



Pre-feasibility Study

MANUFACTURING UNIT FOR VARNISHES AND LACQUERS

October 2021

“The figures and financial projections are approximate due to fluctuations in exchange rates, energy costs, and fuel prices etc. Users are advised to focus on understanding essential elements such as production processes and capacities, space, machinery, human resources, and raw material etc. requirements. Project investment, operating costs, and revenues can change daily. For accurate financial calculations, utilize financial calculators on SMEDA’s website and consult financial experts to stay current with market conditions.”

Small and Medium Enterprises Development Authority
Ministry of Industries and Production
Government of Pakistan

Table of Contents

1. DISCLAIMER	5
2. EXECUTIVE SUMMARY	6
3. INTRODUCTION TO SMEDA	8
4. PURPOSE OF THE DOCUMENT	9
5. BRIEF DESCRIPTION OF PROJECT & products.....	9
5.1. Machinery and Equipment	11
5.2. Process Flow for Manufacturing of Varnishes and Lacquers	17
5.3. Installed and Operational Capacities	27
6. CRITICAL FACTORS	32
7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT	32
8. POTENTIAL TARGET MARKETS/Customers	32
9. PROJECT COST SUMMARY	33
9.1. Initial Project Cost	34
9.1.1. Land.....	34
9.1.2. Building / Infrastructure	35
9.1.3. Machinery and Equipment	35
9.1.4. Office Equipment.....	36
9.1.5. Furniture and Fixture	37
9.1.6. Vehicles	37
9.1.7. Pre-Operating Costs	37
9.1.8. Licenses and Permits	38
9.1.9. Security against Building.....	38
9.1.10. Initial Working Capital.....	39
9.2. Breakeven Analysis	40
9.3. Revenue Generation.....	40
9.4. Variable Cost Estimate	44
9.5. Fixed Cost Estimate.....	52
9.6. Financial Feasibility Analysis	52
9.7. Financial Feasibility Analysis with 50% Debt	53
9.8. Human Resource Requirement.....	53
10. CONTACT DETAILS	55
11. USEFUL LINKS	57
12. ANNEXURES	59
12.1. Income Statement.....	59
12.2. Balance Sheet.....	60
12.3. Cash Flow Statement.....	61

13. KEY ASSUMPTIONS	62
13.1. Operating Cost Assumptions	62
13.2. Revenue Assumptions	62
13.3. Financial Assumptions	62
13.4. Debt Related Assumptions.....	63
13.5. Cash Flow Assumptions	63

Table of Tables

Table 1: Installed and Operational Capacity	28
Table 2: Packing Wise Distribution-Polyurethane Varnish	28
Table 3: Packing Wise Distribution-Synthetic Varnish	29
Table 4: Packing Wise Distribution-Nitrocellulose lacquer	30
Table 5: Packing Wise Distribution-1K-Arcylic Lacquer	30
Table 6: Packing Wise Distribution-2K-Arcylic Lacquer	31
Table 7: Initial Project Cost estimates	34
Table 8: Breakup of Space Requirement	34
Table 9: Building Renovation Cost	35
Table 10: Machinery Cost Details	35
Table 11: Office Equipment Cost Details	36
Table 12: Furniture & Fixtures Cost Details	37
Table 13: Office Vehicle Cost Details	37
Table 14: Pre-Operating Cost Details	37
Table 15: Licenses, Permits Cost Details	38
Table 16: Security against Building	38
Table 17: Initial Working Capital Details	39
Table 18: Lab Consumable	39
Table 19: Breakeven Analysis	40
Table 20: Revenue Details	40
Table 21: Revenue Retail-Polyurethane Varnish	41
Table 22: Revenue Wholesale-Polyurethane Varnish	41
Table 23: Revenue Retail-Synthetic Varnish	41
Table 24: Revenue Wholesale-Synthetic Varnish	42
Table 25: Revenue Retail-Nitrocellulose Lacquer	42
Table 26: Revenue Wholesale-Nitrocellulose Lacquer	42
Table 27: Revenue Retail-1K-Acrylic Lacquer	42
Table 28: Revenue Wholesale-1K-Acrylic Lacquer	43
Table 29: Revenue Retail-2K-Acrylic Lacquer	43
Table 30: Revenue Wholesale-2K-Acrylic Lacquer	43
Table 31: Variable Cost Estimate	44
Table 32: Raw Material Cost-Polyurethane Varnish	45
Table 33: Raw Material Cost-Synthetic Varnish	45
Table 34: Raw Material Cost-Nitrocellulose Lacquer	45
Table 35: Raw Material Cost-Acrylic Lacquer-1K	46
Table 36: Raw Material Cost-2K Acrylic Lacquer and Hardener	46
Table 37: Raw Material Cost Details - Polyurethane Varnish-	46
Table 38: Raw Material Cost Details - Synthetic Varnish	47
Table 39: Raw Material Cost - Nitrocellulose Lacquer	48
Table 40: Raw Material Cost - Acrylic Lacquer-1K	49
Table 41: Raw Material Cost - Acrylic Lacquer-2K	49
Table 42: Raw Material Cost – Acrylic Lacquer-2K Hardener	50
Table 43: Packing Cost – Tin Cans	50
Table 44: Carton Cost for Packing	51
Table 45: Other Consumables	51
Table 46: Vehicle Maintenance	51

Table 47: Direct Labor	51
Table 48: Fixed Cost Estimate	52
Table 49: Financial Feasibility Analysis	52
Table 50: Financial Feasibility Analysis with 50% Debt	53
Table 51: Human Resource	53
Table 52: Contact Details	55
Table 53: Useful Links	57
Table 54: Operating Cost Assumptions	62
Table 55: Revenue Assumptions	62
Table 56: Financial Assumptions	62
Table 57: Debt Related Assumption	63
Table 58: Cash Flow Assumptions	63

Table of Figures

Figure 1: High Power Mixing Machine	12
Figure 2: Packing and Filling Machine	12
Figure 3: Platform Trolley	13
Figure 4: Carry Trolley with Tub (150 liter)	13
Figure 5: Weigh Scales	14
Figure 6: Measuring Cup	14
Figure 7: Portable Spectrophotometer	15
Figure 8: Lacquer Porosity Tester	15
Figure 9: Ammeter	16
Figure 10: petri Dish and Glass Beakers	16
Figure 11: Magnetic Mixer and Test Tubes	16
Figure 12: Glass Stirrer and Nitrocellulose Filter Paper	17
Figure 13: Test Tube Stand and Test Tube Holder	17
Figure 14: Process Flow for Manufacturing of Varnishes	18
Figure 15 Liquid Varnish	20
Figure 16 MPC Test Results	21
Figure 17: Finished Product-Varnish	21
Figure 18: Process Flow for Manufacturing of Lacquers	22
Figure 19: Nitrocellulose Cotton	23
Figure 20: Finished Product-Lacquer	26

1. DISCLAIMER

This information memorandum is to introduce the subject matter and provide a general idea and information on the said matter. Although, the material included in this document is based on data/information gathered from various reliable sources; however, it is based upon certain assumptions, which may differ from case to case. The information has been provided on, as is where is basis without any warranties or assertions as to the correctness or soundness thereof. Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. SMEDA, its employees or agents do not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. The contained information does not preclude any further professional advice to be obtained by the user. The prospective user of this memorandum is encouraged to carry out additional diligence and gather any information which is necessary for making an informed decision, including taking professional advice from a qualified consultant/technical expert before taking any decision to act upon the information.

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2. EXECUTIVE SUMMARY

Varnish is an oily liquid that is coated on wood or other products to give a hard, clear, shiny surface. Varnishes provide a non-porous layer which prevents dust and dirt from being fixed on the surface of the product. When the products such as wooden furniture needs to be cleaned, the older varnish layer can be easily removed from the product, along with the dust and dirt that has gathered on the top of surface. The proposed unit will manufacture two types of varnishes; polyurethane varnish and synthetic varnish.

Polyurethane varnish is a type of resin¹ used to protect floors, cabinets and other woodwork. It provides resistance to heat, chemicals and scratches. When it is applied to the surface, it creates a lustrous finish that enhances the brightness of the surface.

Synthetic varnish is scratch-resistant and durable coating; particularly suitable for the coating of wood, metals and plastics, which are heavily stressed during use. It is recommended as a finishing varnish for interior wood applications. It is suitable for the coating of wood, wood-based materials, metals and hard PVC in interior and exterior areas.

Lacquer is a type of hard and potentially shiny coating or finish applied to materials such as wood or metal. Lacquer is a modern finish that is commonly used on high end furniture. It is fast drying, waterproof coating which maintains its transparency over time, as it ages. The proposed unit will manufacture three types of lacquers; nitrocellulose lacquer, 1k acrylic lacquer and 2k acrylic lacquer.

Nitrocellulose lacquers produce a hard yet flexible, durable finish that can be polished to a high sheen.²

Acrylic lacquer is more commonly used for automotive refinishing and restoration purposes; however, it is also used for finishing of products like musical instruments, furniture, etc. Acrylic lacquer provides a long-lasting lacquer finish that can be polished to a very high gloss. Acrylic lacquer is normally made in two types; identified by 1K and 2K types.

1K acrylic lacquer is a paint coating on the surface of finishing products that does not require any hardener, catalyst or activator to cure it. This term can be used to describe paints that dry in the air ideally at room temperature.

2K acrylic lacquer is a very high gloss and durable automotive paint which does not dry without the use of 2K hardener. 2K means an activator is required to dry/cure, sometimes referred to as a hardener. The hardener works by chemically reacting with a catalyst which sets hard to form a very tough finish.

¹ <https://homeguides.sfgate.com/polyurethane-varnish-98832.html>

² Sheen is a measure of the reflected light from various types of paints. Paint that has a higher sheen contains more enamel, making it harder, easier to clean, and more resistant to scratching, scuffing, and staining.

Varnishes and lacquers are widely used to have a hard, clear, shiny and glossy finish on wooden furniture as well as on metals works. Both varnish and lacquer provide shiny and glossy finishes to fixture surfaces. While varnishes produce a semi-gloss or satin sheen finish, lacquers provide more sheen levels, ranging from high gloss to ultra-matte.

The proposed business unit will target both wholesale market and retail market. The percentage ratio of selling the products to retail market is 30% and wholesale market is 70%.

This “Pre-feasibility Document” provides details for setting up a “Manufacturing Unit for Varnishes and Lacquers” (hereinafter referred to as proposed business/manufacturing unit). Increasing consumption trends of varnishes and lacquers make the proposed project profitable. The potential target market for varnishes and lacquers includes furniture manufactures (metal as well as wood), automotive industries, construction industry, fastener industry, etc.

Pakistan's paints and coatings market is expected to grow at a CAGR of over 3% during the period 2021-26. The construction industry in Pakistan is expected to expand by 3% in real terms in 2021. The local manufacturing sector grew by 12.73% in August of 2021 and automobile sector recorded a growth of 23.4%. With GDP realizing a growth of 3.95%,³ the size of the economy exceeded to reach \$280 billion in 2021.

The proposed manufacturing unit may be established in industrial areas of major cities like Lahore, Karachi, Islamabad, Peshawar, Quetta and medium cities such as Faisalabad, Multan, Rawalpindi, Hyderabad, Bahawalpur, Sargodha, Sukkur, Mardan, Sheikhpura, Sialkot, Gujranwala, Gujrat, Lasbela, etc. These cities are suitable locations due to presence of industrial clusters, availability of strong supply chains, industrial infrastructure and distribution channels. Availability of skilled and low-cost labor is also a major factor in selecting suitable location for this unit.

The proposed project has an annual capacity of manufacturing 196,000 liters of different types of varnish and lacquer products; including 49,000 liters of Polyurethane Varnish, 49,000 liters of Synthetic Varnish, 49,000 liters of Nitrocellulose Lacquer, 19,600 liters of Acrylic Lacquer-1K and 29,400 liters of 2K-Acrylic Lacquer. The capacity utilization in the first year of operations is assumed to be 50% which translates into production of 98,000 liters of all the five types of products. The maximum capacity utilization is assumed to be 90% which will be achieved in 9th year of production.

This manufacturing unit will be set up in a rented building with an area of 2,676 square feet (12 Marla). The project requires a total investment of PKR 13.42 million. This includes capital investment of PKR 9.12 million and working capital of PKR 4.30 million. The project will be established using 100% equity financing. The Net Present

³ https://www.pc.gov.pk/uploads/cpec/PES_2020_21.pdf

Value (NPV) of project is PKR 62.66 million with an Internal Rate of Return (IRR) of 52% and a Payback period of 3.06 years. Further, this project is expected to generate Gross Annual Revenues of PKR 70.92 million during 1st year, Gross Profit (GP) ratio ranging from 27% to 33% and Net Profit (NP) ratio ranging from 4% to 14% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 39% (76,972 liters, 128,289 tin cans) with annual breakeven revenue of PKR 55.69 million.

The proposed project may also be established using leveraged financing. At 50% financing at a cost of KIBOR+3%, the proposed business provides Net Present Value (NPV) of PKR 72.27 million, Internal Rate of Return (IRR) of 51% and Payback period of 3.07 years. Further, this project is expected to generate Net Profit (NP) ratio ranging from 3% to 14% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 40% (78,294-liter, 130,294 tin cans) with breakeven revenue of PKR 56.65 million.

The proposed project will provide employment opportunities to 31 people, working in single shift of 8 hours during 280 days in a year. High return on investment and steady growth of business is expected to the entrepreneur having some prior experience or education in the related field of business. The legal business status of this project is proposed as "Sole Proprietorship".

3. INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with the objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectorial research' to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives.

Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need-based capacity building programs of different types in addition to business guidance through help desk services.

National Business Development Program for SMEs (NBDP) is a project of SMEDA, funded through Public Sector Development Program of Government of Pakistan.

The NBDP envisages provision of handholding support / business development services to SMEs to promote business startup, improvement of efficiencies in

existing SME value chains to make them globally competitive and provide conducive business environment through evidence-based policy-assistance to the Government of Pakistan. The Project is objectively designed to support SMEDA's capacity of providing an effective handholding to SMEs. The proposed program aimed at facilitating around 314,000 SME beneficiaries over a period of five years.

4. PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to facilitate potential investors in setting up a “Manufacturing Unit for Varnishes and Lacquers” by providing a general understanding of the business with the intention of supporting them in investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business setup and its successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form the basis of any investment decision.

5. BRIEF DESCRIPTION OF PROJECT & PRODUCTS

This document provides details about varnishes and lacquers, their uses, machinery and equipment required for their manufacturing, required raw materials and the details of the production processes.

Varnish

Varnish is a clear transparent hard protective coating or film. The term “varnish” refers to the finished appearance of the product. It usually has a yellowish shade; which comes from its manufacturing process and the raw materials used; however, it may also be pigmented as per the usage need.

Varnish finishes are usually glossy but may also be designed to produce satin or semi-gloss sheens by the addition of flattening agents. Two types of varnishes have been covered in this document; polyurethane varnish and Synthetic varnish (simple varnish). Descriptions of these two are provided in the following paragraphs:

- **Polyurethane Varnish**

Polyurethane varnish is a liquid coating that is applied with a brush and dries clear. It is a type of resin used to protect floors, cabinets and other woodwork. Polyurethane varnishes are super-tough coatings, popularly used as a finishing layer for protecting interior and exterior wooden floors, stairs and other surfaces which are prone to pedestrian wear and tear. It can also be used on chipboard, plywood, hardboard, and parquet⁴ surfaces. It is also used on wooden flooring, book cases, desks, picture frames and hard woods.

- **Synthetic Varnish**

Synthetic varnish can be used on wood and wooden surfaces. It is recommended as a finishing varnish for interior wood applications. This product can also be mixed with synthetic enamels for gloss enhancement. It dries slowly and requires up to 6 hours to come into final condition. Synthetic varnish is most commonly used for coating of wood, wood-based materials, metals and hard PVC in interior and exterior areas.

Lacquer

Lacquer is a type of hard and potentially shiny coating or finish applied to materials such as wood or metal. Lacquer is made by dissolving cellulose derivatives or synthetic resins in a volatile solvent. Lacquer is a modern wood finish that is commonly used on high end furniture. It is fast drying, waterproof and maintains its transparent look as it ages.

Lacquer provides extremely shiny and glossy finish to a wood surface that is otherwise difficult to obtain through the use of varnishes, shellac⁵ or other finishing substances. Although it is highly durable, scratches may appear over time due to excessive contact. Automotive Lacquer is a nitrocellulose-based, high gloss, lacquer type paint that is easy to apply, dries rapidly to a long-wearing attractive finish to indoor wood and metal surfaces such as doors, doorjambs, cabinets, and shelves. There are different types of lacquers such as nitrocellulose lacquer, 1k acrylic lacquer and 2k acrylic lacquer.

- **Nitrocellulose Lacquer**

Nitrocellulose lacquer is made by mixing NC cotton with a number of fast drying solvents, diluents and plasticizers. It is fast drying liquid and can be applied by a brush or spray. This lacquer is effectively resistant to heat and water.

NCL Nitrocellulose Lacquer is a single pack,⁶ fast drying general purpose lacquer. Potential uses are for high quality furniture, shop fittings, doors, cabinets, desks, paneling, partitions and most interior timberwork

⁴ Surface (such as a floor) made of small pieces of pure wood that fit together to form a pattern.

⁵ Shellac is actually a natural product (it's made from combining a secretion from the female lac bug with a solvent such as alcohol) that is very safe once dried and hardened.

⁶ A single-pack lacquer is one where a hardening agent, a catalyst, has already been applied to the resin base during the manufacturing process

- **Acrylic Lacquer**

Acrylic lacquer is a premium automotive formulation designed to give a lustrous durable finish to surfaces. It dries quickly and provides a superior grip to metal. This lacquer dries to a high gloss sheen. There are two main types of acrylic lacquers; 1K and 2K.

1K-Acrylic lacquer

1K-acrylic lacquer is designed for spot repairs or complete repainting of machinery and vehicles. It offers scratch resistant properties and ultraviolet protection. 1K-acrylic takes up to 24 hours to completely dry.

2K-Acrylic Lacquer

2K-acrylic lacquer is a very high gloss and durable automotive paint.⁷ A hardener is an activator required to dry/cure the lacquer. Once the hardener is activated, the contents can be applied within 8 hours before it becomes unusable. The hardener works by chemically reacting with a catalyst which sets hard to form a very tough finish. Hardener is an environmentally-friendly paint/lacquer management solution that quickly hardens acrylic lacquer. The primary ingredient in lacquer hardener is sodium Poly Acrylate, which is a crystallized salt product.

5.1. Machinery and Equipment

Details of the machinery and equipment used in this proposed project are as follows:

High Power Mixer/Mixing Machine

High power mixer / mixing machine is an automatic machine used for manufacturing varnishes and lacquers. This machine has a tank which has stirring mechanism installed in it. It has a tank capacity of 100 liter and electricity power of 3.5 kilowatts. Chemicals (according to the standard ratios) are put into the mixing machine and it is run for 1 hour for manufacturing of varnishes and lacquers. Its material is stainless steel. Figure 1 shows high power mixing machine.

⁷ https://en.wikipedia.org/wiki/Automotive_paint

Figure 1: High Power Mixing Machine**Packing and Filling Machine**

Packing and filling machine is used to fill the manufactured varnishes and lacquers in the cans of 250 ml, 500 ml, 750 ml and 1,000 ml. This machine has capacity of filling 150-200 tin cans per hour and requires an electricity power of 200 watts. This machine helps filling the product tin cans in efficient and effective manner. Figure 2 shows packing and filling machine.

Figure 2: Packing and Filling Machine**Platform Trolley**

Platform trolley is used for carrying load or to carry the raw materials from the store to production hall and to carry the finished products from the production hall to the finished goods store. Figure 3 shows platform trolley.

Figure 3: Platform Trolley**Carry Trolley with Tub (150 liter)**

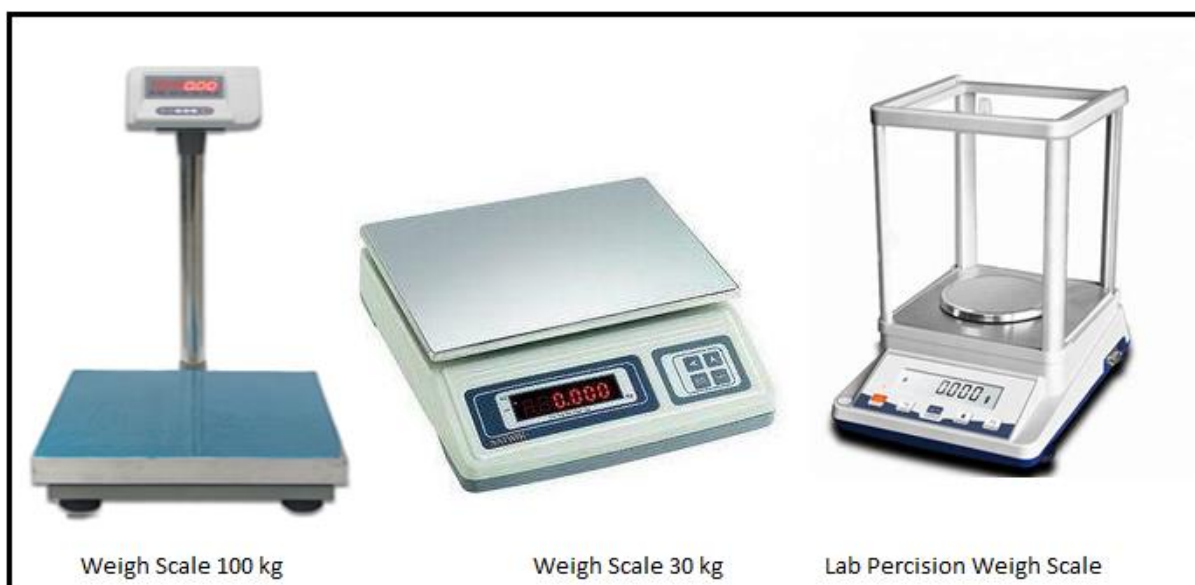
These tubs are used for moving varnish and lacquer from production department to filling and packing department. These are aging resistant and easy to clean. These tubs have a capacity of 150 liters and are made of linear low-density polyethylene (LLDPE) material. Figure 4 shows carry trolley with tub.

Figure 4: Carry Trolley with Tub (150 liter)**Weigh Scale**

Weigh scale is used to measure the weight of the product. In the proposed project, three weigh scales have been suggested, which are required in the production department and quality test lab for weighing.

- Electronic Weight Scale (100 Kg) is used for verifying the quantity of raw materials supplied by a supplier. It consumes electric power of 10 watts
- Electronic Weight Scale (30 Kg) is used for measuring the quantity of raw material for production.
- Lab precision weigh scale is used in the lab to measure very small quantities; it has the precision of 0.001 gram.

Figure 5 shows weigh scale.

Figure 5: Weigh Scales**Measuring Cups 5L**

Liquid measuring cups are usually made of glass or plastic and are equipped with a handle. They are used to pour a liquid into the cup and bring it even with a measurement line without spilling. The proposed unit uses measuring cups to measure the exact quantity being poured in the manufacturing process. Figure 6 shows measuring cup.

Figure 6: Measuring Cup**Portable Spectrophotometer**

A spectrophotometer is an analytical instrument that measures the amount of a known chemical substance (concentration) by measuring the intensity of the light. In the proposed project, portable spectrophotometer is used in the quality assurance lab to test the quality of varnish. Figure 7 shows portable spectrophotometer.

Figure 7: Portable Spectrophotometer

Lacquer Porosity Tester

This equipment is specially designed for testing of the porosity of lacquer which is internally coated on metallic tubes as per European Standard. It is easy to operate, battery operated with handheld current meter. This machine has a user-friendly validation gauge of current flow for lacquer porosity test apparatus. The current validation range of lacquer porosity tester is 0-1000 mA. It has clear visibility LCD display. Figure 8 **Error! Reference source not found.** shows lacquer porosity tester.

Figure 8: Lacquer Porosity Tester

Ammeter

Ammeter is an instrument for measuring either direct or alternating electric current, in amperes. In the proposed project, ammeter will be used in quality testing lab to measure the current during lacquer testing. Figure 9 shows ammeter.

Figure 9: Ammeter**Other Lab Equipment**

Other lab equipment includes test tubes, test tube stands, test tube holders, glass beakers of different sizes, glass stirrers, petri dishes, nitrocellulose filter papers and magnetic mixers. Figure 10 shows petri dish and glass beakers.

Figure 10: petri Dish and Glass Beakers**Petri Dish****Glass Beakers**

Figure 11 shows magnetic mixer and test tubes.

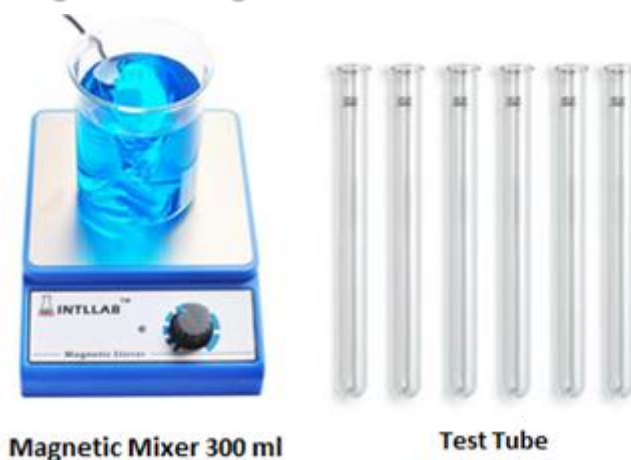
Figure 11: Magnetic Mixer and Test Tubes**Magnetic Mixer 300 ml****Test Tube**

Figure 12 shows glass stirrer and nitrocellulose filter paper.

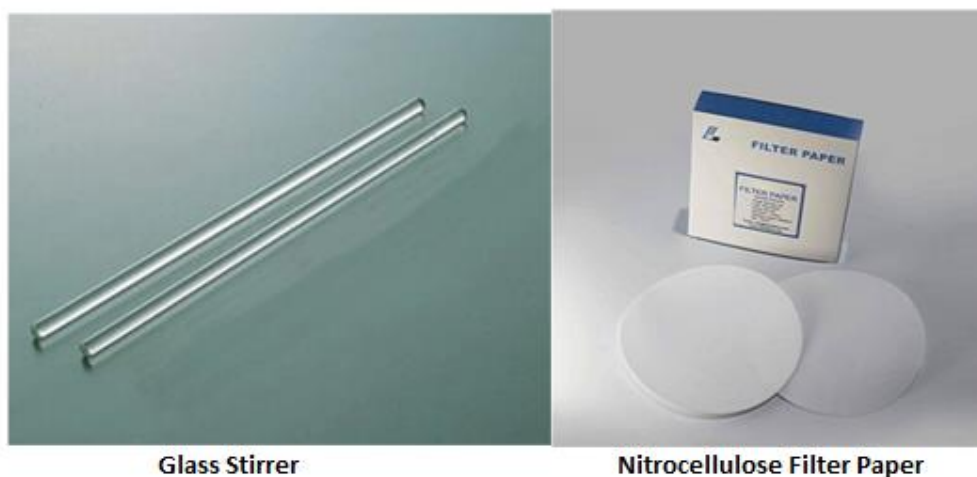
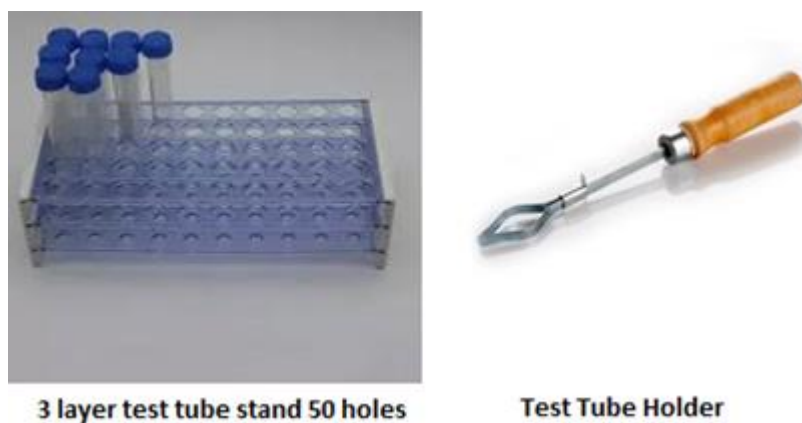
Figure 12: Glass Stirrer and Nitrocellulose Filter Paper

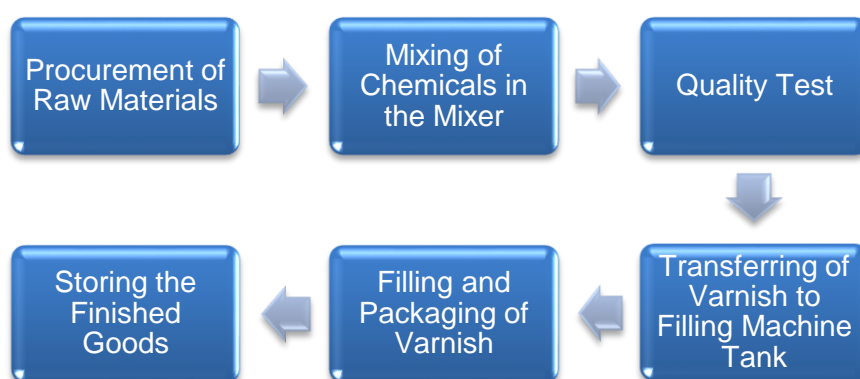
Figure 13 shows test tube stand and test tube holder.

Figure 13: Test Tube Stand and Test Tube Holder

5.2. Process Flow for Manufacturing of Varnishes and Lacquers

Varnishes

The manufacturing process for the proposed two types of varnishes is same. Only difference is in raw materials, which vary for the two types of products, polyurethane varnish and synthetic varnish. The manufacturing process of varnishes is shown in Figure 14.

Figure 14: Process Flow for Manufacturing of Varnishes**Procurement of Raw Material (Chemicals)**

- **Polyurethane Varnish**

The chemicals required for manufacturing of polyurethane varnish are polyurethane resin, MTT (Mineral Turpentine), lead acetate, calcium carbonate, cobalt blue and anti-skinning agent.

- **Synthetic Varnish**

The chemicals required for manufacturing of synthetic varnish are alkyd resin, MTT (Mineral Turpentine), lead acetate, calcium carbonate, cobalt blue and anti-skinning agent.

Polyurethane Resin

Polyurethane resins are copolymers that are formed when an alcohol called polyol (each of its molecules contains 3 or more reactive hydroxyl groups) reacts with an isocyanate (dual or polymeric); in the presence of appropriate additives and catalysts. A wide range of di-isocyanates and polyols can be made to react to make polyurethane resin. Polyurethane resins are used for durable high gloss coatings like in cars, industrial applications, floorings, wood coatings as well as PU resins are used to modify alkyd resins, which are used in paints, enamels and varnishes.

Alkyd resin

Alkyd resins are oil-based polyesters, consisting of dibasic acids, polyols, and fatty acids. These belong to thermosetting polymers.

Alkyd resin are used in paints, varnishes and in molds for casting. They are the dominant resin or binder in most commercial oil-based coatings.

MTT/ Mineral Turpentine

Mineral turpentine is a clear liquid derived from petroleum, and it an important organic solvent for paints. This type of hydrocarbon solvent is mainly used in production of conventional solvent-based paints.

Calcium Carbonate

Calcium carbonate is a chemical compound with the formula CaCO_3 . It is a common substance found in rocks such as calcite⁸ and limestone. Calcium Carbonate Powder is exclusively used in Paint & Coating Industries for the producing Coatings and Emulsion Paint.

Cobalt Blue

Cobalt blue is a blue pigment made by sintering cobalt (II) oxide with aluminum (III) oxide (alumina) at 1200 C. Cobalt blue is used in paints and varnishes to help the oils dry.

Lead Acetate

Lead acetate ($\text{Pb}(\text{CH}_3\text{COO})_2$) is a white crystalline chemical compound. Like many other lead compounds, it is toxic. Lead acetate is soluble in water. Lead acetate is used as a drier in paints and varnishes. It is also useful as a mordant in textile printing and dyeing.

Anti-skinning agent

When varnish is packed in closed tin cans, due to the oxidation, skin formation takes place due to the presence of air between the coating surface and the closed lid. The skinning results in loss of coating material and a possible contamination of the bulk. Anti-skinning agents are therefore added to solvent-borne air-drying coatings to prevent in-can skinning during storage by prohibiting the drier effect until application of the coating. Methyl Ethyl Ketoxime is the most commonly used anti-skinning agent in paints.

Quality Assurance and Storage of Raw Materials

These chemicals are purchased from the suppliers of chemicals present in the major cities of Pakistan and are stored in the raw material store of the manufacturing unit. For quality assurance of the raw materials, a chemist is hired as quality controller to check their quality. Moreover, the manufacturing unit procures chemicals only from the suppliers which follow the standards of Pakistan Standards & Quality Control Authority.

All the materials required for the production of varnish and lacquer are highly inflammable. Following conditions should be met for storing these chemicals:

- Temperature of the store room must be maintained at 20-degree C or below.
- Fire Alarms system should be installed in store room.

⁸ Calcite is a rock-forming mineral with a chemical formula of CaCO_3

- Chemicals should be kept in tightly closed containers.
- Containers should be protected against damage and should not be exposed to heating.
- Storage should be segregated, well ventilated, and equipped with both decomposition & explosion vents, having maximum amount of free opening.

Raw material inventory is maintained for one month production. The payment to supplier is made within 35 days from the receipt of raw materials.

Mixing of Chemicals in the Mixer

In this process, chemicals (such as polyurethane resin, MTT/Mineral Turpentine, lead, calcium, cobalt and anti-skinning agent) are introduced into the high-power mixer machine and mixed for one hour. Chemicals are added in the high-power mixer machine according to the standardized formula of the type of varnish or lacquer to be made.

- **Polyurethane Varnish-per Batch 100 liter**

For manufacturing one batch of 100 liters of polyurethane varnish, polyurethane resin (30 liter), MTT/Mineral Turpentine (60 liter) and additives such as lead acetate (3 kg), calcium carbonate (4 kg), cobalt blue (1.5 kg) and anti-skinning agent (1.5 kg) are mixed up to one hour in a high-power mixing machine after which the varnish formation is completed.

- **Synthetic Varnish-per Batch 100 liter**

For manufacturing one batch of 100 liters of synthetic varnish, the required chemicals are alkyd resin (35 liter), MTT/Mineral Turpentine (64 liter) and driers which include lead acetate (0.20 kg), calcium carbonate (0.40 kg), cobalt blue (0.20 kg) and anti-skinning agent (0.20 kg) are mixed up to one hour in a high-power mixing machine after which the varnish formation is completed. Figure 15 shows liquid varnish.

Figure 15 Liquid Varnish



Quality Tests

Membrane patch colorimetry (MPC) varnish potential testing (ASTM D7843) is an analytical test to determine the propensity for a lubricant to form varnish deposits. There are two main parts to the MPC test: filtration and color measurement.

During the first part, 50 ml of varnish is diluted with an equal volume of petroleum ether. In second step, this mixture is filtered through a 0.45 μm (micrometer) nitrocellulose patch. The color of the patch is then measured using a spectrophotometer that calculates the color difference (ΔE) value.

There are 4 levels on the varnish potential scale: Good ($\Delta E < 15$), Monitor ($\Delta E = 15-25$), Abnormal ($\Delta E = 25-35$) and Critical ($\Delta E > 35$). Figure 16 shows MPC test results.

Figure 16 MPC Test Results



Transferring of Varnish to Filling Machine Tank

After the quality test, the approved varnish batch is transferred to the filling machine tank manually, using carry trolleys.

Filling and Packaging of Varnish

A manual filling machine is used to fill the manufactured varnish in tin cans (sizes of 250 ml, 500 ml, 750 ml and 1000 ml). After filling the tin can is automatically sealed by the same machine and the label is attached on each box manually by the labor. Figure 17 shows finished product.

Figure 17: Finished Product-Varnish



Storing the Finished Goods

The cartons are transferred to finished goods store using trolleys. They are stored with the consideration to avoid any damage or loss. Finished goods inventory that is equal to half month of production capacity will be stored.

Lacquers

The manufacturing process for all types of lacquers is same, but raw material for each type will change. Different chemicals are used in the manufacturing of different types of lacquers such as nitrocellulose lacquer, acrylic lacquer-1K and acrylic lacquer 2K. The manufacturing process of lacquer is discussed in

Figure 18.

Figure 18: Process Flow for Manufacturing of Lacquers



Procurement of Raw Material (Chemicals)

- **Nitrocellulose Lacquer**

The chemicals required for manufacturing of nitrocellulose lacquer are NC-cotton, coconut resin, butyl acetate, methyl ethyl ketone (MEK), ethyl acetate, xylene, and dioctyl phthalate (plasticizer).

- **1K-Acrylic Lacquer**

The chemicals required for manufacturing of acrylic lacquer-1K are acrylic resin, xylene, methyl ethyl ketone (MEK) and dioctyl phthalate (plasticizer).

- **2K-Acrylic Lacquer**

The chemicals required for manufacturing of acrylic lacquer-2K are acrylic resin, xylene, methyl ethyl ketone (MEK), dioctyl phthalate (plasticizer) and hardener.

Wet Nitrocellulose cotton (Guncotton)

Nitrocellulose (also known as cellulose nitrate, flash paper, flash cotton, guncotton, pyroxylin and flash string, depending on form) is a highly inflammable compound formed by nitrating cellulose with a mixture of nitric acid and sulfuric acid. One of its first major uses was as guncotton, a replacement for gunpowder as propellant in firearms. It was also used to replace gunpowder as a low-order explosive in mining and other applications. It is the main ingredient in lacquer formulations.

Because of their fluffy and nearly white appearance, nitrocellulose products are often referred to as cottons, e.g., lacquer cotton, celluloid cotton, and gun cotton.

Guncotton was originally made from cotton (as the source of cellulose) but contemporary methods use highly processed cellulose from wood pulp.

While guncotton is dangerous to store, the hazards it presents can be reduced by storing it dampened with various liquids, such as alcohol. For this reason, accounts of guncotton usage dating from the early 20th century refer to "wet guncotton."

Nitrocellulose cotton should be stored in a damped condition at the temperature of 20-degree C in a cool, dry and well-ventilated area away from all possible sources of heat or ignition. NC cotton is available in major cities of Pakistan. Figure 19 shows nitrocellulose cotton.

Figure 19: Nitrocellulose Cotton



Resin (coconut)

Coconut-Oil Based Short Oil Alkyd Resin, is a white viscous liquid. It is an additive that can be used in polyester urethane gloss coatings, polyester surface coatings, acid-cured paints, and nitrocellulose coatings.

Butyl acetate

n-Butyl acetate, also known as butyl ethanoate, is an ester that is a colorless, flammable liquid at room temperature. Butyl acetate is an active solvent for film-formers such as cellulose acetate butyrate, nitrocellulose, polyesters, epoxies, alkyds, vinyl copolymers, and acrylic resins. It is widely used in nitrocellulose lacquers, readily dissolving the resin and imparting good flow properties.

Methyl Ethyl Ketone (MEK)

Butanone also known as methyl ethyl ketone, is an organic compound. This colorless liquid ketone has a sharp, sweet odor. It is produced industrially on a large scale. MEK is highly effective and commonly-used solvent. As a solvent, it is used in manufacturing processes for gums, resins, cellulose acetate, and nitrocellulose coatings.

Xylene

Xylene is a volatile liquid hydrocarbon obtained by distilling wood, coal tar, or petroleum, used in fuels and solvents and chemical synthesis.

It is primarily used as a solvent in the printing, rubber, leather and coating industries. Along with other solvents, xylene is also widely used as a thinner for paints and varnishes.

DOP (Plasticizer)

Di-octyl Phthalate (DOP) is a general use Plasticizer. Plasticizer are added to improve the plasticity of lacquer film to permit the expansion and contraction without effecting the quality of lacquer. Dioctyl Phthalate (DOP) is a transparent, colorless oily liquid used to increase the flexibility and tensile strength of Lacquer. It provides good solubility for many components used in paint and has low volatility, low separability and good conductance properties.

Acrylic resin

Acrylic resin is a thermoplastic or thermosetting plastic substance typically derived from acrylic acid, methacrylic acid and acrylate monomers. Acrylic resins feature excellent transparency and durability, and are used in a broad range of applications from consumer items like lenses to industrial products like molding materials, coatings and adhesives.

Hardener

An activator is required to dry/cure paint and lacquer, sometimes referred to as a hardener. The primary ingredient in paint/lacquer hardener is sodium poly acrylate, which is a crystallized salt product. The hardener works by chemically reacting with a catalyst which sets hard to form a very tough finish. Once the hardener has been activated, user has up to 8 hours to apply the contents before the can becomes unusable.

Quality Assurance and Storage of Raw Materials

These chemicals are purchased from suppliers of chemicals available in the major cities of Pakistan. All these chemicals are then placed in the raw material store room. For quality assurance of the raw materials, a chemist is hired as quality controller to check their quality. Moreover, the manufacturing unit only procure chemicals from suppliers who follow the standards of Pakistan Standards & Quality Control Authority.

All the materials required for the production of varnish and lacquer are highly inflammable, following conditions should be met for storing these chemicals

- Temperature of the store room must be maintained at 20-degree C or below.
- Fire Alarms system should be installed in store room.
- Chemical should be kept in tightly closed containers.
- Containers should be protected against damage & not exposed to heating.
- Storage should be segregated, well ventilated, & equipped with both decomposition & explosion vents, having max amt of free opening.

Raw material store room maintain raw material inventory (chemicals), average of equal to one-month production. The payment to supplier against his supplies provided is made within 35 days from the receipt of raw material inventory.

Mixing of Chemicals in the Mixer

In this process, the raw chemicals (such as NC-cotton, resin, butyl acetate, MEK, ethyl acetate, xylene, toluene, DOP (plasticizer) are mixed in a high-power mixer machine. Chemicals will be added in the high-power mixer machine according to the standardized mixing ratios for manufacturing of desired lacquer.

The details of Lacquers products (such as nitrocellulose lacquer, 1K-acrylic lacquer- and 2K-acrylic lacquer) is as below:

- **Nitrocellulose Lacquer-per Batch 100 Liter**

For manufacturing one batch of 100 liters of nitrocellulose lacquer, the details of chemicals and its usage are as follows:

NC-cotton (10 liter), resin (coconut) (30 liter), butyl acetate (5 kg), MEK (5 kg), ethyl acetate (4 liter), xylene (45 kg) and DOP (plasticizer) (1 kg) are mixed up to one hour in a high-power mixing machine. After mixing these chemicals for up to one hour in a mixing machine, the manufacturing process of nitrocellulose lacquer is complete.

- **1K-Acrylic lacquer-per Batch 100 Liter**

For manufacturing one batch of 100 liter of 1K-acrylic lacquer the details of chemicals and its usage are as follows:

Acrylic resin (45 liter), xylene (53 kg), MEK (1 kg) and DOP-plasticizer (1 kg) are mixed up to one hour in a high-power mixing machine. After mixing these chemicals for up to one hour in a mixing machine, the manufacturing process of 1K-acrylic lacquer is complete.

- **2K-Acrylic lacquer-per Batch 100 Liter**

For manufacturing one batch of 100 liter of 2K-acrylic lacquer the details of chemicals and its usage is as follows:

Acrylic resin (44.80 liter), xylene (53.6 kg), MEK (0.8 kg), DOP-plasticizer (0.8 kg) and are mixed up to one hour in a high-power mixing machine. After mixing these chemicals for up to one hour in a mixing machine, the manufacturing process of acrylic lacquer-2K is complete.

Quality Test

The function of a porosity test is to examine the quality of an applied coating. The appearance of pores in the coating, reaching the substrate, could introduce serious corrosion attack limiting the effectiveness of the coating.

Porosity of lacquer is evaluated using the electrochemical method (WACO test). The lacquer coated sample (Tin can) is filled with sodium chloride and copper electrode of machine (which acts as Anode) is dipped in the lacquer. The tin can outer body itself makes contact with the cathode which is installed in the machine. Both cathode and Anode are connected to auto range current source of 0-1000mA, ammeter is used to measure the current. When test is performed, the current is passed through these two poles and the flow of current is measured for 4 seconds and displayed on LCD Display. The displayed current flow is directly proportional to the pores formed in internal lacquer coating. Higher flow of current means a lower resistance offered by the lacquer layer coated on tin can and greater pores formation which is indication of lower quality of lacquer. For good quality lacquer, the current values should be in the of range of 4.0- 8.0 μ A.

Transferring of Lacquer to Filling Machine Tank

After quality testing, the approved lacquer batch is transferred to the filling machine tank manually, using carry trolleys.

Filling and packaging of Lacquer

A manual filling machine is used to fill the manufactured lacquer in tin cans (sizes of 250 ml, 500 ml, 750 ml and 1000 ml). After filling of lacquer, the cans is automatically sealed by the same machine and the label is attached on each box manually by labor and are packed in carton boxes. Figure 20 shows finished product.

Figure 20: Finished Product-Lacquer



Finished Goods Store Room

After completion of manufacturing process, the cartons of lacquers products are transferred to finished goods store room by trolleys. They are stored with the consideration to avoid any damage or loss. Finished goods inventory that is equal to half month of production capacity will be stored.

Delivery and Payment

From finished goods store, the products are dispatched to the customers. Usually, the payment is made in cash but for reliable customers, credit facility of 30 days is provided. The manufacturing unit also provides delivery service for large orders and long-standing customers. Carry van is used to deliver the products.

5.3. Installed and Operational Capacities

The total production capacity of the unit is based on the production capacity of the High-Power Mixing Machine (for lacquer and varnishes). The proposed production unit will run for 8 hours in a day for 280 days in a year. The proposed business will have maximum capacity of producing 196,000 liters of different Varnish and Lacquer products per year. These include 49,000 liter of polyurethane varnish, 49,000 liter of synthetic varnish, 49,000 liter of nitrocellulose lacquer, 19,600 liters of 1K lacquer and 29,400 liters of 2k Lacquer. This production will be sold in four types of tin cans (250 ml, 500 ml, 750 ml and 1000 ml). The production translates into a total of 326,668 tin cans.

The project is assumed to attain 50% capacity utilization during the first year of operations; which is equal to 98,000 liters of varnish and lacquer products. These include 24,500 liter of polyurethane varnish, 24,500 liter of synthetic varnish, 24,500 liter of nitrocellulose lacquer, 9,800 liters of 1K lacquer and 14,700 liters of 2k Lacquer. The total production at 50% capacity utilization translates into 163,334 tin cans.

It has been assumed that the operational capacity utilization of the unit will increase at the rate of 5% per annum. From the utilized operational capacity of 50% during first year, the unit will attain maximum 90% of its total installed capacity in year 9. Table 1 shows details of maximum annual capacity and operational capacity utilized during first year of operations.

Table 1: Installed and Operational Capacity

Product	Production Capacity of Mixing Machine (Liter/hour)	Per Day Capacity (Liter)	Per Day Capacity (Milliliter)	Total Annual Capacity (liter)	Production Ratio	Annual Capacity @100% (liter)	Initial Year Capacity @ 50% (liter)
Polyurethane Varnish	100	700	700,000	196,000,	25%	49,000	24,500
Synthetic Varnish					25%	49,000	24,500
Nitrocellulose Lacquer					25%	49,000	24,500
1K-Acrylic Lacquer					10%	19,600	9,800
2K-Acrylic Lacquer					15%	29,400	14,700
Total					100%	196,000	98,000

Table 2 shows packing wise distribution of polyurethane varnish production in different packing sizes.

Table 2: Packing Wise Distribution-Polyurethane Varnish

Products	Ratio	Total Annual Capacity per year (Liter)	No.of Tin Can at 100% capacity	No. of Varnish Tin Can @ 50% capacity
Packing of 250ml (Tin Can)	10%	49,000	19,600	9,800
Packing of 500ml (Tin Can)	30%		29,400	14,700

Packing of 750ml (Tin Can)	20%		13,067	6,534
Packing of 1000ml (Tin Can)	40%		19,600	9,800
Total	100%		81,667	40,834

Table 3 shows packing wise distribution of synthetic varnish production in different packing sizes.

Table 3: Packing Wise Distribution-Synthetic Varnish

Products	Ratio	Total Annual Capacity per year (liter)	No.of Tin Can at 100% capacity	No. of Varnish Tin Can @ 50% capacity
Packing of 250ml (Tin Can)	10%	49,000	19,600	9,800
Packing of 500ml (Tin Can)	30%		29,400	14,700
Packing of 750ml (Tin Can)	20%		13,067	6,534
Packing of 1000ml (Tin Can)	40%		19,600	9,800
Total	100%		81,667	40,834

Table 4 shows packing wise distribution of nitrocellulose lacquer production in different packing sizes.

Table 4: Packing Wise Distribution-Nitrocellulose lacquer

Products	Ratio	Total Annual Capacity per year (liter)	No.of Tin Can at 100% capacity	No. of Varnish Tin Can @ 50% capacity
Packing of 250ml (Tin Can)	10%	49,000	19,600	9,800
Packing of 500ml (Tin Can)	30%		29,400	14,700
Packing of 750ml (Tin Can)	20%		13,067	6,534
Packing of 1000ml (Tin Can)	40%		19,600	9,800
Total	100%		81,667	40,834

Table 5 shows packing wise distribution of 1K-arcylic lacquer production in different packing sizes.

Table 5: Packing Wise Distribution-1K-Arcylic Lacquer

Products	Ratio	Total Annual Capacity per year (Liter)	No.of Tin Can at 100% capacity	No. of Varnish Tin Can @ 50% capacity
Packing of 250ml (Tin Can)	10%	19,600	7,840	3,920
Packing of 500ml (Tin Can)	30%		11,760	5,880
Packing of 750ml (Tin Can)	20%		5,227	2,614
Packing of 1000ml (Tin Can)	40%		7,840	3,920
Total	100%		32,667	16,334

Table 6 shows packing wise distribution of 2K-arcylic lacquer production in different packing sizes.

Table 6: Packing Wise Distribution-2K-Arcylic Lacquer

Products	Ratio	Total Annual Capacity per year (liter)	No.of Tin Can at 100% capacity	No. of Varnish Tin Can@ 50% capacity
Packing of 250ml (Tin Can)	10%	29,400	11,760	5,880
Packing of 500ml (Tin Can)	30%		17,640	8,820
Packing of 750ml (Tin Can)	20%		7,840	3,920
Packing of 1000ml (Tin Can)	40%		11,760	5,880
Total	100%		49,000	24,500

6. CRITICAL FACTORS

Before making the decision to invest in manufacturing unit for varnishes and lacquers, one should carefully analyze the associated risk factors. The important considerations in this regard include:

- Engagement of skilled staff
- Use of good quality raw materials
- Good knowledge of accurate formulas/composition of the products
- Good knowledge of process parameters; especially the practical knowledge gained through experience; which is usually not available in the books
- Maintaining quality of finished product
- Use of modern technology and machines for maintaining quality
- Continuous inspection of production process
- Fine finishing as visual appeal is central to the consumer decisions
- Strong distribution channels

7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Major users of varnishes and lacquers are in furniture manufacturing, fastener manufacturing, automobile manufacturing and construction industries. Therefore, the proposed manufacturing unit has potential to provide good entrepreneurship opportunity if the business is established in metropolitan cities of Pakistan like Lahore, Karachi, Islamabad, Peshawar, Quetta and medium cities such as Faisalabad, Multan, Rawalpindi, Hyderabad, Bahawalpur, Sargodha, Sukkur, Mardan, Sheikhpura, Sialkot, Gujranwala, Lasbela, Gujrat, etc. These are suitable locations to establish the proposed manufacturing unit due to easy access to raw materials and low-cost labor. Other reasons of proposing metropolitan cities for setting up of this business are presence of manufacturing units of automobiles, furniture and paint in these cities. In addition to above factors, majority of urban housing is also located in above cities, which directly creates demand for the products produced by the proposed business.

8. POTENTIAL TARGET MARKETS/CUSTOMERS

The potential target markets/customers for varnishes and lacquers are retail shops of paints, construction companies, manufacturing units of furniture and automobile manufacturers.

The construction industry in Pakistan is expected to expand by 3% in real terms in 2021, following a decline of 6.2% in 2019.⁹ Manufacturing sector grew by 12.73% in August of 2021 over the same month during the previous year,¹⁰ and automobile sector recorded a growth of 23.4%.¹¹ The growth in aforementioned industries is expected to directly generate demand for the products manufactured by the proposed manufacturing unit.

There are around 20 large to medium size units operating in the formal sector and around 110 medium to small units existing in the unorganized sector; engaged in manufacturing different paint and related products; including varnishes and lacquers. The Pakistani paint industry has multinational paint producers such as AkzoNobel (formerly ICI), Jotun, Berger, Kansai, Nippon and local companies Buxly, Brighto, Diamond, Happilac, Master and Nelson. Pakistan's paint and coating industry is expected to register steady growth rates in the coming years on account of current low per capita consumption, rising disposable income, growing economy and decreasing repainting cycle.¹²

The Pakistan paints and coatings market is expected to grow at a CAGR of over 3% during the forecast period (2021-26).¹³ The paint and coatings industry in Pakistan has registered a steady growth on the back of strong economic performance of the domestic economy in the last few years. With GDP growth at 3.95% for FY2021,¹⁴ and healthy growth in the construction sector, continued growth in the manufacturing sector, and healthy contribution by the services sector, the size of the economy is expected to reach at \$280 billion by the end of 2021.¹⁵

9. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of manufacturing unit for varnishes and lacquers. Various assumptions relevant to revenue and costs along with the results of the analysis are outlined in this section.

The projected Income Statement, Cash Flow Statement and Balance Sheet are attached as annexures of this document.

All the figures in this financial model have been calculated after carefully considering the relevant assumptions and target market.

⁹<https://finance.yahoo.com/news/pakistan-construction-market-trends-opportunities->

¹⁰<https://tradingeconomics.com/pakistan/manufacturing-production>.

¹¹<https://propakistani.pk/2021/07/23/pakistans-automobile-sector>.

¹²https://www.coatingsworld.com/issues/2018-11-01/view_india_asia_pacific_reports/overview-of-paint-coatings-industry-in-pakistan/

¹³<https://www.grwoth+of+paint+sector+in+pakisyan&oq=grwoth+of+paint+sector+in+pakisyan>

¹⁴<https://www.worldbank.org/en/pakistan-s-sustained-economic-growthThe%20October%202021%20Pakistan%20>

¹⁵<https://tradingeconomics.com/pakistan/gdp>

9.1. Initial Project Cost

Table 7 provides fixed and working capital requirements for establishment of manufacturing unit for varnishes and lacquers.

Table 7: Initial Project Cost estimates

Particulars	Cost (PKR)	Reference
Land	-	9.1.1
Building Renovation Cost	724,650	9.1.2
Machinery & equipment	3,477,400	9.1.3
Office equipment	1,571,000	9.1.4
Furniture & fixtures	1,200,000	9.1.5
Office vehicles	1,167,250	9.1.6
Pre-operating costs	494,362	9.1.7
License and Permits	34,500	9.1.8
Security against building	450,000	9.1.9
Total Capital Cost - (A)	9,119,162	
Equipment spare part inventory	43,468	
Raw Material Inventory	3,220,813	
Lab Consumable	37,404	
Cash	1,000,000	
Working Capital Requirement - (B)	4,301,685	9.1.10
Total Project Cost - (A+B)	13,420,846	

9.1.1. Land

The proposed unit will be established in a rented space having an area of 2,676 square feet (12 Marla). Total rental cost has been estimated as PKR 150,000. The breakup of the space requirement is provided in .

Table 8.

Table 8: Breakup of Space Requirement

Particular	Number	Length	Width	Area (Sq. Ft.)
Executive Office	1	12	12	144
Office Area	1	30	25	750

Raw Material Store Room	1	15	15	225
Finished Goods Store Room	1	15	15	225
Production Department	1	30	30	900
Quality Assurance Lab	1	15	16	240
Washrooms	3	8	8	192
Total Area				2,676

9.1.2. Building / Infrastructure

There will be no cost of building construction since the manufacturing unit for varnishes and lacquers will be established in a rented building having an area of 2,676 square feet. However, there will be a renovation cost required to make the building usable for the business. Building rent of PKR 150,000 per month has been included in the operating cost. The proposed project requires electricity load of around 10-11 KW for which a three-phase industrial electricity connection will be required. Table 9 provide details of building renovation cost.

Table 9: Building Renovation Cost

Cost Item	Unit of Measurement	Total Units	Cost/Unit (PKR)	Total Cost (PKR)
Paint Cost	Liter	71	500	35,520
Labour Cost- Paint	Sq. Feet	7,104	10	71,040
Tiles Cost	Sq. Feet	894	120	107,280
Labour Cost- Tiles	Sq. Feet	894	40	35,760
Curtains	Units	4	3,000	12,000
Shelves-Precasted	Sq. Feet	240	300	72,000
Glass Partitions	Units	711	550	391,050
TOTAL (PKR)				724,650

9.1.3. Machinery and Equipment

Table 10 provides details of machinery and equipment for the proposed project.

Table 10: Machinery Cost Details

Cost Item	Number of Items	Unit Cost (PKR)	Total Cost (PKR)
High Power Mixing Machine (for lacquer	1	750,000	750,000

and Varnish) 100 liter/hour			
Automatic Packing and Filling Machine (300 tin cans/ hour)	1	1,200,000	1,200,000
Platform Trolley	4	30,000	120,000
Generator (10 KW)	1	600,000	600,000
Electronic Weigh Balance (100 kg)	4	5,000	20,000
Carry Trolley with Tub	4	30,000	120,000
Electronic Weigh Balance (30 kg)	2	4,800	9,600
Lab Equipment			
Spectrophotometer	1	380,000	380,000
Lacquer Porosity Apparatus	1	85,000	85,000
Ammeter	1	800	800
Lab precision weight scale	2	15,000	30,000
Fire Handling and Safety Equipment			
Fire Extinguisher (2 kg)	6	2,000	12,000
Fire Alarm System	1	150,000	150,000
Total			3,477,400

9.1.4. Office Equipment

Table 11 shows details of equipment cost required for the manufacturing unit for varnishes and lacquers.

Table 11: Office Equipment Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Laptop	6	100,000	600,000
Printer	2	40,000	80,000
Desktop Computer	7	40,000	280,000
LED/LCD (Surveillance)	2	40,000	80,000
Water Dispenser	2	20,000	40,000
Ceiling Fan	15	5,000	75,000
Wi-Fi / Internet Routers	2	5,000	10,000
Exhaust Fan	6	3,000	18,000
1.5 ton Air Conditioner	4	90,000	360,000

Security Cameras - 2MP	8	2,000	16,000
Digital Video Recorder (DVR)	1	12,000	12,000
Total			1,571,000

9.1.5. Furniture and Fixture

Table 12 provides details of furniture and fixtures.

Table 12: Furniture & Fixtures Cost Details

Cost Item	Number of Items	Unit Cost (PKR)	Total Cost (PKR)
Owner Tables	1	30,000	30,000
Owner Chairs	1	20,000	20,000
Office Chairs	38	10,000	380,000
Office Tables	14	35,000	490,000
Wall Racks	12	15,000	180,000
Cabinets	10	10,000	100,000
Total	76		1,200,000

9.1.6. Vehicles

Table 13 provides details of the vehicles required along with their cost for the proposed project.

Table 13: Office Vehicle Cost Details

Cost Item	Number of Vehicles	Unit Cost (PKR)	Total (PKR)
Motorcycle	1	80,000	80,000
Carry Van	1	1,075,000	1,075,000
Registration Charges-Motorcycle	1	1,500	1,500
Registration Charges-Carry Van	1	1%	10,750
Total Cost (PKR)			1,167,250

9.1.7. Pre-Operating Costs

Table 14 provides details of estimated pre-operating costs.

Table 14: Pre-Operating Cost Details

Costs Item	No.	Hiring Months Before in Year 0	Unit Cost (per month) (PKR)	Annual Cost (PKR)
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Production Manager	1	1	100,000	100,000
Labour Skilled	1	1	35,000	35,000
Labour - Unskilled	1	1	25,000	25,000
Procurement Manager	1	1	60,000	60,000
Admin and HR Manager	1	1	75,000	75,000
Sales Manager	1	1	75,000	75,000
Research and Development Officer	1	1	50,000	50,000
Security Guard	1	1	22,000	22,000
Office Boy	1	1	22,000	22,000
Utilities expenses.				30,362
Total Cost (PKR)				494,362

9.1.8. Licenses and Permits

Trademark is an important requirement for protecting brand identity. It will stop the competitors from approaching proposed project's customers by copying the brand. It is also important to provide protection to the reputation of the business. The details of legal and licensing fee are provided in the Table 15.

Table 15: Licenses, Permits Cost Details

Particular	Cost (PKR)
<u>Trade Mark Registration</u>	
Professional charges for registration	30,000
Trade Mark search fee	500
Trade Mark application fee	1,000
Trade Mark Certificate fee	3,000
Total	34,500

9.1.9. Security against Building

Table 16: Security against Building

Particular	Months	Rent per month (PKR)	Total (PKR)
Security against building	3	150,000	450,000
Total (PKR)			450,000

9.1.10. Initial Working Capital

Table 17 provides details of working capital requirements for the project.

Table 17: Initial Working Capital Details

Particulars	No. of Months	Total Cost (PKR)
Equipment spare part inventory	1	43,468
Raw Material Inventory	1	3,220,813
Lab Consumable	1	37,404
Cash		1,000,000
Total Working Capital		4,301,685

Table 18 shows the details of the lab consumables.

Table 18: Lab Consumable

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Nitrocellulose/Filter Paper Sandwich, 0.45 μ m (box of 100)	10	35,000	350,000
Petroleum Ether (2.5 liter bottle)	5	1,000	5,000
Measuring Cups 5 liters	10	2,000	20,000
Test Tube	100	50	5,000
3 layer test tube stand (50 holes)	4	2,000	8,000
Test Tube Holder	10	60	600
Magnetic Mixer 300 ml	4	5,000	20,000
Lab Gloves-box	10	1,000	10,000
Face Mask-box	10	500	5,000
Petri dish (10 pieces)	5	850	4,250
Glass Beaker (set of 5)	5	1,850	9,250
Glass stirrer (set of 3)	4	1,500	6,000
Sodium chloride(1 Kg pack)	115	50	5,750
Total Working Capital			448,850

9.2. Breakeven Analysis

Table 19 shows calculation of break-even analysis.

Table 19: Breakeven Analysis

Particulars	Amount First Year (PKR)	Profitability Ratio
Sales (PKR) – A	70,916,146	100%
Variable Cost (PKR) – B	52,790,601	74%
Contribution (PKR) (A-B) = C	18,125,545	26%
Fixed Cost (PKR) – D	14,236,308	20%
Contribution Margin	26%	
Breakeven Analysis		
Breakeven Revenue (PKR)	55,699,518	
Breakeven (Tin cans)	128,289	
Break-Even (Liter)	76,972	
Breakeven Capacity	39%	

9.3. Revenue Generation

Table 20 provides details regarding revenue generation from the manufacturing for varnishes and lacquers during the first year of its operations. The proposed business unit will target both wholesale market and retail market. The percentage ratio of selling the products to retail market is 30% and wholesale market is 70%.

Table 20: Revenue Details

Products	Total Revenue (PKR) (Retail)	Total Revenue (PKR) (Wholesale)	Total Revenue (PKR)	Reference Retail Revenue	Reference Wholesale Revenue
Polyurethane Varnish	4,982,990	11,054,682	16,037,672	Table 21	Table 22
Synthetic Varnish	4,316,080	9,571,089	13,887,169	Table 23	Table 24
Nitrocellulose Lacquer	4,597,870	10,201,126	14,798,996	Table 25	Table 26
1K-Acrylic	2,197,673	4,871,569	7,069,242	Table 27	Table 28

Lacquer					
2K-Acrylic Lacquer	5,945,133	13,177,934	19,123,067	Table 29	Table 30
Total	22,039,746	48,876,400	70,916,146		

Table 21: Revenue Retail-Polyurethane Varnish

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
Polyurethane Varnish-250 ml	2,818	180	507,240
Polyurethane Varnish-500 ml	4,226	350	1,479,100
Polyurethane Varnish-750 ml	1,879	530	995,870
Polyurethane Varnish-1000 ml	2,818	710	2,000,780
Total	11,741		4,982,990

Table 22: Revenue Wholesale-Polyurethane Varnish

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
Polyurethane Varnish-250 ml	6,574	171	1,124,154
Polyurethane Varnish-500 ml	9,862	333	3,284,046
Polyurethane Varnish-750 ml	4,383	504	2,209,032
Polyurethane Varnish-1000 ml	6,574	675	4,437,450
Total	27,393		11,054,682

Table 23: Revenue Retail-Synthetic Varnish

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
Synthetic Varnish-250 ml	2,818	160	450,880
Synthetic Varnish-500 ml	4,226	310	1,310,060
Synthetic Varnish-750 ml	1,879	460	864,340
Synthetic Varnish-1000 ml	2,818	600	1,690,800
Total	11,741		4,316,080

Table 24: Revenue Wholesale-Synthetic Varnish

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
Synthetic Varnish-250 ml	6,574	152	999,248
Synthetic Varnish-500 ml	9,862	295	2,909,290
Synthetic Varnish-750 ml	4,383	437	1,915,371
Synthetic Varnish-1000 ml	6,574	570	3,747,180
Total	27,393		9,571,089

Table 25: Revenue Retail-Nitrocellulose Lacquer

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
Nitrocellulose Lacquer-250 ml	2,818	170	479,060
Nitrocellulose Lacquer-500 ml	4,226	330	1,394,580
Nitrocellulose Lacquer-750 ml	1,879	490	920,710
Nitrocellulose Lacquer-1000 ml	2,818	640	1,803,520
Total	11,741		4,597,870

Table 26: Revenue Wholesale-Nitrocellulose Lacquer

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
Nitrocellulose Lacquer-250 ml	6,574	162	1,064,988
Nitrocellulose Lacquer-500 ml	9,862	314	3,096,668
Nitrocellulose Lacquer-750 ml	4,383	466	2,042,478
Nitrocellulose Lacquer-1000 ml	6,574	608	3,996,992
Total	27,393		10,201,126

Table 27: Revenue Retail-1K-Acrylic Lacquer

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
1K-Acrylic Lacquer-250 ml	1,127	200	225,400

1K-Acrylic Lacquer-500 ml	1,691	393	664,563
1K-Acrylic Lacquer-750 ml	752	585	439,920
1K-Acrylic Lacquer-1000 ml	1,127	770	867,790
Total	4,697		2,197,673

Table 28: Revenue Wholesale-1K-Acrylic Lacquer

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
1K-Acrylic Lacquer-250 ml	2,630	190	499,700
1K-Acrylic Lacquer-500 ml	3,945	373	1,471,485
1K-Acrylic Lacquer-750 ml	1,754	556	975,224
1K-Acrylic Lacquer-1000 ml	2,630	732	1,925,160
Total	10,959		4,871,569

Table 29: Revenue Retail-2K-Acrylic Lacquer

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
2K-Acrylic Lacquer--250 ml	1,691	360	608,760
2K-Acrylic Lacquer-500 ml	2,536	713	1,808,168
2K-Acrylic Lacquer-750 ml	1,127	1,045	1,177,715
2K-Acrylic Lacquer-1000 ml	1,691	1,390	2,350,490
Total	7,045		5,945,133

Table 30: Revenue Wholesale-2K-Acrylic Lacquer

Products	Quantity Sold during the Year (Tin cans) (A)	Price Per Can (PKR) (B)	Total Revenue (PKR) (A*B)
2K-Acrylic Lacquer--250 ml	3,945	342	1,349,190
2K-Acrylic Lacquer-500 ml	5,917	677	4,005,809
2K-Acrylic Lacquer-750 ml	2,630	993	2,611,590
2K-Acrylic Lacquer-1000 ml	3,945	1,321	5,211,345
Total	16,437		13,177,934

9.4. Variable Cost Estimate

Variable costs of the project have been provided in Table 31.

Table 31: Variable Cost Estimate

Description of Costs	Amount (PKR)
Raw Material-Polyurethane Varnish	7,080,154
Raw Material-Synthetic Varnish	5,690,108
Raw Material-NitroCellulose Laquer	10,486,392
Raw Material-Acrylic Lacquer-1K	4,473,931
Raw Material-Acrylic Lacquer-2K	10,919,169
Direct Utilities Cost	176,640
Direct Labor	5,640,000
Machinery Maintenance - Cost	521,610
Fuel Cost-Generator	54,651
Office vehicles running expense-Carry Van	408,000
Carton for Packaging-Polyurethane Varnish	278,181
Carton for Packaging-Synthetic Varnish	278,181
Carton for Packaging-NitroCellulose Laquer	278,181
Carton for Packaging-Acrylic Lacquer-1K	111,287
Carton for Packaging-Acrylic Lacquer-2K	166,920
Tin Can Cost-Polyurethane Varnish	1,150,542
Tin Can Cost-Synthetic Varnish	1,150,542
Tin Can Cost-NitroCellulose Laquer	1,150,542
Tin Can Cost-Acrylic Lacquer-1K	460,290
Tin Can Cost-Acrylic Lacquer-2K	1,175,040
Workers Consumables	48,000
Communications expense (phone,mail, internet, etc.)	263,520
Office vehicles running expense-motorcycle	126,000
Office expenses (stationery, entertainment, janitorial etc.)	702,720
Total Variable Cost (PKR)	52,790,601

Table 32: Raw Material Cost-Polyurethane Varnish

Products	Tin cans Sold during the Year (Units) (A)	Material Cost Per Unit (PKR) (B)	Total Cost (PKR) (A*B)
Packing of 250ml (Tin Can)	9,392	75	704,400
Packing of 500ml (Tin Can)	14,088	151	2,127,288
Packing of 750ml (Tin Can)	6,262	227	1,421,474
Packing of 1000ml (Tin Can)	9,392	301	2,826,992
Total Cost	39,134		7,080,154

Table 33: Raw Material Cost-Synthetic Varnish

Products	Tin cans Sold during the Year (Units) (A)	Material Cost Per Unit (PKR) (B)	Total Cost (PKR) (A*B)
Packing of 250ml (Tin Can)	9,392	61	572,912
Packing of 500ml (Tin Can)	14,088	121	1,704,648
Packing of 750ml (Tin Can)	6,262	182	1,139,684
Packing of 1000ml (Tin Can)	9,392	242	2,272,864
Total Cost	39,134		5,690,108

Table 34: Raw Material Cost-Nitrocellulose Lacquer

Products	Tin cans Sold during the Year (Units) (A)	Material Cost Per Unit (PKR) (B)	Total Cost (PKR) (A*B)
Packing of 250ml (Tin Can)	9,392	112	1,051,904
Packing of 500ml (Tin Can)	14,088	223	3,141,624
Packing of 750ml (Tin Can)	6,262	336	2,104,032
Packing of 1000ml (Tin Can)	9,392	446	4,188,832
Total Cost	39,134		10,486,392

Table 35: Raw Material Cost-Acrylic Lacquer-1K

Products	Tin cans Sold during the Year (Units) (A)	Material Cost Per Unit (PKR) (B)	Total Cost (PKR) A*B
Packing of 250ml (Tin Can)	3,757	119	447,083
Packing of 500ml (Tin Can)	5,635	238	1,341,368
Packing of 750ml (Tin Can)	2,506	358	897,148
Packing of 1000ml (Tin Can)	3,757	476	1,788,332
Total Cost	15,655		4,473,931

Table 36: Raw Material Cost-2K Acrylic Lacquer and Hardener

Products	Tin cans Sold during the Year (Units) (A)	Material Cost Per Unit (PKR) (B)	Total Cost (PKR) A*(B+C)
Packing of 250 ml Lacquer and 125ml Hardener (Tin Can)	5,636	194	1,093,384
Packing of 500 ml Lacquer and 225ml Hardener (Tin Can)	8,453	387	3,271,311
Packing of 750 ml Lacquer and 375ml Hardener (Tin Can)	3,757	582	2,186,574
Packing of 1000 ml Lacquer and 500ml Hardener (Tin Can)	5,636	775	4,367,900
Total Cost	23,482		10,919,169

Table 37: Raw Material Cost Details - Polyurethane Varnish-

Cost Item	Unit of Measurement	Consumption per (kg/ltr)	Consumption per batch (kg/ltr)	Cost per kg/ltr (PKR)	Cost (PKR)
Polyurethane Resin	Liter	0.30	30.00	325	9,750
MTT/ Terpene	Liter	0.60	60.00	185	11,100
Additives					
Lead Powder	KG	0.03	3.00	650	1,950
Calcium Powder	KG	0.04	4.00	650	2,600
Cobalt Powder	KG	0.015	1.50	2500	3,750

Antiskining Agents	KG	0.015	1.50	650	975
Total			1.00		30,125
Number of Tin Can (250 ML) per batch					400
Cost per Tin Can (PKR)					75
Number of Tin Can (500 ML) per batch					200
Cost per Tin Can (PKR)					151
Number of Tin Can (750 ML) per batch					133
Cost per Tin Can (PKR)					227
Number of Tin Can (1000 ML) per batch					100
Cost per Tin Can (PKR)					301

Table 38: Raw Material Cost Details - Synthetic Varnish

Cost Item	Unit of Measurement	Consumption per (kg/ltr)	Consumption per batch (kg/ltr)	Cost per kg/ltr (PKR)	Cost (PKR)
Alkyd Resin	Liter	0.350	35.00	325	11,375
MTT/ Terpen	KG	0.640	64.00	185	11,840
Driers					
Lead Powder	KG	0.002	0.20	650	130
Calcium Powder	KG	0.004	0.40	650	260
Cobalt Powder	KG	0.002	0.20	2500	500
Antiskining Agents	KG	0.002	0.20	650	130
Total			1.000		24,235
Number of Tin cans (250 ML) per 1 Liter					400
Cost per Box (PKR)					61
Number of Tin cans (500 ML) per 1 Liter					200

Cost per Box (PKR)	121
Number of Tin cans (750 ML) per 1 Liter	133
Cost per Box (PKR)	182
Number of Tin cans (1000 ML) per 1 Liter	100
Cost per Box (PKR)	242

Table 39: Raw Material Cost - Nitrocellulose Lacquer

Cost Item	Unit of Measurement	Consumption per (kg/ltr)	Consumption per batch (kg/ltr)	Cost per kg/ltr (PKR)	Cost (PKR)
Nitrocellulose NC-Cotton	Liter	0.100	10	1,000	10,000
Resin-Coconut	Liter	0.300	30	420	12,600
Butyl Acetate	KG	0.050	5	550	2,750
MEK	KG	0.050	5	550	2,750
Ethyl Acetate	Liter	0.040	4	330	1,320
Xylene & Toluene	KG	0.450	45	325	14,625
DOP (plasticizer)	KG	0.010	1	600	600
Total			1.000		44,645
Number of Tin cans (250 ML) per 1 Liter					400
Cost per Box (PKR)					112
Number of Tin cans (500 ML) per 1 Liter					200
Cost per Box (PKR)					223
Number of Tin cans (750 ML) per 1 Liter					133
Cost per Box (PKR)					336
Number of Tin cans (1000 ML) per 1 Liter					100
Cost per Box (PKR)					446

Table 40: Raw Material Cost - Acrylic Lacquer-1K

Cost Item	Unit of Measurement	Consumption per (kg/ltr)	Consumption per batch (kg/ltr)	Cost per kg/ltr (PKR)	Cost (PKR)
Acrylic Resin	Liter	0.450	45.00	650	29,250
Xylene & Toluene	KG	0.530	53.00	325	17,225
MEK	KG	0.010	1.00	550	550
DOP (plasticizer)	KG	0.010	1.00	600	600
Total			1.000		47,625
Number of Tin cans (250 ML) per 1 Liter					400
Cost per Box (PKR)					119
Number of Tin cans (500 ML) per 1 Liter					200
Cost per Box (PKR)					238
Number of Tin cans (750 ML) per 1 Liter					133
Cost per Box (PKR)					358
Number of Tin cans (1000 ML) per 1 Liter					100
Cost per Box (PKR)					476

Table 41: Raw Material Cost - Acrylic Lacquer-2K

Cost Item	Unit of Measurement	Consumption per (kg/ltr)	Consumption per batch (kg/ltr)	Cost per kg/ltr (PKR)	Cost (PKR)
Acrylic Resin	Liter	0.448	44.80	650	29,120
Xylene & Toluene	KG	0.536	53.6	325	17,420
MEK	KG	0.008	0.8	550	440
DOP (plasticizer)	KG	0.008	0.8	600	480
Total			1.000		47,460
Number of Tin cans (250 ML) per 1 Liter					400
Cost per Box (PKR)					119

Number of Tin cans (500 ML) per 1 Liter	200
Cost per Box (PKR)	237
Number of Tin cans (750 ML) per 1 Liter	133
Cost per Box (PKR)	357
Number of Tin cans (1000 ML) per 1 Liter	100
Cost per Box (PKR)	475

Table 42: Raw Material Cost – Acrylic Lacquer-2K Hardener

Cost Item	Unit of Measurement	Consumption per (kg/ltr)	Consumption per batch (kg/ltr)	Cost per kg/ltr (PKR)	Cost (PKR)
2k-Hardener	kg	0.500	50	600	300
Total					300
Cost per 250 ML (PKR)					75
Cost per 500 ML (PKR)					150
Cost per 750 ML (PKR)					225
Cost per 1000 ML (PKR)					300

Table 43: Packing Cost – Tin Cans

Products	Total Cost (PKR)
Tin Can Cost-Polyurethane Varnish	1,150,542
Tin Can Cost-Synthetic Varnish	1,150,542
Tin Can Cost-NitroCellulose Laquer	1,150,542
Tin Can Cost-1K-Acrylic Lacquer	460,290
Tin Can Cost-2K-Acrylic Lacquer	1,175,040
Total Cost	5,086,956

Table 44: Carton Cost for Packing

Products	Total Cost (PKR) (A*B)/C
Carton for Packaging-Polyurethane Varnish	278,181
Carton for Packaging-Synthetic Varnish	278,181
Carton for Packaging-NitroCellulose Laquer	278,181
Carton for Packaging-1K-Acrylic Lacquer	111,287
Carton for Packaging-2K-Acrylic Lacquer	166,920
Total Cost	1,112,750

Table 45: Other Consumables

Cost Item	No	Unit Cost (PKR)	Total Cost(PKR)
Rubber Gloves (pair)	20	500	10,000
Rubber Shoes	10	1,800	18,000
Safety Glasses	50	400	20,000
Total			48,000

Table 46: Vehicle Maintenance

Particulars	Motorcycle(s) (PKR)	Carry Van (PKR)	Total (PKR)
Fuel cost	9,000	30,000	39,000
Service Charges	500	2,000	2,500
Oil & Tuning	1,000	2,000	3,000
Monthly expenses/ Motorcycle	10,500	34,000	44,500
Monthly vehicle running cost	10,500	34,000	44,500
Yearly Cost	126,000	408,000	534,000

Table 47: Direct Labor

Personnel	Number of Personnel	Salary per Person (PKR)	Annual Salaries (PKR)
Production Manager	1	100,000	1,200,000
Labour Skilled	4	35,000	1,680,000

Labour - Unskilled	4	25,000	1,200,000
Procurement Officer	1	40,000	480,000
Lab Assistant	1	40,000	480,000
Research and Development Officer	1	50,000	600,000
Total			5,640,000

9.5. Fixed Cost Estimate

Table 48 shows the estimated fixed cost of the project.

Table 48: Fixed Cost Estimate

Description of Costs	Amount (PKR)
Management Staff	8,784,000
Administration benefits expense	721,200
Building rental expense	1,800,000
Promotional expense	709,161
Amortization of legal, licensing, and training costs	6,900
Depreciation expense	1,184,813
Indirect Utilities	187,701
Research and development expense	709,161
Amortization of pre-operating costs	98,872
License, Permits, etc.	34,500
Total Fixed Cost	14,236,308

9.6. Financial Feasibility Analysis

The financial feasibility analysis provides the information regarding projected Internal Rate of Return (IRR), Net Present Value (NPV) and Payback period of the study, which is shown in Table 49.

Table 49: Financial Feasibility Analysis

Description	Project
IRR	52%
NPV (PKR)	62,662,840
Payback Period (years)	3.06

Projection Years	10
Discount rate used for NPV	15%

9.7. Financial Feasibility Analysis with 50% Debt

The financial feasibility analysis provides the information regarding projected IRR, NPV and payback period of the study on the basis of Debt: Equity Model (50:50), which is shown in Table 50.

Table 50: Financial Feasibility Analysis with 50% Debt

Description	Project
IRR	51%
NPV (PKR)	72,275,518
Payback Period (years)	3.07
Projection Years	10
Discount rate used for NPV	13%

9.8. Human Resource Requirement

The proposed manufacturing unit shall require the workforce as provided in Table 51.

Table 51: Human Resource

Personnel	Number of Personnel	Salary per Person (PKR)	Annual Salaries (PKR)
Owner/Manager	1	-	
Production Manager	1	100,000	1,200,000
Labour Skilled	4	35,000	1,680,000
Labour - Unskilled	4	25,000	1,200,000
Procurement Manager	1	60,000	720,000
Procurement Officer	1	40,000	480,000
Accounts Manager	1	75,000	900,000
Accounts Officer	2	40,000	960,000
Admin and HR Manager	1	75,000	900,000

Admin Officer	1	40,000	480,000
HR Officer	1	40,000	480,000
Marketing and Sales Manager	1	75,000	900,000
Sales Officer	2	40,000	960,000
Quality Controller	1	50,000	600,000
Lab Assistant	1	40,000	480,000
Research and Development Officer	1	50,000	600,000
Security Guard	4	22,000	1,056,000
Driver	1	25,000	300,000
Office Boy	2	22,000	528,000
Total	31		14,424,000

10. CONTACT DETAILS

The contact details of all the major suppliers of machinery and equipment and raw materials are given in Table 52.

Table 52: Contact Details

Name of Supplier	Location	Category	Contact	Websit/ Email
NewGenic Chemicals	Lahore	Chemicals supplier	(042) 36301555	https://newgenic-chemicals.business.site/
Humayun Chemicals	Lahore	Chemicals supplier	0321 8467933	http://humayunchemicals.com/
Haq Chemicals	Peshawar	Chemical Manufacturer	0300 9346775	
Frontier Chemical Industries	Peshawar	Chemical Manufacturer	91823056	
Power Chemical Industries Limited	Faisalabad	Chemical Manufacturer	(041) 8530124	
Swan Chemical (private) limited	Sukkur	Chemical Manufacturer	0300 8178511	
NASA Chemicals (private) Limited	Karachi	Chemical Manufacturer	(021) 32631753	
Sindh Chemicals	Sukkur	Chemical Manufacturer	034011377 65	
Guangzhou Lianmeng Machinery Equipment Co., Ltd.	China	Packaging Machine and other production machines		http://www.lienm.com/en/
Jiangyin Ida Equipment Co., Ltd	China	Mixer and filling Machine	+8613585 068675	http://www.idamill.com
Guangdong Shanghang Technology Limited	China	Production Machinery		http://zonesuntech.com
Aleem Can Private Limited	Multan	Tin Can	0321-05318550	
General Can Industries	Karachi	Tin Can	92-213-6691124	
Scientific Technical	Lahore	Lab Equipment	0321 9427780	

Corporation (Pvt) LTD				
paradise laboratory equipment co	Hyderaba d	Lab Equipmen	0333 7835174	

11. USEFUL LINKS

Table 53: Useful Links

Name of Organization	E-mail Address
Small and Medium Enterprises Development Authority (SMEDA)	www.smeda.org.pk
National Business Development Program (NBDP)	www.nbdp.org.pk
Government of Pakistan	www.pakistan.gov.pk
Ministry of National Health Services Regulations and Coordination	www.nhsrsc.gov.pk
Ministry of Federal Education and Professional Training	www.mofept.gov.pk
Government of Punjab	www.punjab.gov.pk
Government of Sindh	sindh.gov.pk/
Government of Balochistan	balochistan.gov.pk/
Government of KPK	kp.gov.pk/
Government of Gilgit Baltistan	gilgitbaltistan.gov.pk/
Government of Azad Jammu & Kashmir	ajk.gov.pk/
Trade Development Authority of Pakistan	www.tdap.gov.pk
Securities and Exchange Commission of Pakistan	www.secp.gov.pk
State Bank of Pakistan	www.sbp.gov.pk
Federal Board of Revenue	www.fbr.gov.pk
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
Pakistan Stock Exchange (PSX)	www.psx.com.pk
Pakistan Standards and Quality Control Authority (PSQCA)	http://www.psqca.com.pk
Punjab Small Industries Corporation	https://www.psic.gop.pk/
Sindh Small Industries Corporation	https://ssic.gos.pk/
Government of KPK	https://small_industries_de.kp.gov.pk/
Government of Balochistan Industries and Commerce	https://balochistan.gov.pk/departments-download/industries-and-commerce/
Pakistan Paint Manufacturers Association	
Pakistan Chemical Manufacturers Association	https://www.pcma.org.pk/

Pakistan Coating Association	
All Pakistan Furniture Makers Association	http://apfma.org.pk/
Pakistan Automotive Manufacturers Association	https://www.pama.org.pk/
Constructors Association of Pakistan	https://cappak.org/

12. ANNEXURES

12.1. Income Statement

Income Statement										SMEDA
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue										
Polyurethane Varnish	16,037,672	19,612,737	23,799,509	28,667,472	34,323,922	40,902,864	48,514,322	57,324,390	67,495,340	75,059,752
Synthetic Varnish	13,887,169	16,989,284	20,607,929	24,831,255	29,724,208	35,415,588	42,011,045	49,630,084	58,449,134	64,986,529
Nitrocellulose Lacquer	14,798,996	18,098,692	21,951,361	26,463,338	31,689,970	37,738,230	44,771,041	52,894,724	62,270,081	69,253,784
1K-Acrylic Lacquer	7,069,242	8,646,049	10,486,593	12,636,894	15,129,139	18,026,360	21,378,834	25,258,449	29,741,440	33,075,897
2K-Acrylic Lacquer	19,123,067	23,390,077	28,370,782	34,175,448	40,928,531	48,767,516	57,846,680	68,338,668	80,474,017	89,481,619
Total Revenue (PKR)	70,916,146	86,736,839	105,216,174	126,774,407	151,795,770	180,850,558	214,521,922	253,446,315	298,430,012	331,857,581
Cost of sales										
Raw Material-Polyurethane Varnish	7,080,154	8,660,344	10,505,683	12,656,364	15,155,976	18,057,126	21,418,160	25,305,875	29,795,055	33,132,102
Raw Material-Synthetic Varnish	5,690,108	6,960,059	8,443,103	10,171,541	12,180,405	14,511,972	17,213,135	20,337,574	23,945,398	26,627,282
Raw Material-NitroCellulose Lacquer	10,486,392	12,826,805	15,559,930	18,745,298	22,447,465	26,744,348	31,722,364	37,480,445	44,129,358	49,071,846
Raw Material-1K-Acrylic Lacquer	4,473,931	5,472,313	6,637,476	7,996,629	9,576,060	11,409,379	13,532,340	15,988,725	18,823,642	20,931,890
Raw Material-2K-Acrylic Lacquer	10,919,169	13,355,746	16,200,427	19,517,446	23,372,186	27,847,209	33,028,524	39,025,212	45,947,222	51,093,311
Tin Can Cost-Polyurethane Varnish	1,150,542	1,392,985	1,672,581	1,994,440	2,364,005	2,787,819	3,273,014	3,827,697	4,460,805	4,909,859
Tin Can Cost-Synthetic Varnish	1,150,542	1,392,985	1,672,581	1,994,440	2,364,005	2,787,819	3,273,014	3,827,697	4,460,805	4,909,859
Tin Can Cost-NitroCellulose Lacquer	1,150,542	1,392,985	1,672,581	1,994,440	2,364,005	2,787,819	3,273,014	3,827,697	4,460,805	4,909,859
Tin Can Cost-1K-Acrylic Lacquer	460,290	557,269	669,035	797,817	945,658	1,115,224	1,309,250	1,531,145	1,784,258	1,963,874
Tin Can Cost-2K-Acrylic Lacquer	1,175,040	835,819	1,003,513	1,196,659	1,418,395	1,672,744	1,963,764	2,296,658	2,676,475	2,945,907
Carton for Packaging-Polyurethane Varnish	278,181	336,796	404,393	482,221	571,570	674,035	791,352	925,459	1,078,543	1,187,116
Carton for Packaging-Synthetic Varnish	278,181	336,796	404,393	482,221	571,570	674,035	791,352	925,459	1,078,543	1,187,116
Carton for Packaging-NitroCellulose Lacquer	278,181	336,796	404,393	482,221	571,570	674,035	791,352	925,459	1,078,543	1,187,116
Carton for Packaging-1K-Acrylic Lacquer	111,287	134,736	161,757	192,895	228,642	269,641	316,551	370,202	431,397	474,824
Carton for Packaging-2K-Acrylic Lacquer	166,920	202,088	242,629	289,326	342,940	404,435	474,801	555,286	647,109	712,251
Lab Consumable	448,850	494,034	543,767	598,506	658,756	725,071	798,061	878,399	966,825	1,064,152
Direct Utilities Cost	176,640	198,766	223,447	250,966	281,634	315,796	353,832	396,163	443,255	483,311
Direct Labor	5,640,000	6,187,080	6,787,227	7,445,588	8,167,810	8,960,087	9,829,216	10,782,650	11,828,567	12,975,938
Machinery Maintenance - Cost	521,610	574,119	631,913	695,526	765,542	842,607	927,429	1,020,790	1,123,550	1,236,654
Fuel Cost-Generator	54,651	67,687	83,752	103,536	127,885	157,832	194,644	239,869	295,399	354,518
Total cost of sales	51,691,211	61,716,207	73,924,578	88,088,079	104,476,081	123,419,031	145,275,168	170,468,459	199,455,553	221,358,784
Gross Profit	19,224,935	25,020,632	31,291,596	38,686,328	47,319,689	57,431,527	69,246,754	82,977,856	98,974,459	110,498,797
General administration & selling expenses										
Management Staff	8,784,000	9,636,048	10,570,745	11,596,107	12,720,929	13,954,859	15,308,481	16,793,403	18,422,364	20,209,333
Administration benefits expense	721,200	791,156	867,899	952,085	1,044,437	1,145,747	1,256,885	1,378,803	1,512,547	1,659,264
Building rental expense	1,800,000	1,980,000	2,178,000	2,395,800	2,635,380	2,898,918	3,188,810	3,507,691	3,858,460	4,244,306
Indirect Utilities	187,701	211,211	237,438	266,681	299,269	335,569	375,987	420,968	471,009	513,573
Workers Consumables	48,000	52,832	58,150	64,004	70,447	77,539	85,345	93,936	103,392	113,800
License,Permits,etc.	34,500	37,973	41,796	46,003	50,634	55,731	61,341	67,516	74,313	81,794
Communications expense (phone,mail, internet, etc.)	263,520	289,081	317,122	347,883	381,628	418,646	459,254	503,802	552,671	606,280
Office vehicles running expense-motorcycle	126,000	138,684	152,645	168,011	184,924	203,540	224,030	246,582	271,405	298,726
Office vehicles running expense-Carry Van	408,000	444,870	485,071	528,905	576,701	628,815	685,639	747,598	815,156	888,819
Office expenses (stationery, entertainment, janitorial, etc.)	702,720	770,884	845,660	927,689	1,017,674	1,116,389	1,224,678	1,343,472	1,473,789	1,616,747
Research and development expense	709,161	867,368	1,052,162	1,267,744	1,517,958	1,808,506	2,145,219	2,534,463	2,984,300	3,318,576
Promotional expense	709,161	867,368	1,052,162	1,267,744	1,517,958	1,808,506	2,145,219	2,534,463	2,984,300	3,318,576
Amortization of legal, licensing, and training costs	6,900	6,900	6,900	6,900	6,900	6,900	10,895	10,895	10,895	10,895
Depreciation expense	1,184,813	1,184,813	1,184,813	1,184,813	1,184,813	1,184,813	814,030	2,115,909	2,115,909	2,115,909
Amortization of pre-operating costs	98,872	98,872	98,872	98,872	98,872	-	-	-	-	-
Subtotal	15,784,548	17,378,061	19,149,434	21,119,241	23,308,524	25,648,473	27,985,813	32,299,502	35,650,509	38,996,597
Operating Income	3,440,387	7,642,570	12,142,162	17,567,087	24,011,165	31,783,054	42,246,940	50,678,353	63,323,950	71,502,201
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	869,350	-	-	-
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	392,750	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	291,813	-	-	-
Earnings Before Interest & Taxes	3,440,387	7,642,570	12,142,162	17,567,087	24,011,165	31,783,054	42,814,853	50,678,353	63,323,950	71,502,201
Earnings Before Tax	3,440,387	7,642,570	12,142,162	17,567,087	24,011,165	31,783,054	42,814,853	50,678,353	63,323,950	71,502,201
Tax	886,452	1,794,900	3,369,757	5,268,481	7,523,908	10,244,069	14,105,198	16,857,424	21,283,383	24,145,770
NET PROFIT/(LOSS) AFTER TAX	2,553,935	5,847,671	8,772,405	12,298,607	16,487,258	21,538,985	28,709,654	33,820,930	42,040,568	47,356,430

12.2. Balance Sheet

Balance Sheet											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Assets											
<i>Current assets</i>											
Cash & Bank	1,000,000	1,223,503	2,105,419	3,137,065	4,134,392	4,888,354	5,315,994	23,159,924	51,105,302	87,149,299	94,072,809
Accounts receivable	-	6,331,799	7,744,361	9,394,301	11,319,143	13,553,194	16,147,371	19,153,743	22,629,135	26,645,537	21,585,192
Lab Consumable	37,404	45,108	54,399	65,603	79,115	95,409	115,060	138,759	167,338	201,803	-
Equipment spare part inventory	43,468	52,420	63,217	76,237	91,939	110,876	133,712	161,252	194,464	234,516	-
Raw Material-Polyurethane Varnish	590,013	794,346	1,060,607	1,406,356	1,853,642	2,430,784	3,173,480	4,126,965	5,348,222	6,545,911	-
Raw Material-Synthetic Varnish	474,176	638,392	852,378	1,130,246	1,489,717	1,953,549	2,550,431	3,316,718	4,298,207	5,260,753	-
Raw Material-NitroCellulose Laquer	873,866	1,176,533	1,570,862	2,082,949	2,745,423	3,600,227	4,700,231	6,112,434	7,921,235	9,695,126	-
Raw Material-1K-Acrylic Lacquer	372,828	501,933	670,090	888,573	1,171,194	1,535,889	2,005,056	2,607,494	3,378,850	4,135,514	-
Raw Material-2K-Acrylic Lacquer	909,931	1,225,019	1,635,524	2,168,748	2,858,521	3,748,690	4,893,762	6,364,360	8,247,542	10,094,507	-
Finished goods inventory-Polyurethane Varnish		538,002	642,348	769,796	916,409	1,087,398	1,284,565	1,512,588	1,774,869	2,077,323	2,305,444
Finished goods inventory-Synthetic Varnish		538,002	642,348	769,796	916,409	1,087,398	1,284,565	1,512,588	1,774,869	2,077,323	2,305,444
Finished goods inventory-Nitrocellulose Lacquer		538,002	642,348	769,796	916,409	1,087,398	1,284,565	1,512,588	1,774,869	2,077,323	2,305,444
Finished goods inventory-1K-Acrylic Lacquer		214,884	256,252	307,768	366,315	434,502	513,826	604,813	709,088	831,065	922,328
Finished goods inventory-2K-Acrylic Lacquer		322,801	385,065	462,029	549,679	652,439	770,739	907,775	1,063,939	1,246,258	1,383,116
Total Current Assets	4,301,685	14,140,714	18,325,217	23,429,263	29,408,307	36,266,106	44,173,359	71,192,001	110,387,929	158,272,258	124,879,777
<i>Fixed assets</i>											
Building Renovation Cost	724,650	652,185	579,720	507,255	434,790	362,325	289,860	217,395	144,930	72,465	-
Machinery & equipment	3,477,400	2,955,790	2,434,180	1,912,570	1,390,960	869,350	347,740	6,591,797	5,603,027	4,614,258	3,625,488
Furniture & fixtures	1,200,000	1,020,000	840,000	660,000	480,000	300,000	120,000	2,274,733	1,933,523	1,592,313	1,251,103
Office vehicles	1,167,250	992,163	817,075	641,988	466,900	291,813	116,725	1,778,425	1,511,661	1,244,897	978,134
Office equipment	1,571,000	1,335,350	1,099,700	864,050	628,400	392,750	157,100	2,978,004	2,531,304	2,084,603	1,637,902
Total Fixed Assets	8,590,300	7,405,488	6,220,675	5,035,863	3,851,050	2,666,238	1,481,425	14,290,354	12,174,445	10,058,536	7,942,627
<i>Intangible assets</i>											
Pre-operation costs	494,362	395,489	296,617	197,745	98,872	-	-	-	-	-	-
Total Intangible Assets	528,862	423,089	317,317	211,545	105,772	54,477	43,581	32,686	21,791	10,895	86,021
TOTAL ASSETS	13,420,846	21,969,291	24,863,209	28,676,670	33,365,129	38,986,820	45,698,365	85,515,040	122,584,165	168,341,689	132,908,425
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		5,994,509	7,241,559	8,769,219	10,551,677	12,626,042	15,038,061	17,838,117	21,086,311	24,803,268	26,597,094
Total Current Liabilities		5,994,509	7,241,559	8,769,219	10,551,677	12,626,042	15,038,061	17,838,117	21,086,311	24,803,268	26,597,094
<i>Other liabilities</i>											
Total Long Term Liabilities	-	-	-	-	-	-	-	-	-	-	-
<i>Shareholders' equity</i>											
Paid-up capital	13,420,846	13,420,846	13,420,846	13,420,846	13,420,846	13,420,846	13,420,846	21,727,811	21,727,811	21,727,811	21,727,811
Retained earnings		2,553,935	4,200,803	6,486,604	9,392,605	12,939,931	17,239,458	45,949,113	79,770,042	121,810,610	84,583,520
Total Equity	13,420,846	15,974,781	17,621,649	19,907,450	22,813,452	26,360,778	30,660,305	67,676,924	101,497,853	143,538,421	106,311,331
TOTAL CAPITAL AND LIABILITIES	13,420,846	21,969,291	24,863,209	28,676,670	33,365,129	38,986,820	45,698,365	85,515,040	122,584,165	168,341,689	132,908,425

12.3. Cash Flow Statement

Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Operating activities</i>											
Net profit		2,553,935	5,847,671	8,772,405	12,298,607	16,487,258	21,538,985	28,709,654	33,820,930	42,040,568	47,356,430
Add: depreciation expense		1,184,813	1,184,813	1,184,813	1,184,813	1,184,813	1,184,813	814,030	2,115,909	2,115,909	2,115,909
amortization of pre-operating costs		98,872	98,872	98,872	98,872	98,872	-	-	-	-	-
Accounts receivable		(6,331,799)	(1,412,562)	(1,649,941)	(1,924,842)	(2,234,050)	(2,594,178)	(3,006,372)	(3,473,392)	(4,016,402)	5,060,345
Lab Consumable	(37,404)	(7,704)	(9,291)	(11,204)	(13,512)	(16,295)	(19,651)	(23,698)	(28,579)	(34,466)	201,803
Equipment spare part inventory	(43,468)	(8,953)	(10,797)	(13,020)	(15,702)	(18,936)	(22,836)	(27,540)	(33,212)	(40,052)	234,516
Raw Material-Polyurethane Varnish	(590,013)	(204,333)	(266,261)	(345,748)	(447,287)	(577,142)	(742,696)	(953,485)	(1,221,257)	(1,197,688)	6,545,911
Raw Material-Synthetic Varnish	(474,176)	(164,216)	(213,986)	(277,868)	(359,471)	(463,832)	(596,882)	(766,287)	(981,489)	(962,546)	5,260,753
Raw Material-NitroCellulose Lacquer	(873,866)	(302,637)	(394,359)	(512,087)	(662,475)	(854,803)	(1,100,004)	(1,412,203)	(1,808,800)	(1,773,892)	9,695,126
Raw Material-1K-Acrylic Lacquer	(372,828)	(129,105)	(168,158)	(218,483)	(282,621)	(364,695)	(469,167)	(602,438)	(771,356)	(756,664)	4,135,514
Raw Material-2K-Acrylic Lacquer	(909,931)	(315,088)	(410,505)	(533,225)	(689,772)	(890,169)	(1,145,072)	(1,470,598)	(1,883,182)	(1,846,966)	10,094,507
Finished goods inventory-Polyurethane Varnish		(538,002)	(104,346)	(127,449)	(146,612)	(170,989)	(197,168)	(228,023)	(262,281)	(302,454)	(228,121)
Finished goods inventory-Synthetic Varnish		(538,002)	(104,346)	(127,449)	(146,612)	(170,989)	(197,168)	(228,023)	(262,281)	(302,454)	(228,121)
Finished goods inventory-Nitrocellulose Lacquer		(538,002)	(104,346)	(127,449)	(146,612)	(170,989)	(197,168)	(228,023)	(262,281)	(302,454)	(228,121)
Finished goods inventory-1K-Acrylic Lacquer		(214,884)	(41,368)	(51,516)	(58,547)	(68,188)	(79,324)	(90,987)	(104,275)	(121,977)	(91,263)
Finished goods inventory-2K-Acrylic Lacquer		(322,801)	(62,264)	(76,964)	(87,651)	(102,759)	(118,301)	(137,036)	(156,164)	(182,319)	(136,858)
Accounts payable		5,994,509	1,247,050	1,527,660	1,782,458	2,074,365	2,412,018	2,800,056	3,248,195	3,716,957	1,793,826
Cash provided by operations	(3,301,685)	223,503	5,082,718	7,518,250	10,389,933	13,748,371	17,667,098	23,159,924	27,945,379	36,043,996	91,593,051
<i>Financing activities</i>											
Issuance of shares	13,420,846	-	-	-	-	-	-	8,306,965	-	-	-
Cash provided by / (used for) financing activities	13,420,846	-	-	-	-	-	-	8,306,965	-	-	-
<i>Investing activities</i>											
Capital expenditure	(9,119,162)	-	-	-	-	(54,477)	-	(13,622,959)	-	-	(86,021)
Cash (used for) / provided by investing activities	(9,119,162)	-	-	-	-	(54,477)	-	(13,622,959)	-	-	(86,021)
NET CASH	1,000,000	223,503	5,082,718	7,518,250	10,389,933	13,693,894	17,667,098	17,843,930	27,945,379	36,043,996	91,507,030

13. KEY ASSUMPTIONS

13.1. Operating Cost Assumptions

Table 54: Operating Cost Assumptions

Description	Details
Operating costs growth rate	11.2%
Administration benefits expense	6% of administration expenses
Communication expenses	3% of Management staff expense
Office expenses (stationery, janitor, etc.)	8% of Management staff expense
Promotional Expense	1% of revenue
Machinery Maintenance - Cost	15% of Cost of Machinery
Fuel Cost	15% of utilities cost
Depreciation	
Building	10% of Building cost
Machinery and Equipment	15% of Cost
Office Equipment/Office Vehicle/Furniture and Fixture	15% of Cost

13.2. Revenue Assumptions

Table 55: Revenue Assumptions

Description	Details
Sale price growth rate	11.2%
Capacity utilization	50%
Capacity utilization growth rate	5%
Maximum capacity	90%

13.3. Financial Assumptions

Table 56: Financial Assumptions

Description	Details
Project life (Years)	10
Debt: Equity	0:100
Discount Rate	15%

13.4. Debt Related Assumptions**Table 57: Debt Related Assumption**

Description of Cost	Details
Project Life (Years)	10
Debt: Equity	50:50
Discount Rate	13%
Debt Tenure	5 Years
Debt Grace Period	1 Years
Interest Rate (KIBOR+3%)	11.3%

13.5. Cash Flow Assumptions**Table 58: Cash Flow Assumptions**

Description	Details
Accounts receivable cycle (in days)	25 Days
Accounts payable cycle (in days)	35 Days

Small and Medium Enterprises Development Authority

HEAD OFFICE

4th Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road, Lahore
Tel: (92 42) 111 111 456, Fax: (92 42) 36304926-7

www.smeda.org.pk, helpdesk@smeda.org.pk

REGIONAL OFFICE PUNJAB	REGIONAL OFFICE SINDH	REGIONAL OFFICE KPK	REGIONAL OFFICE BALOCHISTAN
3 rd Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road Lahore, Tel: (042) 111-111-456 Fax: (042) 36304926-7 helpdesk.punjab@smeda.org.pk	5 TH Floor, Bahria Complex II, M.T. Khan Road, Karachi. Tel: (021) 111-111-456 Fax: (021) 5610572 helpdesk-khi@smeda.org.pk	Ground Floor State Life Building The Mall, Peshawar. Tel: (091) 9213046-47 Fax: (091) 286908 helpdesk-pew@smeda.org.pk	Bungalow No. 15-A Chaman Housing Scheme Airport Road, Quetta. Tel: (081) 831623, 831702 Fax: (081) 831922 helpdesk-qta@smeda.org.pk