AUTOMOBILE LIGHT ENCLOSURE

1. INTRODUCTION:

The lighting system of a motor vehicle consists of lighting and signaling devices mounted or integrated to the front, rear, sides, and in some cases the top of a motor vehicle. This lights the roadway for the driver and increases the conspicuity of the vehicle, allowing other drivers and pedestrians to see a vehicle's presence, position, size, direction of travel, and the driver's intentions regarding direction and speed of travel. Emergency vehicles usually carry distinctive lighting equipment to warn drivers and indicate priority of movement in traffic. The all these lights require the closures. Nowadays the design of each lights are varies with make and models of vehicle. The replacement market is very high, as the closure is get broken in accident very rapidly. Nowadays the closures are manufactured from acrylic mainly. So in this project, we have included automotive light enclosure as acrylic parts only.

2. PRODUCT & ITS APPLICATION:

Acrylic sheets can be obtained in transparent, translucent and opaque grades as well as wide range of colors and shades. They are used in measuring and drawing instruments, sign boards, auto-mobile components, buttons, transparent casings and covers for electrical/electronic items. Advertising displays constitute the most important uses of acrylic sheets. It has largely replaced printed metal, wooden and neon sign boards. Cast and extruded acrylic sheets are used extensively for lighting shields. They are also replacing glass in domes, skylight, swimming pool enclosures, shop fronts and related applications. Transparent acrylic sheet enclosures are used for commercial and defence aircraft, windows, wind shields, canopies etc. Laminated acrylic sheets are used by the aircraft industry. The casting of acrylic sheet involves the preparation of a liquid chemical monomer (methyl methacrylate) which is placed between two sheets of glass separated by a gasket to control the thickness of the product. Applications of acrylic sheets are comparatively new, so

considering this; manufacturers have to resort to fair amount of publicity to market the product. Entrepreneurs can enter into this field as there exists enormous potential of the product. These types of plastic enclosures work perfect for parts displays, point of sales units, a replacement for glass enclosures, or many different applications where you would want people to see the insides of an enclosure.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Graduate in any discipline.

4. INDUSTRY LOOK OUT AND TRENDS

The global auto industry is more challenged than many people realize. On the surface, performance is strong. Worldwide sales reached a record 88 million autos in 2016, up 4.8 percent from a year earlier, and profit margins for suppliers and auto makers (also known as original equipment manufacturers, or OEMs) are at a 10-year high. Nonetheless, viewed through the lens of two critical performance indicators, the industry is in serious trouble.

5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

Automotive lighting covers have very good scope, as both new vehicles and used vehicles, both requires lighting covers. The present scenario and growth prospects of the global automotive lighting market for the period 2015-2020 is tidied very well and data are available. However, in small scale, one can cater automotive light closure for used car. To calculate the market size, we have considered revenue generated from the total production of automotive lights, which include halogen, xenon, and LED lights. Lighting in an auto mobile is considered to be an important system, as it is vital for safety and comfort and, in modern cars, is an important feature of vehicle appearance. Automotive lighting includes lighting and signaling devices located in the front, sides, and rear of a vehicle. The primary uses of automotive lighting are to ensure visibility for the driver, improve vehicle conspicuity, and indicate the presence and position of the vehicle to others. The Lighting market for

Automotive is majority driven by increasing vehicle production and increasing lighting applications, especially in passenger cars. Additionally, factors such as passenger and pedestrian safety regulations and increased demand for luxury, comfort, and ambience are driving technological advancements in the automotive lighting industry. The Lighting market for Automotive is projected to grow at a CAGR of 6.80% from 2017 to 2022 and is expected to reach USD 29.97 Billion by 2022.

6. RAW MATERIAL REQUIREMENTS:

Acrylic resins are a group of related thermoplastic or thermosetting plastic substances derived from acrylic acid, meth acrylic acid or other related compounds. Polymethyl acrylate is an acrylic resin used in an emulsified form for lacquer, textile finishes, adhesives and, when mixed with clay, to gloss paper. Another acrylic resin is polymethyl methacrylate, which is used to make hard plastics with various light transmitting properties.

Material Type: Acrylic Flammability Rating: UL94HB, Foam Core: No, Composite Material: No Static Dissipative: No, Specific Gravity: 1.19, Heat Deflection @264 psi): 200°F, Tensile Strength (psi): 10200, Flexural Strength (psi): 16000 Refractive Index: 1.49Impact, Notched @.125, Thickness @72F (ft-lb/in notch): 0.3, Light Transmission: 0.92. Acrylic Sheet is a plastic manufactured using one or more derivatives of acrylic acid. Polymethyl Methacrylate acrylic, or PMMA, is one of the more widely used forms of acrylic due to its exceptional weather ability, strength, clarity and versatility. There are a variety of acrylic polymer grades available for extrusion and injection moulding manufacturing processes. Transparent, translucent opaque and colored polymers are available with varying levels of heat resistance, light transmissions, impact strength, flow rates and release capabilities. PMMA acrylic sheet exhibits glass-like qualities – clarity, brilliance, transparency, translucence – at half the weight with up to 10 times the impact resistance. It can be tinted or colored, mirrored or made opaque. A number of coatings can be applied to a sheet or finished part for performance enhancing characteristics such as scratch resistance, anti-fogging, glare reduction and solar reflectivity. Because it's thermoplastic and softens under extremely high temperatures, acrylic can be formed to virtually any shape. Incredibly durable, acrylic is a

suitable solution for over a broad temperature range, and has superior weathering properties compared to other plastics.

7. MANUFACTURING PROCESS:

In order to provide the widest variety of design capabilities for developing plastic enclosures, Solid Works is primary design tool. Using this sophisticated program allows engineers to draw upon own library of designs and models to create a full 3D solid works model. Then, using the software and specially written automation programs, one can further develop the detailed designs and manufacturing files needed to fabricate the plastic enclosure panels. The 3D models in multiple extensions one can see what product will looks like. Ten step processes: Design the plastic enclosure starting from a dimensioned drawing or CAD file showing the circuit boards and electronic components oriented in space. Generate the CNC code that drives all the machining and bending operations. Machine the plastic sheet to add openings, vents and recesses. Cut individual pieces from sheet. Prepare joint and edge details on routing machines. All joints feature a modified tongue-and-groove design. Score the sheet with bending cuts on a custom table saw. These v-shaped bending cuts extend halfway through the sheet and boost the bending precision. Bend the pieces in a computerized thermal bending machine that resembles a sheet metal brake press. Heat stake metal inserts into bosses. Install the bosses into machined recesses in the sheet. Assemble the pieces using a solvent-bonding process. Perform secondary operations like painting, EMI shielding, and latch or hinge installations. Your custom enclosures are then shipped out and into your hands quickly.

8. MANPOWER REQUIREMENT:

The enterprise requires 7 employees as detailed below**:**

Sr. No.	Designation of Employees	Salary Per Person	Monthly Salary ₹	Year-1	Year-2	Year-3	Year-4	Year-5
1	Production Manager	18,000	18000.00	1	1	1	1	1
2	Operators	12,000	12000.00	1	1	1	1	1
3	Helpers	10,000	20000.00	2	2	2	2	2
4	Admin Manager	15,000	15000.00	1	1	1	1	1
5	Accounts/Stores	12,500	12500.00	1	1	1	1	1
6	Office Boy	9,000	27500.00	1	1	1	1	1
	Total		97500	7	7	7	7	7

9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 4 months' time as detailed below:

Sr. No.	Activity	Time Required*(in months)*
1	Acquisition of premises	1.00
2	Construction (if applicable)	1.00
3	Procurement & installation of Plant & Machinery	2.00
4	Arrangement of Finance	2.00
5	Recruitment of required manpower	1.00
	Total time required *(some activities shall run concurrently)*	4.00

10. COST OF PROJECT:

The project shall cost ₹ 35.89lacs as detailed below:

Sr. No.	Particulars	₹ in Lacs
1	Land 2000 sq.mtr@ 1000	5.00
2	Building	10.00
3	Plant & Machinery	9.00
4	Furniture, Electrical Installations	1.00
5	Other Assets including Preliminary / Pre-operative expenses	0.90
6	Working Capital	9.99
	Total	**35.89**

11. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets.

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	8.97
2	Bank Finance	26.92
	Total	**35.89**

12. WORKING CAPITAL CALCULATION:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	5.00	0.25	1.25	3.75
2	Receivables	2.50	0.25	0.62	1.87
3	Overheads	2.50	100%	2.50	0.00
4	Creditors	-		0.00	0.00
	Total	9.99		4.37	5.62

13. LIST OF MACHINERY REQUIRED:

CNC Plastic and Acrylic Carving Machine

Most machining equipment was originally designed for use on wood and metal substrates. If used properly, however, acrylic sheet can also be machined with the same tools and Equipment, including mills, files, engraving equipment, threads cutters, lathes, and reamers. Inadequate equipment or improper cutting tools can cause notching or overheating of acrylic sheet, and may even cause failure of the fabricated item. It is important to ensure that the right equipment and procedures are used for acrylic sheet.

To cut internal and external threads in acrylic sheet, use normal taps and dies. Most machine cutters are suitable for this procedure. Since acrylic sheet is notch sensitive, do not machine threads with sharp edges; use rounded threads to reduce stresses.

A detail of important machinery is given below: Power Requirement: 125 HP

Sr. No.	Particulars	UOM	Qtty	Rate (₹)	Value (₹ in Lacs)
	Plant & Machinery / equipments				
a)	***Main Machinery***				
i.	CNC PLASTIC MACHINING and equipments	NOS.	1	700000	7.00
ii.	BENDING AND ASSEMBLING	Nos	1	50000	0.50
iii.	PACKING MACHINARIES	Nos	1	50000	0.50
	Other Implementations				
i.	Installation, erection electr.			100,000	0.50
ii.	Taxes and transportation			100000	0.50
	sub-total Plant & Machinery				**9.00**
	Furniture / Electrical installations				
a)	Office furniture	LS	1	50000	0.50
b)	Stores Almirah	LS	1	0	0.00
c)	Computer & Printer	L. S.	1	50000	0.50

	sub total				**1.00**
	Other Assets				
a)	preliminary and preoperative				0.90
	sub-total Other Assets				0.90
	Total				**10.90**

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. Some of the machinery and tooling suppliers are listed here below:

1. Kabra Extrusiontechnik
   402, Lalita Complex, Jain Mainder Road,
   Oppiosite Hdfc Bank, Navrangpura,
   Ahmedabad, Gujarat 380009. Phone:079 2656 4828

2. Success Technologies
   97, Barcelona Industrial Estate,
   Odhav Ring Road Circle, Odhav,
   Ahmedabad, Gujarat 382415. Phone: 076000 08995

3. AXYZ INTERNATIONAL - "Foreign Supplier"
   5330 South Service Road, Burlington, Ontario, L7L 5L1
   Canada. Tell: +1 800 361 3408, Email: enquiries@axyz.com

4. S. A. Engineering Works
   No. 17/2, Periyasamy Street, Sunambu Kalavai,
   Kuniyamuthur, Coimbatore-641008, Tamil Nadu, India
   Phone: +91-9362233362; +91-9047476299, +91-422-2233362

14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	29.97	34.97	39.96	44.96	49.95
3	Raw Materials & Other direct inputs	₹. In Lacs	22.90	26.72	30.54	34.35	38.17
4	Gross Margin	₹. In Lacs	7.07	8.25	9.42	10.60	11.78
5	Overheads except interest	₹. In Lacs	3.44	3.66	4.09	4.21	4.30
6	Interest	₹. In Lacs	2.69	2.69	1.79	1.35	1.08
7	Depreciation	₹. In Lacs	6.30	4.50	3.15	2.25	2.03
8	**Net Profit before tax**	₹. In Lacs	**-5.36**	**-2.60**	**0.39**	**2.79**	**4.38**

The basis of profitability calculation:

The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study; it can be increased according to the selling strategy.)

Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per litre. The depreciation of plant is taken at 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

15. BREAKEVEN ANALYSIS:

The project shall reach cash break-even at 45.64 % of projected capacity as detailed below:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	49.95
2	Variable costs	₹. In Lacs	38.17
3	Fixed costs incl. interest	₹. In Lacs	5.38
4	BEP = FC/(SR-VC) x 100 =	% of capacity	45.64%

16. STATUTORY / GOVERNMENT APPROVALS

As per the allocation of business rules under the Constitution, labour is in the concurrent list of subjects. It is dealt with by the MOLE at the Central and Departments of Labour under State Governments in respective States / UTs. The MOLE has enacted workplace safety and health statutes concerning workers in the manufacturing sector, mines, ports and docks and in construction sectors.

Further, other Ministries of the Government of India have also enacted certain statutes relating to safety aspects of substances, equipment, operations etc. Some of the statutes applicable in the manufacturing sector are discussed below:

The Manufacture, Storage and Import of Hazardous Electronic Rules (MSIHC), 1989

These MSIHC Rules are notified under the Environment (Protection) Act, 1986. These rules are aimed at regulating and handling of certain specified hazardous chemicals. The rules stipulate requirements regarding notification of site, identification of major hazards, taking necessary steps to control major accident, notification of major accident, preparation of safety report and on-site emergency plan; prevention and control of major accident, dissemination of information etc. These rules are notified by the Ministry of Environment and Forests (MOEF) but enforced by the Inspectorates of Factories of respective States / UTs in the manufacturing sector.Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATIONS

Both forward and backward integration for any Plastic and Electrical Industry are strategies to gain better control over the supply chain, reduce dependency on the suppliers and increase their competitiveness. The two strategies can help companies reduce their dependency on suppliers and increase their influence over the customers. The benefits of

these strategies can be big. Both impact the bottom line directly. Integration happens if a company moves upward or downward in its supply chain. Starting from the suppliers from whom the raw materials are obtained, the chain moves downstream towards the distributors and the retailers. If the suppliers' power is very high, it can create financial burdens for the company. Suppose the number of suppliers of a company is low, then the control in their hands would be low. The burden in that case will fall upon company's shoulders. Its expenditure on raw materials will be high.

18. TRAINING CENTERS AND COURSES

There is no such training required to start this business but, basic Plastic Engineering or Electrical Engineering degree is plus point for Entrepreneur. Promoter may train their employees in such specialized institutions to grow up the business. There are few specialized Institutes provide degree certification in chemical Technology, few most famous and authenticate Institutions are as follows:

1. Department of Electrical LD College of engineering
   No.120, Circular Road, University Area, Navrangpura,
   Opposite Gujarat University, Ahmedabad, Gujarat 380015

2. MIT College of Engineering, Pune
   Gate.No.140, Raj Baugh Educational Complex,
   Pune Solapur Highway,LoniKalbhor,
   Pune – 412201Maharashtra, India

3. Central Institute of Plastics Engineering and Technology
   CIPET Head Office,T.V.K. Industrial Estate,
   Guindy, Chennai - 600 032.
   Phone No.: +91-44-22254780, +91-44-22253040
   Fax No.: +91-44-22254787

Udyamimitraportal (link : www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.