bombay, for providing such a valuable opportunity to experience an industrial experience of product design.

Finally, I am thankful to the whole Design team of Tata Elxsi, Pune for providing me a conducive atmosphere and supporting me with impeccable technical expertise.

Akshay N. Hargude 136130007 3rd Semester, IDC-IIT Bombay Dated:

What I wanted to do

I wanted to have a first hand experience of the design industry with active involvement in live projects. Having had no prior industrial experience in design field, I felt it was very important to understand the trend and practices followed in this field. It is more so because I intend to practice in this sector after my post graduation in IDC.

Secondly, I wanted to meet expand my knowledge base and improve my skills. More specifically, I wanted to improve my sketching skills and solid modelling capability. Lastly, I also wanted to be in an environment of responsibility and team play, through which I hoped to become a better leader in the future.

About the company



Tata Elxsi is a design company that blends technology, creativity and engineering to help customers transform ideas into world-class products and solutions.

A part of the \$100 billion Tata group, Tata Elxsi addresses the communications, consumer products, defense, healthcare, media & entertainment, semiconductor and transportation sectors. This is supported by a network of design studios, development centers and offices worldwide. Key services include embedded product design, industrial design, animation & visual effects and systems integration.

Services provided by Tata Elxsi

Embedded Product Design

Tata Elxsi provides technology consulting, product development and testing services for leading product companies, service providers and start-ups. This is backed by an in-depth understanding of technology, a large multi-disciplinary product development team, mature processes and systems.

Industrial Design

Tata Elxsi helps customers develop successful brands and products by using design as a strategic tool for business success. It caters to a broad spectrum of industries like Automotive, Communications, Consumer products, Healthcare and Retail.

Visual Computing Labs

Tata Elxsi provides Animation and Visual Effects (VFX) services for feature films and episodic television. It also supports advertising and marketing by providing these services for TV Ad Commercials and corporate videos for visualization and new product launches. It has a world-class studio in India and a creative team that includes national and international award winning professionals.

Systems Integration

Tata Elxsi implements and integrates complete systems and solutions for Broadcast, CAD/CAM/CAE/PLM, Disaster Recovery, High-Performance Computing, Storage and Virtual Reality.

It addresses the Broadcast, Defense, Education, Government and Manufacturing sectors with an expert team of integration specialists and support engineers located across a wide network of offices.

My work at Tata Elxsi

During the tenure of my summer internship I worked on two levels

Main project- I worked on this project which was assigned to me only.

Other projects- I also helped other designers in their projects by making ideations and prototypes.

Main project-

Introduction of new segment in LED lighting

It was a pitch project from Tata Elxsi for a Well-known brand in LED lighting industry. The basis of the project was to introduce new segment of LED lights in market.

Other projects-

Ideation and form exploration of an elderly assistance device.

It is a device which can assist elderly person with hearing disorder and guide him through day to day activities.

Ideation of tamper evident packaging for a pesticide making company.

The main moto of this project was to design a container for pesticide with tamper evident feature, to eliminate adulteration. Also to maximize the branding area on bottle.

Prototyping

I helped other designers by making mock-ups and prototypes.

(Client names can not be displayed due to company policy)







Introduction-

With the recent Central government effort to promote manufacturing of light emitting diode (LED) lighting products in India, the industry expects a significant growth in the LED market in the next five years, due to Central government thrust. The most recent product category to be brought under the Preferential Market Access policy is LED. "Due to this Central government effort and other state government efforts to boost LED manufacturing in the country, we expect the India LED market to grow remarkably in next decade.

The growth factor is the significant cut in price of LED lighting products. The price of these products has gone down by almost 25 per cent over the years. Due to cost optimization and technical advancements in LED chip and power electronics, the prices of luminaires like down lights, bulbs and streetlights have been brought down to some acceptable level.

In current scenario of India, There are many Well established multinational brands in LED lighting. Also some new brands are emerging because of encouraging national policies. Because of this, the Indian market is full of new LED luminaire with advanced LED technologies.

Considering all this scenario, to increase profit in such competitive LED industry, company have to come up with Out Of The Box idea and introduce it in market as a new segment.





Market Study-

To understand the current market trend in LED luminaires, I did market study. The market study was done on two levels.

- 1- The types of LED luminaires available in Indian market
- 2- The LED luminaires manufacturing companies and their products in Indian market



Desk



Ceiling



Wall



Outdoor



Intelligent



Health



Types of LED luminaires-

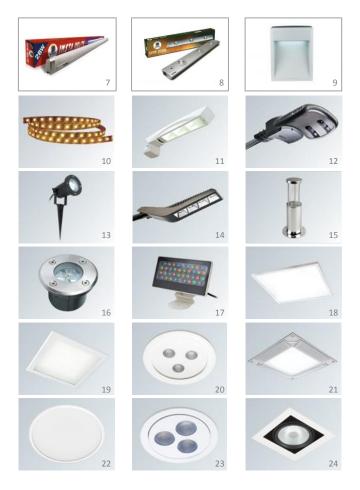
According to the use and the position of mounting, the luminaires available in the market can be classified in six main types.

- 1- Desk mounted Luminaires (figure 1)
- 2- Ceiling mounted Luminaires (figure 2)
- 3- Wall mounted Luminaires (figure 3)
- 4- Other outdoor Luminaires (figure 4)
- 5- Intelligent Luminaires (figure 5)
- 6- Lamps used for health and well being (figure 6)

(Reference image 1 to 6)







Wipro

Wipro has a huge range of Luminaires. It has luminaires in all categories, right from the simple LED bulbs (figure 7, figure 8 figure 10) to Luxurious lamps (figure 19). It also has street lamps and garden lamps (figure 11 to 14). Wipro has a wide range of ceiling lamps (figure 18 to 24). These luminaires are elegant and simple. These are average from technological point of view; But are advanced from aesthetic point of view.

(Reference image 7 to 24)







Philips

As compared to competitor companies, Philips is far ahead in terms of technology as well as aesthetics. Similar to Wipro, Philips also has a huge range of LED luminaires. These are ranging from simple LED bulb (figure 25 to 27) to high end LED ambiance creating lamps (figure 28). Philips has a complete new range of wall mounted luminaires (figure 39 to 42). By using advanced technology and aesthetic treatment, Philips has set a new benchmark in LED luminaires industry.

(Reference image 25 to 42)







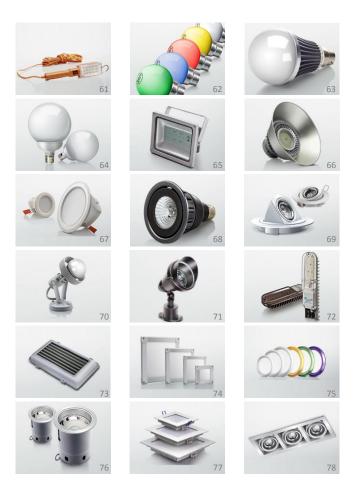
Havells

The luminaires of havells are more advanced in technology as compared to aesthetic treatment. These luminaires are more functional and simple (figure 43 to 48) Also the range of luminaires is very limited. These luminaires are mainly from indoor category.

(Reference image 43 to 60)







Syska

This is newly emerging brand in India. It has luminaires in some selected categories. All these luminaires are advanced in technology. Also these are quite ahead to its competitor companies in terms of aesthetic treatment. Basic bulbs are also very nicely made with good finishing (figure 62 to 64). Most of the luminaires by syska are in luxurious category (figure 66 to 78) which are used to create ambiance in living rooms and bed rooms.

(Reference image 61 to 78)







Bajaj

Bajaj has quite a large range or luminaires. But, these luminaires lag in both technology as well as aesthetic treatment as compare to its competitor companies. Its tube lights, bulbs and emergency lamps have very much crooked shape (figure 79 to 83). Bajaj have a new range of outdoor luminaires (figure 91 to 96).

(Reference image 79 to 96)







Crompton Greves

Crompton greves has its products in some limited categories. Most of the luminaires of Crompton greves are in indoor category. It has products, ranging from simple LED bulbs (figure 100 to 102) and tube lights (figure 109) to luxurious ambiance creating lamps (figure 105 to 108).

(Reference image 97 to 114)



Panasonic































© Competitor's products-

Panasonic

Almost all the luminaires by Panasonic are in indoor category. These luminaires are average from technological point of view and slightly better from aesthetic point of view. Panasonic has a huge range of ceiling mounted luminaires (figure 122 to 129).

(Reference image 115 to 129)























General Electric

General Electric has a very limited categories of luminaires. These luminaires are average from technological point of view but are below average from aesthetic point of view. These luminaires lag in luxurious ambiance creating lamps. It includes bulbs (figure 130 to 136) and tube lights (figure 137 to 138 which are more functional.



Analysis-

| | WIPRO Applying Thought | PHILIPS | G | HAVELLS | Panasonic | SYSKA LED | F | BAJAJ |
|-------------------|---------------------------|----------|----------|-------------|-----------|-----------|----------|----------|
| | | | Inde | oor lights | | | | |
| Ceiling lamps | ⊘ | ⊘ | ⊘ | ⊘ | ⊘ | Ø | ② | ⊘ |
| Wall lamps | Ø | Ø | ⊘ | Ø | ② | Ø | ② | ⊘ |
| Table lamps | ⊘ | Ø | ⊘ | Ø | ② | Ø | ② | ⊘ |
| Spot lamps | Ø | Ø | ⊘ | Ø | ② | Ø | Ø | ⊘ |
| Night lamps | Ø | Ø | ⊘ | Ø | ② | Ø | | ② |
| Emergency lamps | Ø | Ø | ⊘ | | ② | | | ⊘ |
| Torch | ② | ② | ⊘ | | ⊘ | | | Ø |
| | | | Outo | door lights | | | | |
| Step lights | ⊘ | Ø | | | | ⊘ | | ⊘ |
| Walkover lights | ⊘ | Ø | | | | | | ⊘ |
| Undrewater lights | ⊘ | Ø | | | | | | ⊘ |
| Flood lights | Ø | Ø | ② | Ø | | Ø | ② | ⊘ |
| Flexi lights | ⊘ | Ø | | | | | Ø | |
| street lights | ⊘ | ⊘ | ⊘ | ⊘ | ⊘ | Ø | ⊘ | ⊘ |





Image- http://cdn-2.vivalascuola.it/o/orig/i-concetti-base-della-statistica 1b40de82e783800994fdb4aae6b93102.jpg

Analysis-

After market study I did analysis of entire data collected.

Method 1

I compared all companies on the basis of types of luminaires manufactured by them. After this comparison, I came to know that, The client-Company has luminaires in most of the categories. So the conclusion was, either the product quality needs to be improved or the new segment needs to be introduced in market.

Method 2

I used graphical method to compare the luminaires of each company. I arranged the luminaires of each company on the graph of "Technology Vs Aesthetics". From these graphs I understood that, the luminaires of the client-company are lagging in both Technology as well as aesthetic point of view.

21

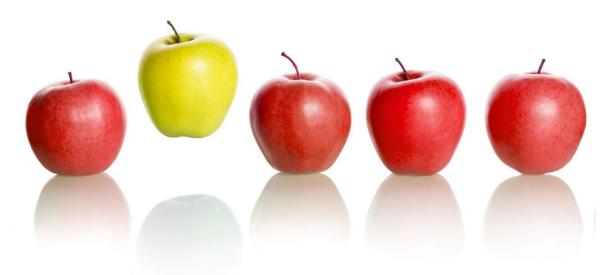


Design Statement-

To introduce a new segment in LED luminaires.

Design Brief-

To maximize the profit by introducing a new segment in LED luminaire market which will be technologically advanced, mass manufactural and user-need oriented.













User activity analysis-

I did the user activity analysis to find out the opportunities for introducing a new segment in LED lighting. While carrying activity analysis, I considered four main users which are the main part of an Indian family.

- 1) Husband
- 2) Wife
- 3) Elderly person
- 4) Children





By considering all the results which I got from market analysis and the user activity analysis, I tried to ideate some new categories in LED lighting.

For that first of all I tried to find out need of light in day to day life of a person from Indian family. Then I tried to satisfy that need by using advanced LED technology. I also tried to give it an aesthetic treatment to make it more attractive.

For ideation I used the principles of lateral thinking.

(I can not share the ideations because of the Tata elxsi policies)

Other projects

During the tenure of my summer internship I helped other designers of Tata Elxsi by making ideations and prototypes for their projects.

Ideation and form exploration of an elderly assistance device.It is a device which can assist elderly persons with hearing disorder and guide them through day to day activities.

Ideation of tamper evident packaging for a pesticide making company.

The main moto of this project was to design a container for pesticide with tamper evident feature, to eliminate adulteration. Also to maximize the branding area on bottle.

Prototyping

I helped other designers by making mock-ups and prototypes.



Introduction-

It is a device which can assist elderly person with partial hearing loss and guide him through day to day activities. It will be equipped with a projector, a speaker, an indicator and necessary buttons.

(I can not explain more about the functionality of the product because of Tata Elxsi policy)

(Also I can not display the name of client because of Tata Elxsi policy)







Concept 1



This form is inspired by the "Kalash", which is generally used in Indian culture.

The main problem for elderly people is the lack of proper hand grip. The "kalash" has a typical shape in which the diameter of neck is quite small and after that, the diameter changes drastically in both directions (i.e. both on upper side and lower side). As the mass is more below the neck portion, the center of gravity comes below the neck portion. As the weight acts vertically downwards, it provides better stability. Also, because of it's shape, the fingers get good grip at neck portion.



Most of the elderly people use walking stick for support while walking; and they use second hand to take support of neighboring objects. So carrying this device from one place to other can be a problem for them.

So to avoid this, I tried to fit this device on walking stick, so that the person can carry it without any difficulty and also his/her balance will be maintained.

For that, a groove is made on the device, and it is covered with rubber padding.

The camera cap is in the form of slider. As the elderly people can not do skillful operations cause of weak hand grip, they can not fit the conventional camera cap.

Also, this operation can be mechanized.

The LED strip is provided on the periphery of the device to grasp attention and to make them alert.

Good quality speakers are provided on the device to convey the message to the people with partial hearing loss.





Concept 2

Here I have given conical form to the device with flat upper face. The LED strip is provided along the periphery of the device. Also the speaker is in the form of peripheral ring.





!deations

As stated earlier, the main problem with elderly people is the lack of proper hand grip. So, here I have given a separate handle in the form of smaller diameter cylinder. (Diameter of the handle should be between 20 mm to 25 mm).

Ideations-

The camera cap is in the form of slider. As the elderly people can not do skillful operations cause of weak hand grip, they can not fit the conventional camera cap.

Also, this operation can be mechanized.

The LED strip is provided on the periphery of the device to grasp attention and to make them alert.

Good quality speakers are provided on the device to convey the message to the people with partial hearing loss.

















Introduction-

The main moto of this project was to design a container for pesticide with tamper evident feature, to eliminate adulteration. Also to maximize the branding area on bottle.

The client company is facing a loss of several crores due to reuse of its pesticide bottles by adulterators. Also, as compare to its competitors, the bottle size was small because of which its shelf appearance was weak. So, to increase the size of bottle and its branding area was the second challenge in front of us.

(I can not display the name of client because of Tata Elxsi policies)



Ideations-



Concept 1



Constructional details-

The bottle is made up of three main parts; bottom portion, thin partition wall, top portion. All these three parts are joined together by ultrasonic welding. The pesticide is filled by company in both upper and lower compartments but in **unequal** amount. The farmer is supposed to make a hole in the partition wall by using some tool to use the pesticide in lower portion.









How does it work-

As stated earlier, the pesticide is filled in **unequal** amount in both upper and lower compartments. Hence, when a person holds it horizontally, a separate demarcation can be seen due to level difference.

Once the hole is made in the separating wall, a permanent damage is made to the bottle. So, if the adulterator filed the same bottle with dilute/low quality pesticide, it can be easily identified, as on holding it horizontally it will not show separate demarcation.

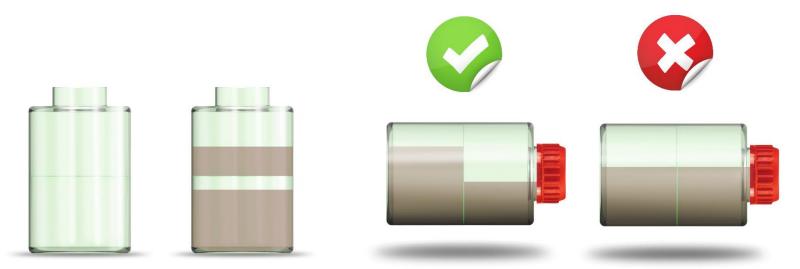


Image- http://www.psdgraphics.com/wp-content/uploads/2011/10/right-wrong-check-marks.jpg





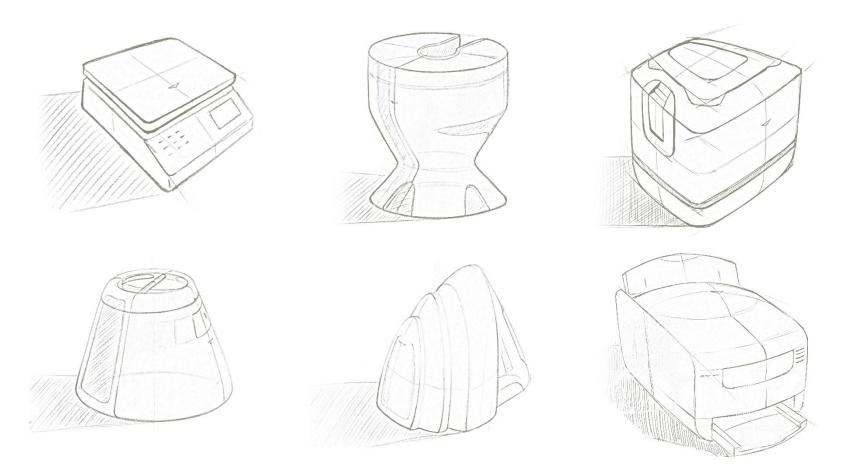


I helped other designers by making mock-ups and prototypes of their designs.

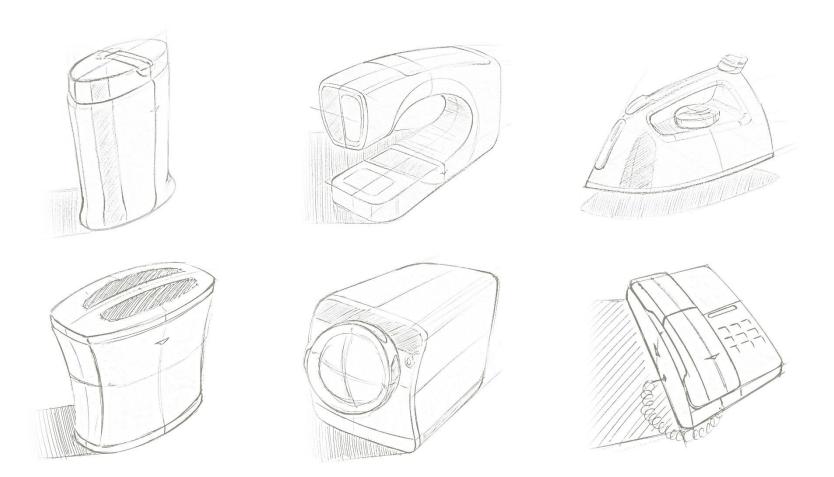
- 1) Mock-ups of an Oil jar
- 2) Prototypes of packaging of a chocolate company



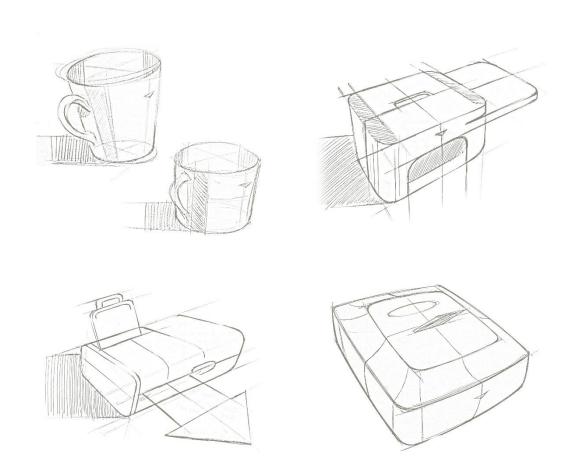
Mr. Dipesh Parmar guided me to improve my product-sketching skill







Sketching



My learning



Image- http://a3.mzstatic.com/us/r30/Purple4/v4/c3/66/ee/c366eef3-4a40-2137-43f9-4af13398e17b/icon 340.png

Being a complete Engineer and half Designer, working in a design firm was a whole new experience.

I had a first class exposure to Basic design process in the word class design studio. The work involved continuous interaction with engineering team to ensure the required output for the market.

It gave me a good understanding of client-customer relationship and the multiple levels of interaction.

It greatly improved my sketching, solid modeling and rendering skills.

It also improved my interactive skills and the ability to convey ideas to the client.



Fig.1 http://moderndesklamps.wordpress.com/tag/bap-led-desk-lamp/

Fig.2 http://www.eneltec-led.com/LED-Lighting-Blog/led-ceiling-lamp-classic- creation-for-your-life/

Fig.3 http://www.designmag.it/foto/artemide-al-salone-del-mobile-2013_6235.html

Fig.4 http://www.bossgoo.com/china-aguarium-light-strip.html

Fig.5 http://buzzhoz.com/mini-led-lights-for-crafts.html

Fig.6 http://www.parentdish.com/2008/10/30/fearful-moms-choosing-c-sections-more-often/

Fig.7 http://www.wiprolighting.com/modules/product/detail.php?img_id=416&submenu=2

Fig.8 http://www.wiprolighting.com/modules/product/detail.php?img_id=407&submenu=2

Fig.9 http://www.wiprolighting.com/modules/product/detail.php?img_id=408&submenu=2

Fig.10 http://www.wiprolighting.com/modules/product/detail.php?img_id=417&submenu=2

Fig. 10 http://www.wiprolighting.com/modules/product/detail.php?img_id=417&submenu=2

Fig.12 http://www.wiprolighting.com/modules/product/detail.php?img_id=401&submenu=6

Fig.13 http://www.wiprolighting.com/modules/product/detail.php?img_id=407&submenu=2

rig. 13 http://www.wiprolighting.com/modules/product/detail.php?img_id=407&submend=.

 $Fig. 14\ http://www.wiprolighting.com/modules/product/detail.php?img_id=394\&submenu=6\\$

Fig.15 http://www.wiprolighting.com/modules/product/detail.php?img_id=411&submenu=2

Fig.16 http://centurysalesonline.com/index.php/product/details/189

Fig.17 http://www.wiprolighting.com/modules/product/detail.php?img_id=400&submenu=6

Fig.18 http://www.wiprolighting.com/modules/product/detail.php?img_id=392&submenu=6

Fig.19 http://www.wiprolighting.com/modules/product/detail.php?img_id=409&submenu=2

Fig.20 http://www.wiprolighting.com/modules/product/detail.php?img_id=410&submenu=2

Fig.21 http://www.myhomesol.com/wipro-silverstreak-3w

Fig.22http://www.wiprolighting.com/modules/product/detail.php?img_id=398&submenu=6

Fig.23 http://www.wiprolighting.com/modules/product/detail.php?img_id=403&submenu=6

Fig.24 http://www.wiprolighting.com/modules/product/detail.php?img_id=414&submenu=2





- Fig.25 http://2.bp.blogspot.com/-vasS5YTdDB0/UoN_LZjqIUI/AAAAAAAAQQo/gYjlvFx0CBg/s1600/Philips+shield.png
- Fig.26 http://www.lampenmann.de/detail/index/sArticle/3412
- Fig.27 http://www.lampen-winkel.nl/product/5828/hanglamp-philips-ledino-diffuse-rond-instyle-cinta-690554816.html
- Fig.28 http://sklep.ecrystal.pl/philips-sepia-571701716-p-15798.html
- Fig.29 http://www.homedepot.com/p/Philips-Forecast-Sail-2-Light-White-Semi-Flush-Wall-Sconce-336043148/204805963?N=5yc1vZc7p5Zcgd
- Fig.30 http://www.theblaze.com/stories/2012/04/17/will-you-celebrate-earth-day-by-forking-over-60-for-this-light-bulb/
- Fig.31 http://www.philips.ie/c/myliving/302024/cat/
- Fig.32 http://www.archello.com/en/product/spot-led-i-surface-mounted
- Fig.33 http://m.ecat.lighting.philips.bg/m/indoor-luminaires/wall-mounted/icolor-tile-mx/55355/cat/
- Fig.34 http://www.quickmedical.com/burton-philips-wall-mounted-patient-room-lighting-light-caress-xc.html
- Fig.35 http://www.philips.co.in/e/philips-lighting/home.html
- Fig.36 http://www.lumec.com/blog/index.php/2013/03/21/philips-expands-led-portfolio
- Fig.37 http://www.philips.com.sg/c/ledino/302199/cat/
- Fig.38 http://www.philips.co.in/c/choose-your-luminaire/ledino-wall-light-690853186/prd/
- Fig.39 http://images.philips.com/is/image/PhilipsConsumer/690878786-A1P-global-001?wid=430&hei=430&media=image&\$jpgsmall\$
- Fig.40 http://www.nachi.org/increasing-home-energy-efficiency.htm
- Fig.41 http://www.dutchwest.co.uk/Philips-69056-31-16-Contemporary/dp/B004NXY17S
- Fig.42 http://www.philips.co.nz/c/ledino/302095/cat/
- Fig.43 http://symbolphotos.blogspot.in/2011/12/havells-logo-photos.html
- Fig.44 http://www.joseandsons.in/havellsconsumer.html
- Fig.45 http://pricebav.in/products/176
- Fig.46 http://www.archiexpo.com/prod/havells-sylvania/square-recessed-fluorescent-ceiling-light-fixtures-125799-1288887.html
- Fig.47 http://www.archiproducts.com/en/products/82366/led-built-in-lamp-officelyte-led-concord-by-havells-sylvania.html
- Fig.48 http://www.electraautomation.com/Led-lighting.html
- Fig.49 http://uttarakhandlighthouse.in/LED.html
- Fig.50 http://www.havells.com/ProductDetails.aspx?s=1595
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