



Pre-feasibility Study

MANUFACTURING UNIT FOR FABRICATED PIPE AND PIPE FITTINGS

November 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

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1. DISCLAIMER

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Document Control

Document No.	222
Prepared by	SMEDA-Punjab
Revision Date	November 2021
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2. EXECUTIVE SUMMARY

PPRC pipes and pipe fittings are used for water distribution systems and are equally useful for both cold and hot water systems. These pipes and their fittings may also be used for gas distribution systems. PPRC is the basic raw material for making these pipes. Its full form is “Polypropylene Random Copolymer” and it is also known as ‘Type-3’ class raw material. PPRC pipes have smooth surface and they offer easy installation solutions. PPRC pipes and pipe fittings are used for hot/cold water and gas distribution systems in residential, industrial and commercial buildings.

PVC Pipes replaced Galvanized Iron (GI) pipes in mid-20th century due to their drawbacks of being very heavy, difficult to install/repair, and being prone to chipping and cracking. GI Pipes often get clogged over time which leads to reduced water pressure. When GI pipes corrode, dangerous levels of lead is released into the water system. PVC pipes are low cost, require low maintenance, are less prone to corrosion, offer quick installation and versatile flexibility. All these properties made them a popular choice for household, industry, agriculture and commercial very quickly. PPRC products offers even more benefits than PVC products. PPRC pipes are smooth, luminous, have slippery interior faces and are calcification-free, stain-free, hygienic, and offer easy to fit options and high resistance against chemical effects. As a result of these benefits, the PPRC pipes have quickly captured a large share of this market.

PPRC pipes are manufactured through the extrusion process, while the fittings are made through injection molding process. This pre-feasibility study provides information for setting up a Manufacturing Unit of Fabricated Pipe and Pipe Fittings of PPRC. The proposed unit comprises of a production facility for manufacturing PPRC pipes and pipe fittings of 25 mm, 32 mm and 40 mm (outer) diameters.

Most of the PPRC Pipes manufacturing units are small and medium scale industries and are operating in major cities like Karachi, Lahore, Quetta, Gujranwala, Multan, Faisalabad, Hyderabad, etc. Easy availability of raw materials, access to market, availability of low-cost labor, and presence of good industrial infrastructure in major cities make these locations suitable to establish this business. The ability to generate orders through industrial networking, direct marketing, and negotiating long-term contracts are the key success factors of the proposed business.

The maximum production capacity of the unit is 223,194 pipes of 4-meter length and 1,080,000 pipe fittings while operating in a single shift of 12-hour for 300 days per year. Capacity utilization in “Year One” is assumed to be 60%, which translates into production of 133,917 pipes and 648,000 pipe fittings.

The proposed “Manufacturing Unit for Fabricated Pipe and Pipe Fittings” will be set up in a rented building with an area of 7,000 square feet. The project requires a total investment of PKR 29.95 million. This includes capital investment of PKR 25.90 million and working capital of PKR 4.05 million. This project is financed through 100% equity. The Net Present Value (NPV) of the project is PKR 147.65 million with an Internal Rate of Return (IRR) of 59% and a Payback period of 2.59 years. Further, this project is

expected to generate Gross Annual Revenues of PKR 98.17 million during 1st year, with Gross Profit (GP) ratio ranging from 24% to 29% and Net Profit (NP) ratio ranging from 9% to 20% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at the capacity of 28% for pipes (62,289 units) and 42% for pipe fittings (458,885 units) with breakeven revenues of PKR 38.41 million and PKR 11.03 million respectively.

The proposed project may also be established using leveraged financing. With 50% debt financing, at a cost of KIBOR+3%, the proposed manufacturing unit provides Net Present Value (NPV) of PKR 171.47 million, Internal Rate of Return (IRR) of 58%, and Payback period of 2.70 years. Further, this project is expected to generate Net Profit (NP) ratio ranging from 9% to 20% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 29% for pipes (63,705 units) and 43% for pipe fittings (464,416 units) with breakeven revenues of PKR 39.28 million and PKR 11.17 million respectively.

The proposed project will provide employment opportunities to 28 people including the owner. High return on investment and steady growth of the business is expected with 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". Further, the proposed project may also be established as a "Partnership Concern".

3. INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an 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 'sectoral 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 is 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 provide information to the potential investors about establishing a “Manufacturing Unit for Fabricated Pipe and Pipe Fittings”. The document provides a general understanding of the business to facilitate potential investors in crucial and effective 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

The proposed project involves setting up a Manufacturing Unit for Fabricated Pipe and Pipe Fittings of PPRC. PPRC stands for ‘Poly Propylene Random Copolymer’, which is a thermoplastic polymer composition. This raw material is a plastic, made by the chemical industry and used in a wide variety of applications, including water supply systems, gas distribution systems, plumbing, etc. Polypropylene is used in the manufacturing of those piping systems where high strength and cleanliness is required. When used under proper pressure and temperature, the life of PPRC pipes and pipe fittings is more than 50 years. Some key properties of PPRC pipes are as follows:

- Lightweight and smooth
- Bright internal surfaces
- Calcification free
- Rust-free

- Hygienic and easy-to-assemble
- Replaces galvanized iron pipes
- Suitable for both hot and cold-water supply systems
- Environmental friendly
- Colorless, tasteless and odorless material
- Do not change the color, taste, and odor of the water

Before the introduction of plastic pipes, Galvanized Iron (GI) pipes were used until mid-20th century. In the later half of the century, PVC pipes started replacing GI pipes due to the drawbacks of being very heavy, difficult to install/repair, being prone to chipping and cracking and getting clogged over time which led to reduced water pressure. When GI pipes corrode, dangerous levels of lead gets released into the water system. In contrast, the PVC pipes are low cost, require less maintenance, are less prone to corrosion, offer easy installation solutions and have versatile flexibility. All these properties quickly made them a preferred choice for household, industry, agriculture and commercial purposes. One of the drawbacks of PVC pipes is that with the passage of time, they become acidic. Moreover, the adhesive used to join bends, tees, and pipes in the PVC pipe system is highly scented.

PPRC pipes is the latest improvement in this industry and with the passage of time, the conventional PVC piping is being replaced by PPRC pipe and pipe fittings. PPRC pipes and pipe fittings are highly resistant to chemical substances and offer durable solutions for plumbing and liquid supply systems; particularly for the supply of cold and hot waters in residential, commercial and industrial buildings. They are also used for transporting chemicals in different process industries. In Pakistan, most of the PPRC Pipes manufacturing units exist as small or medium scale industries. The market for PPRC pipes exists wherever any residential and commercial construction takes place. Availability of raw material is limited to major cities but the production facilities are present in many cities across the whole country.

The proposed unit will manufacture pipes and pipe fittings. Pipe fittings are used in piping systems to change the direction of the liquid flow, connect pipes of different sizes, change pipe diameter and branch liquid flow from one pipe into multiple pipes. Integrating fittings into piping systems is a very important task. The unit will manufacture pipes and pipe fittings of the sizes 25 mm, 32 mm and 40 mm (outer diameter), The type of pipe fittings, covered in this study, include elbow 45 degrees, elbow 90 degrees, bridge, clamp, cross tee, endcap, over-crossed socket and, plug. Some common pipe fittings, frequently used in the market are shown in Figure 1 below **Error! Reference source not found..**

Figure 1: PPRC Fittings

The raw material used to make PPRC pipe and Pipe Fittings is pure PPRC plastic granule, commonly imported from China by commercial traders from whom it is procured by the manufacturers. The plastic grade usually used in PPRC pipe and pipe fittings is PPRC R200-P.

5.1. Machines used in Production

5.1.1. PPRC Pipes

The machines used in the production of PPRC pipes are as follows:

Granules Mixing Machine

Mixing of plastic granules is done in a vertical mixing machine, made of stainless steel. The Mixer machine uses a motor and a spiral mixer to mix the smokey-white granules with the recycled ones (coming from the crusher) and with the colored ones to give color to the end product. The spiral at the center elevates materials to the top of the tank and then throws them outwards all around in the tank to achieve uniform blending. The granules mixing machine is shown in Figure 2.

Figure 2 Granules Mixing Machine**PPRC Pipe Production Line**

The Process of manufacturing PPRC pipe goes through a single production line. This complete production line has a capacity of 1000 kg PPRC pipe production per day. The production line consists of different sets of machines combined together. These machines are locally manufactured and/or assembled. These may also be imported from other countries; China and India being two important countries in this regard. PPRC pipes production line consists of the following set of machines:

- Extruder
- Strip/Line Injector
- Vacuum/Water tank
- Weight Control Machine
- Ink-Jet Printer
- Cutting Machine

The PPRC pipe production line is shown in Figure 3.

Figure 3: PPRC Pipe Production Line

5.1.2. PPRC Fittings

The production of PPRC fittings is done using a different process which is the injection molding process. The machines used in the process are discussed as follows:

Granules Mixing Machine

After weighing the required quantities of simple and colored granules, these are mixed in the same manner as done for the production of pipes in granules mixing machine.

Injection Molding Machine

Injection molding is a process to manufacture molded products by injecting plastic materials, melted by heat, into a mold, and then cooling and solidifying them. The method is suitable for mass production of products with complicated shapes.

The functions of the injection unit are to melt plastic by heat and then inject molten PPRC plastic into a mold. The screw is rotated to melt PPRC plastic introduced from the hopper and to accumulate molten plastic in front of the screw. After the required amount of molten plastic is accumulated, the injection process is started. While molten plastic is flowing in a mold, the machine controls the moving speed of the screw or injection speed. On the other hand, it controls dwell pressure¹ after molten plastic fills out cavities.

The project uses a 268 Ton Injection molding machine have a capacity of 60 seconds per cycle and a screw diameter of 30 mm, and loaded with clamping force of 800KN.² The machine have injection pressure of 213 Mpa³ and heating power of 5.4KW⁴. 4 types of molds are used in the proposed project for different types of pipe fittings. The production capacity of this machine is 3,600 fittings per day. An Injection Molding machine is shown in Figure 4.

Figure 4: Injection Molding Machine



¹ The dwelling pressure is the pressure that is applied during the period after the entire cavity has been filled with molten plastic until the gate has been sealed so that the plastic does not flow back from the gate.

² Kilo Newton

³ Mega Pascal

⁴ www.hitech-machinery.com/servo-hybrid-pvc-pc-special-injection-molding-machine/#specification

Crushing Machine

Plastic crushers are specialized in crushing leftovers and waste materials into granules or flakes. Crushed granules or flakes are reused in production as the recycled raw materials. This machine can help reduce the volume of plastic waste, and save costs and resources. Crushing machine is shown in Figure 5.

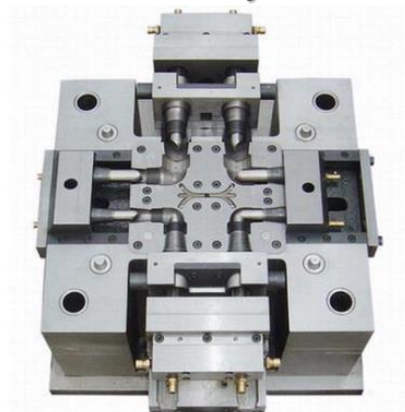
Figure 5: Crushing Machine



Molds for Injection Molding

A mold is a hollow metal block into which molten plastic is injected to form a certain fixed shape. There are many holes drilled in the block for temperature control by circulating water or oil or by using heaters. Molten plastic flows into a mold through a sprue and fills the cavities by way of runners and gates. Then, the mold is opened after cooling process and the ejector rod of the injection molding machine pushes the ejector plate of the mold to further eject moldings. The molds used in the proposed project have multiple cavities and are made locally. These molds are made of aluminum alloy and have a useful life of 500,000 cycles. Mold for injection molding is shown in Figure 6.

Figure 6: Mold for Injection molding



Electric Chain Pulley

An Electric chain pulley is used for lifting or moving objects. An electric motor and controller are utilized to lift, lower and accelerate or decelerate the speed of the pulley. Electric chain pulleys are ideal for use in industrial production lines and small machine shops where more frequent and faster lifting is required. The electric chain pulley used in the proposed project is used to lift molds for injection molding machine and other heavy objects. Electric chain Pulley is shown in Figure 7.

Figure 7: Electric Chain Pulley



Weighing Scale

Weighing Scale is a device used to measure the exact quantities of raw materials, which afterwards are mixed together in the mixer in specific ratios. Weighing scale used in the proposed project is shown in Figure 8.

Figure 8: Weighing Scale

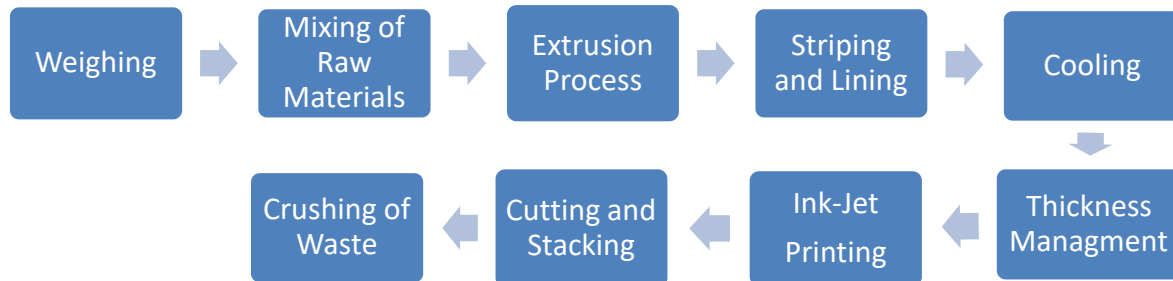


5.2. Production Process

5.2.1. PPRC Pipes

The production process flow of the PPRC Pipe is shown in Figure 9.

Figure 9: Process Flow of PPRC Pipe



Weighing Process

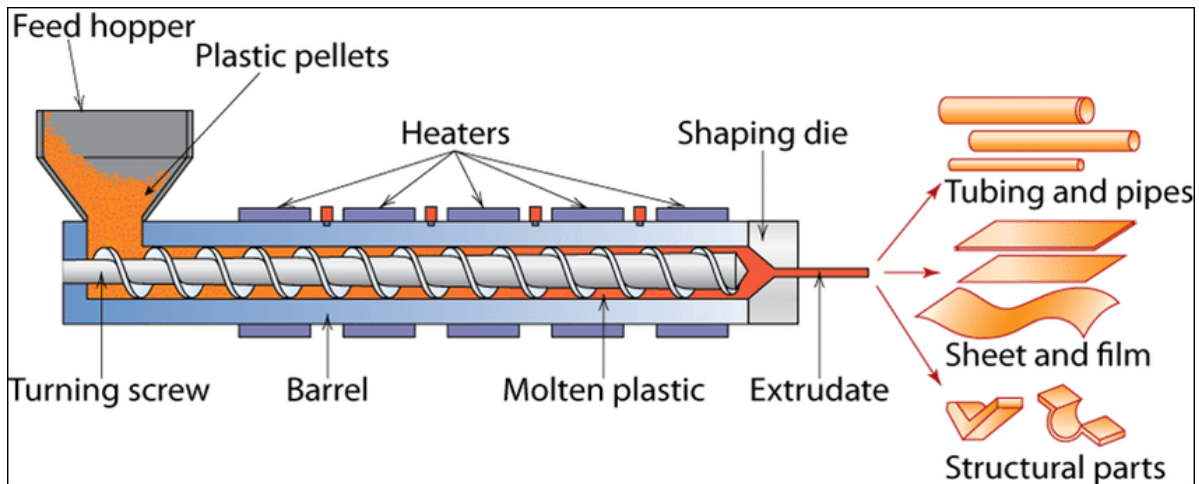
A weighing scale is used to measure the quantities of raw materials. Recycled, fresh and colored granules are measured in proportional quantities, ready to be mixed and processed afterwards.

Mixing Process

Before going to the production line, a Mixer machine is required to mix in proportional ratios, the raw materials, which include fresh granules colored and recycled granules. These proportions are measured by a weighing scale as shown in Figure 8. After uniform mixing, the product is ready to be filled in the hopper of the extrusion line. The mixer used the proposed project have a capacity of 150 kg per hour. Mixing is done in batches as per need.

Extrusion Process

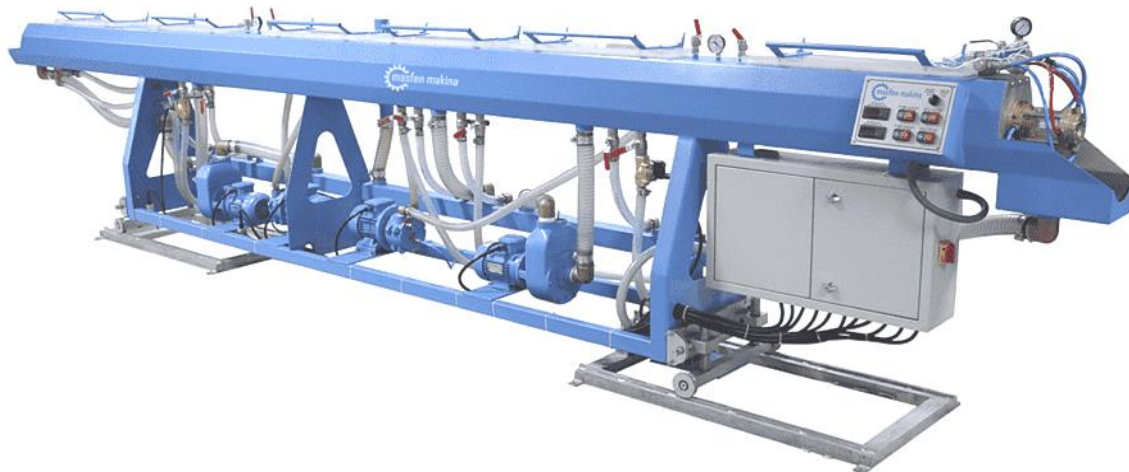
The raw plastic granules are loaded into a hopper from where they are automatically fed into a long heated cylindrical chamber of the extruder. The molten plastic is moved through this extruder by a spinning bolt. Within the horizontal rotatory barrel, the molten raw materials are filtered to ensure a uniform consistency. Sizing of the molten plastic is done through the controlling panel. Afterwards, the molten plastic is pushed through the die fitted at the end. The die makes the material to take the size or shape of the desired finished product. Extrusion process is shown in Figure 10.

Figure 10: Extrusion process**Striping/ Lining Process**

When the pipe comes out of the extruder there is an injector that injects a colored stripe mostly red or blue. It contains the same raw material PPRC granules. The red PPRC stripe means that the tube wall thickness is large and its long-term compressive strength is higher at high temperatures. The blue PPRC stripes means that the thickness of the tube wall is smaller, and its compressive strength under long-term high temperature is also smaller. Striping is shown in Figure 11.

Figure 11: Striping/ Lining of PPRC pipes**Cooling Process**

When the pipe comes out of the die, the temperature of the PPRC pipe is very high. To reduce the temperature, the pipe goes through the cooling chamber where the temperature of the pipe is consistently lowered by sprinkling water from showers as shown in Figure 12.

Figure 12: Vacuum/ Cooling Chamber

This section of the manufacturing plant must have an efficient water drainage system; so as to avoid any issues regarding water flow.

Weight Control

After cooling the pipe, its weight is automatically tested in this machine. The weight should be uniform all over the length of the pipe. The sensing head moves around the pipe, showing the places where the pipe may be out of shape or too heavy or too light. Such issue occurs due to some extra or less application of material at some places. The machine identifies the fault and gives instructions to the extruder or the puller. Resultantly, the extruder automatically adjusts the specifications to maintain the desired product specifications.

Ink-Jet Printer

The ink-jet printer attached at the end of the weight control machine prints desired information which may be trade-mark, production date, batch number, company information or, any other useful information. According to the market practice, traditionally ink-jet printers are used while laser printers are costly and used in large size concerns. Ink Jet printer is shown in Figure 13.

Figure 13: Ink-Jet Printer for pipes

Cutting and Stacking

The last step is to cut the PPRC pipe to the required lengths. 4 meters for each pipe that is the standard and most frequently used length. The cutting machine in the production line is shown in Figure 14.

Figure 14: Cutting Machine



After cutting, the pipes are stacked properly on different shelves in the store-room as shown in Figure 15.

Figure 15: Stacking



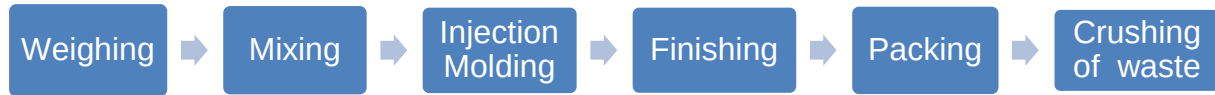
Crushing

The leftover, waste material or pipes produced in the first batch (products not meeting the required specifications) are crushed to small particles again. These bits are mixed with raw material directly for reuse. Due to its purity, it is easy to re-use.

5.2.2. PPRC Fittings

Process flow of PPRC Pipe Fittings is given as under Figure 16.

Figure 16: Process Flow of PPRC Pipe Fittings



The production of PPRC pipe fittings is a simple process. The required raw material is only PPRC plastic granules as used in the production of pipes. The production process is as follows:

Weighing Process

A weighing scale is used to measure the quantities of raw materials. These raw materials should be in proportional ratio.

Mixing Process

PPRC R200P is one of the finest types of granules and is used most commonly for making both pipes and fittings. It is available in 25 kg bags. The mixing machine evenly mixes the recycled and fresh granules. The mixed material is loaded to the hopper of injection molding machine for the next process.

Injection Molding Process

The working principle of the injection molding machine is similar to the syringe used for injection. It uses the thrust of the screw (or plunger) to inject the molten plastic into the closed cavity. Injection molding is a cycled process; each cycle mainly includes:

- **Quantitative feeding**

Granules are injected from the mixer machine into the barrel through the hopper of the Injection Molding machine to melt them.

- **Melt Plasticizing**

The granules are melted, by electric heaters, in the barrel to be injected into the molds

- **Pressure injection**

The molten plastic is then injected into the molds. As the melt enters the die, the displaced air escapes through vents in the injection pins and along the parting line. It must be ensured that the dies are properly filled to give a proper and smooth shape to the product.

- **Mold Cooling**

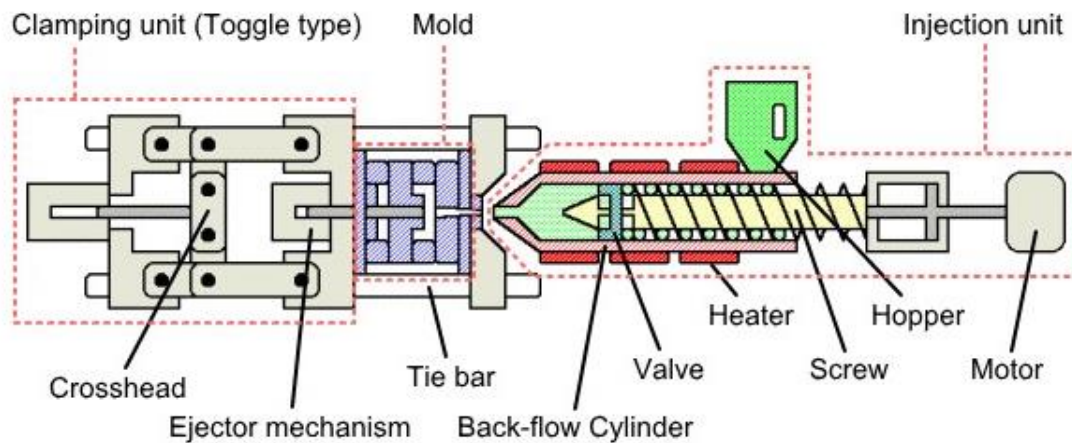
The filled dies are cooled through cycled water to harden the product. Cooling time is dependent on the type of material and the thickness of the part.

- **Mold Opening**

After cooling the product, the mold is opened and the molded products are ejected into a container. Dies are closed and the machine is ready for the next cycle.

The Injection Molding machine used in the proposed project is a 268 Ton machine. The machine produces one type of fitting with one mold; however, there are more than one cavity in one mold. A single mold can be used to produce different types of fittings. The process is shown in the Figure 17.

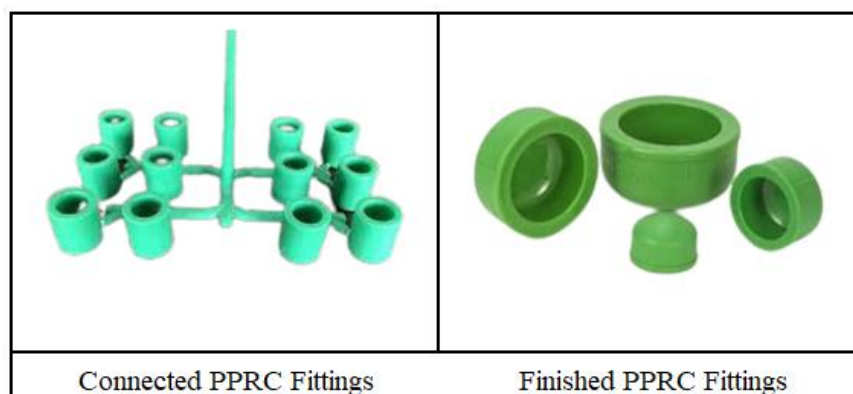
Figure 17: Injection Molding Process



Finishing

The individual molded products are separated by a cutter manually by a worker and the excess material from the products is also removed manually. A quality check is done by a worker at this point. Rejected pieces and excess material is then sent to the crusher. Separated fittings are sent for packing as shown in Figure 18.

Figure 18: Finishing



Packing

Finished PPRC pipe fittings are packed in boxes or plastic bags by the workers manually. After packing the fittings, they are directed for stacking in the storeroom. Packed PPRC pipe fittings are shown in Figure 19.

Figure 19 Packed PPRC fittings**Crushing of Waste**

In this process, the leftover material is crushed into small granules/ flakes again. These bits are mixed with raw material directly for reuse.

5.3. Installed and Operational Capacities

The proposed manufacturing unit shall, at maximum capacity of 100%, will produce 223,194 PPRC pipe lengths (4 meters) and 1,080,000 PPRC pipe fittings annually. The unit would operate for 12 hours per day, working in one shift per day for 300 working days in a year. The project is assumed to attain a capacity utilization of 60% during first year of operations, to produce 133,917 PPRC pipe lengths (4 meters) and 648,000 PPRC pipe fittings. During the projected period of 10 years, the facility will continue to operate with 10% annual increase in capacity utilization each year to reach 100% capacity in fifth year of operations. Table 1 and Table 3 depict installed and operational capacities of proposed PPRC pipe and pipe fittings manufacturing unit.

Table 1: Installed and Operational Capacity - PPRC Pipes

Products	Machine Capacity (Kg /day)	Machine Capacity (Kg/ Annum)	Production Ratio	Production KG/ Annum	Weight per 4-meter pipe (Kg)	Total Installed Capacity (No. of Pipe Lengths)	Operational Capacity @ 60% Year1
	<i>A</i>	$B=(A*300)$	<i>C</i>	$D=(B*C)$	<i>E</i>	$F=(D*E)$	$G= (F*60\%)$
Pipe - 1 (25 mm)	1,000	300,000	50%	150,000	1.03	145,631	87,379
Pipe - 2 (32 mm)			30%	90,000	1.66	54,217	32,530
Pipe - 3 (40 mm)			20%	60,000	2.57	23,346	14,008
Total			100%			223,194	133,917

Table 2: Injection Molding Machine Capacity

Machine hours per day	Machine Prepration Time (Hours)	Available Machine Time per day	Available time per day (seconds)	Cycle time per batch (seconds)	Cavities per mold	Machine Capacity (Fittings)/ Day
<i>A</i>	<i>B</i>	$C=(A-B)$	$D= (B*60*60)$	<i>E</i>	<i>F</i>	$G=(D/E*F)$
12	2	10	36,000	60	6	3,600

Based on 60 seconds per cycle and 6 cavities per mold, the injection molding machine produces 3,600 fittings per day. Production capacity of injection molding machine is shown in Table 3. 2 hours per day have been assumed as the preparation time of machine and time taken for start of every cycle.

Table 3: Installed and Operational Capacities - Fittings

Products	Machine Capacity (Fittings) /day	Machine Capacity (Fittings)/ Annum	Production Ratio	Production (Fittings)/ Annum	Operational Capacity @ 60% Year1
	<i>A (Table 2)</i>	<i>B=(A*300)</i>	<i>C</i>	<i>D=(B*C)</i>	<i>E= (D*60%)</i>
Elbow 45 degree (25mm)	3600	1080,000	7%	75,600	45,360
Elbow 45 degree(32mm)			6%	64,800	38,880
Elbow 45 degree (40mm)			2%	21,600	12,960
Elbow 90 degree(25mm)			7%	75,600	45,360
Elbow 90 degree(32mm)			6%	64,800	38,880
Elbow 90 degree(40mm)			3%	32,400	19,440
Bridge(25mm)			7%	75,600	45,360
Bridge(32mm)			5%	54,000	32,400
Bridge(40mm)			2%	21,600	12,960
Clamp(25mm)			7%	75,600	45,360
Clamp(32mm)			5%	54,000	32,400
Clamp(40mm)			2%	21,600	12,960
Cross T joint(25mm)			6%	64,800	38,880
Cross T joint(32mm)			5%	54,000	32,400

Cross T joint(40mm)			2%	21,600	12,960
End Cap(25mm)			4%	43,200	25,920
End Cap(32mm)			4%	43,200	25,920
End Cap(40mm)			1%	10,800	6,480
Over Cross Socketed(25mm)			5%	54,000	32,400
Over Cross Socketed(32mm)			4%	43,200	25,920
Over Cross Socketed(40mm)			1%	10,800	6,480
Plug PPRC(25mm)			4%	43,200	25,920
Plug PPRC(32mm)			4%	43,200	25,920
Plug PPRC(40mm)			1%	10,800	6,480
Total			100%	1,080,000	648,000

6. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Majority of the PPRC pipe-manufacturing units in the country are located in Gujranwala, Lahore, Karachi, Quetta, Faisalabad, and Multan. Therefore, any of the above cities would be suitable for setting up a PPRC pipe-manufacturing unit. In addition, this industry may also be set up in any other large to medium cities where raw material, low-cost labor and industrial infrastructure is easily available. The ideal location for the project may be outside municipal and cantonment limits, preferably in a small industrial cluster/estate. The areas in Pakistan that are under development phase in the construction sector and have the availability of raw material are suitable locations for this manufacturing business.

7. POTENTIAL TARGET MARKETS

Pakistan's PPRC pipe industry has witnessed a high growth in the recent years. Large manufacturers have been able to capture a major market share; but there is still a lot of room for establishment of medium and small industries in this sector. The PPRC pipes market is gaining momentum in different sectors due to its useful high-end properties. Other than that, manufacturers, traders, distributors, and suppliers, are the major controllers for this industry. The proposed unit aims to fulfill the demand of PPRC pipes and pipe fitting products of different diameters used for gas and water supplies in industrial, residential and commercial buildings. Target customers of the proposed unit are as follows:

- Residential apartments and public housing
- Commercial buildings and shopping centers
- Hotels, resorts, entertainment parks, halls, theaters etc.
- Chemical sewerage and drainage systems
- Liquid chemicals flow system in chemical, pharmaceuticals and food processing industries
- Schools, hospitals, office and laboratories

Civil construction constitutes a major share of the overall developmental activity. Construction sector has witnessed a rapid growth over the recent years. The target market of PPRC pipes and pipe fittings is directly linked to the construction sector of Pakistan. To support the construction sector, and boost employment and economic output, Prime Minister announced a construction stimulus package in April 2020. The package included a fixed tax rate for the construction industry, a subsidy worth PKR 30 billion (US\$191.5 million) for the Naya Pakistan Housing Scheme, a decrease in sales tax and incentives for builders to construct affordable housing which led to a great boost in this sector.

Industry growth is expected to improve, registering annual growth in the range of 4.8-5.3% till 2025, supported by investment in China-Pakistan Economic Corridor (CPEC)

infrastructure projects. To support industrialization, the Pakistani Government is creating Special Economic Zones in the country. Moreover, to address the housing shortage, the government aims to build five million housing units till 2023.

Almost all the construction activity is now using PPRC pipes instead of pipes of other materials because of its added benefits.

The Global PPRC Pipe market was valued at USD 5633.2 million in 2019. The market size will reach USD 10030 million by the end of 2026, growing at a CAGR of 8.5% during 2021-2026.⁵

According to the All Pakistan PVC & Plastic Pipe Manufacturers Association (APPPMA) there are more than 1,150 mechanized small, medium and large sized industrial undertakings present in Lahore, Karachi, Gujranwala and Faisalabad directly employing over 28,750 persons and indirectly employing over 475,000 persons.⁶ Major manufacturers are Master Plastic Industries in Faisalabad, Adamjee and Euro Gulf Industries in Karachi, and Super Asia in Lahore.

8. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of “Manufacturing Unit for Fabricated Pipe and Pipe Fittings”. Various costs and revenue related assumptions along with results of the analysis are outlined in this section.

The projected Income Statement, Cost of Goods Sold, Cash Flow Statement and Balance Sheet are attached as Annexure.

8.1. Project Economics

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

8.2. Project Cost

Total cost of the project has been calculated to be PKR 29.95 million. The project will be financed through 100% Equity. Table 4 provides the details of the costs calculated for the proposed manufacturing unit.

⁵ <https://www.wboc.com/story/43704591/ppr-pipe-market-share-2021-cagr-status-comprehensive-analysis-industry-size-dynamics-business-growth-prospects-and-opportunities-with-covid-19-impact>

⁶ <http://appmma.org/pgaboutus.aspx>

Table 4: Project Cost

Description of Costs	Amount (PKR)
Building / Infrastructure	896,460
Machinery & Equipment	20,050,000
Furniture & Fixtures	986,000
Office Vehicle	333,300
Office Equipment	1,553,500
Pre-operating Costs	825,720
Security against building	1,260,000
Total Capital Cost	25,904,980
Spares inventory	83,542
Raw material inventory	2,653,009
Upfront insurance payment	309,083
Cash	1,000,000
Working Capital	4,045,633
Total Project Cost	29,950,614

8.2.1. Land

The manufacturing unit will be established in a rented building to avoid the high cost of land. Suitable units for setting up a business like this can be easily found on rent. Therefore, no land cost has been added to the project cost. Total space requirement for the proposed unit has been estimated as 7,000 sq. ft. The required space breakup is shown in Table 5.

Table 5: Breakup of Space Requirement

Break-up of Land Area	% Break-up	Area (Sq. Ft.)
Raw Material Store Room	13%	900
Production Department	47%	3,300
Finished Goods Store Room	21%	1,500
Executive Office	2%	150
Admin and Accounts Department	2%	150
Sales and marketing Department	3%	210
Kitchen	1%	100
Parking and Gate area	8%	550
Washroom	2%	140
Total Area	100%	7,000

8.2.2. Building

There will be no cost of building since the unit will be started in a rented premises. However, there will be a renovation cost; required to make the building usable for the business. The proposed project requires electricity load of 70 KW for which an electricity connection under the General Supply Tariff-Industrial will be required. Building rent of PKR 420,000 per month has been included in the operating cost. Building renovation cost is shown in Table 6.

Table 6: Building Renovation Cost

Cost Item	Unit of Measurement	Total Units	Cost/Unit (PKR)	Total Cost (PKR)
Paint Cost	Liter	149	500	74,420
Labour Cost	Sq. Feet	14,884	10	148,840
Wall Racks	No.	37	15,000	555,000
Curtains	No.	7	5,000	35,000
Blinds	No.	4	5,000	20,000
Glass Partition and Doors	Sq. Feet	79	800	63,200
Total				896,460

8.2.3. Machinery and Equipment

Table 7 provides details of machinery and equipment required for the project.

Table 7: Machinery and Equipment

Cost Item	Unit	Unit Cost (PKR)	Total Cost (PKR)
PPRC Pipe Production Line - 1000Kg/Day	1	7,200,000	7,200,000
Injection Molding Machine 268 ton - 60Sec/Cycle	1	10,000,000	10,000,000
Mixer Machine - 150Kg/ Hour	1	350,000	350,000
Crusher Machine - 100Kg/Hour	1	300,000	300,000
Molds for Injection Molding Machine	4	450,000	1,800,000
Electric (static) Chain Pulley 500kg	1	150,000	150,000
Material Handling Trolleys	4	20,000	80,000
Weighing Scale	1	40,000	40,000
Mechanical Tool Kit	3	30,000	90,000
Electrical Tool Kit	2	20,000	40,000
Total			20,050,000

8.2.4. Furniture & Fixtures

Table 8 provides details of the furniture and fixture requirement of the project.

Table 8: Furniture and Fixtures

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Office Tables	11	25,000	275,000
Executive Tables	1	35,000	35,000
Executive Chairs	1	20,000	20,000
Office Chairs	17	10,000	170,000
Visitor's Chairs	12	10,000	120,000
Sofa Sets	2	35,000	70,000
Racks	37	8,000	296,000
Total			986,000

8.2.5. Office Equipment

Details of office equipment required for the project is provided in Table 9.

Table 9: Office Equipment

Cost Item	Units	Unit Cost (PKR)	Total Cost (PKR)
Laptops	5	90,000	450,000
Desktop Computers	4	40,000	160,000
Printer	2	40,000	80,000
CCTV Cameras (2MP)	16	2,000	32,000
DVR	1	12,000	12,000
LED TV (32")	1	40,000	40,000
Air Conditioners	6	90,000	540,000
Exhaust Fan	12	4,000	48,000
Bracket Fan	9	4,500	40,500
Ceiling Fan	7	6,000	42,000
Pedastal Fan	8	8,000	64,000
Water Dispenser	2	20,000	40,000
Wi-Fi / Internet Router	1	5,000	5,000
Total			1,553,500

8.2.6. Office Vehicles

Details of office vehicles required for the project is provided in Table 10.

Table 10: Office Vehicles

Cost Item	Unit(s)	Unit Cost (PKR)	Registration fee @ 1%	Total Cost (PKR)
Loader – Rickshaw(150cc)	1	250,000	2,500	252,500
Motorcycle	1	80,000	800	80,800
Total				333,300

8.2.7. Pre-Operating Cost

Details of pre-operating cost for the project are provided in Table 11.

Table 11: Pre-Operating Cost

Cost Item	Number of Months	Total Cost (PKR)
Staff Salaries	2	395,000
Utilities	1	430,720
Total		825,720

8.2.8. Security against Building

Detail of security against rented building for the project is provided in Table 12.

Table 12: Security against Building

Cost Item	Months	Unit Cost/Month (PKR)	Total Cost (PKR)
Security against Building	3	420,000	1,260,000

8.2.9. Working Capital Requirements

Table 13 provides details of working capital requirements for the project.

Table 13: Working Capital Requirements

Cost Item	Assumptions	Amount (PKR)
Spare part inventory	1 month	83,542
Raw material inventory	0.5 month	2,653,009
Upfront insurance payment	1.5% of machinery cost	309,083
Cash		1,000,000
Total		4,045,633

8.3. Financial Feasibility Analysis

The financial feasibility analysis given in Table 14 provides the information regarding projected IRR, NPV and payback period of the study based on 100% equity.

Table 14: Financial Feasibility Analysis

Description	Project
IRR	59%
NPV (PKR)	147,653,094
Payback Period (years)	2.59
Projection Years	10
Discount Rate used for NPV	15%

8.4. Financial Feasibility Debt Financing

Table 15 provides the information regarding projected IRR, NPV and payback period of the study based on combination of equity (50%) and debt (50%) financing for the proposed project.

Table 15: Financial Feasibility Debt Financing

Description	Project
IRR	58%
NPV (PKR)	171,468,092
Payback Period (years)	2.70
Projection Years	10
Discount Rate used for NPV	13%

8.4.1. Breakeven Analysis

Breakeven analysis for PPRC pipes and fittings is provided in Table 16 and Table 17 respectively.

Table 16: Breakeven Analysis- PPRC pipes

Description	Amount First Year (PKR)	Ratios
Sales (PKR) – A	82,585,015	100%
Variable Cost (PKR) – B	66,015,501	80%
Contribution (PKR) (A-B) = C	16,569,514	20%
Fixed Cost (PKR) – D	7,706,993	9%
Contribution Margin		20%
Breakeven Revenue (PKR)		38,412,841

Number of units at Breakeven (Pipe Lengths)	62,289
Breakeven Capacity	28%

Table 17: Breakeven Analysis- PPRC Pipe Fittings

Description	Amount First Year (PKR)	Ratios
Sales (PKR) – A	15,586,506	100%
Variable Cost (PKR) – B	11,710,526	75%
Contribution (PKR) (A-B) = C	3,875,980	25%
Fixed Cost (PKR) – D	2,744,800	18%
Contribution Margin		25%
Breakeven Revenue (PKR)		11,037,684
Number of units at Breakeven (Fittings)		458,885
Breakeven Capacity		42%

8.4.2. Revenue Generation

Based on the 60% capacity utilization of the unit, sales revenue during the first year of operations is estimated in Table 18, Table 19 and Table 20.

Table 18: Revenue Generation PPRC Pipes

Product	Quantity Sold Year-1(A)	Sale Price Per Unit (B)	Total Revenue (PKR) (A*B)=D
Pipe - 1 (25mm)	85,195	485	41,319,575
Pipe - 2 (32mm)	31,717	780	24,739,260
Pipe - 3 (40mm)	13,658	1,210	16,526,180
Total			82,585,015

Table 19: Revenue Generation PPRC Pipe Fittings

Product	Quantity Sold Year-1(A)	Sale Price Per Unit (B)	Total Revenue (PKR)(A*B)
Elbow 45 degree (25 mm)	44,226	25	1,105,650
Elbow 45 degree (32 mm)	37,908	30	1,137,240
Elbow 45 degree (40 mm)	12,636	32	404,352
Elbow 90 degree (25 mm)	44,226	25	1,105,650
Elbow 90 degree (32 mm)	37,908	30	1,137,240
Elbow 90 degree (40 mm)	18,954	40	758,160
Bridge (25 mm)	44,226	45	1,990,170
Bridge (32 mm)	31,590	50	1,579,500
Bridge (40 mm)	12,636	55	694,980
Clamp (25 mm)	44,226	5	221,130
Clamp (32 mm)	31,590	8	252,720
Clamp (40 mm)	12,636	10	126,360
Cross T joint (25 mm)	37,908	30	1,137,240
Cross T joint (32 mm)	31,590	35	1,105,650
Cross T joint (40 mm)	12,636	40	505,440
End Cap (25 mm)	25,272	8	202,176
End Cap(32mm)	25,272	10	252,720
End Cap (40 mm)	6,318	15	94,770
Over Cross Socketed (25 mm)	31,590	15	473,850
Over Cross Socketed (32 mm)	25,272	18	454,896
Over Cross Socketed (40 mm)	6,318	20	126,360
Plug PPRC (25 mm)	25,272	10	252,720
Plug PPRC (32 mm)	25,272	14	353,808
Plug PPRC (40 mm)	6,318	18	113,724
Total			15,586,506

Table 20: Total Revenue

Product	Total Revenue (PKR)
Revenue from Pipes	82,585,015
Revenue from Pipe Fittings	15,586,506
Total	98,171,521

8.4.3. Variable Cost Estimate

Variable costs of the project have been provided in detail in Table 21.

Table 21: Variable Cost Estimate PPRC Pipes and Fittings

Variable Cost	Pipes Cost (PKR)	Fittings Cost (PKR)
Material Cost	57,302,736	6,369,480
Electricity	3,740,819	1,367,826
Supervisor's Salary	990,000	990,000
Direct Labour	1,380,000	1,980,000
Machinery repair and maintenance	412,500	590,000
Vehicle running and maintenance cost	128,907	24,329
Communications expense (phone, internet etc.)	408,839	77,161
Promotional expense	619,388	116,899
Bad debt expense	206,463	38,966
Distribution and selling expenses	825,850	155,865
Total Variable Cost	66,015,501	11,710,526

Table 22: Material Cost - Pipes

Material	Quantity Sold (Units)	Cost/Unit (PKR)	Total Cost (PKR)
	A	B(Table 23)	C=(A*B)
Pipe - 1 (25mm)	85,195	336	28,651,251
Pipe - 2 (32mm)	31,717	542	17,189,670
Pipe - 3 (40mm)	13,658	839	11,461,815
Total			57,302,736

Table 23: Calculations for Pipes Material Cost

Types	Production per Annum (KGs)	Loss (2%) (KGs)	Required Plastic Granules (KGs)	Plastic Granules/ Bag (kg)	Total bags to be purchased	Purchase price per bag (PKR)	Total Cost of Raw Material (PKR)	No. of Pipes to be produced / Annum	Cost / Pipe (PKR)
	<i>A</i>	$B=(A/98)*2$	$C=(A*B)$	<i>D</i>	$E=(C/D)$	<i>F</i>	$G=F*E$	<i>H</i>	$I=(G/H)$
Pipe - 1 (25mm)	150,000	3,061	153,061	25	6,122	8000	48,976,000	145,631	336
Pipe - 2 (32mm)	90,000	1,837	91,837		3,673		29,384,000	54,217	542
Pipe - 3 (40mm)	60,000	1,224	61,224		2,449		19,592,000	23,346	839
Total			306,122		12,244		97,952,000	223,194	

Table 24: Material Cost - Fittings

Material	Quantity Sold (Units)	Cost/Unit (PKR)	Total Cost (PKR)
	A	B	C=(A*B)
Elbow 45 degree (25mm)	44,226	7.20	318,240
Elbow 45 degree(32mm)	37,908	11.48	435,240
Elbow 45 degree (40mm)	12,636	17.78	224,640
Elbow 90 degree(25mm)	44,226	9.10	402,480
Elbow 90 degree(32mm)	37,908	14.07	533,520
Elbow 90 degree(40mm)	18,954	22.96	435,240
Bridge(25mm)	44,226	14.71	650,520
Bridge(32mm)	31,590	18.96	599,040
Bridge(40mm)	12,636	22.96	290,160
Clamp(25mm)	44,226	1.59	70,200
Clamp(32mm)	31,590	2.67	84,240
Clamp(40mm)	12,636	3.70	46,800
Cross T joint(25mm)	37,908	11.11	421,200
Cross T joint(32mm)	31,590	16.59	524,160
Cross T joint(40mm)	12,636	26.67	336,960
End Cap(25mm)	25,272	3.89	98,280
End Cap(32mm)	25,272	6.11	154,440
End Cap(40mm)	6,318	8.15	51,480
Over Cross Socketed(25mm)	31,590	5.48	173,160
Over Cross Socketed(32mm)	25,272	6.48	163,800
Over Cross Socketed(40mm)	6,318	8.15	51,480
Plug PPRC(25mm)	25,272	3.89	98,280
Plug PPRC(32mm)	25,272	6.11	154,440
Plug PPRC(40mm)	6,318	8.15	51,480
Total			6,369,480

Table 25: Per Unit Material Cost - Fittings

Types	Production / Annum (Kg)	Plastic Granules/Bag (kg)	Total bags to be purchased	Purchase price per bag (PKR)	Total Cost of Raw Material (PKR)	No. of Fittings to be produced / Annum	Material Cost / Piece (PKR)
Calculations	$A =$ (Production Units/Weight per Unit)	B	$C=(A/B)$	E	$F=(C*E)$	G	$H=(F/G)$
Elbow 45 degree (25mm)	1,696	25	68	8,000	544,000	75,600	7.20
Elbow 45 degree(32mm)	2,313		93		744,000	64,800	11.48
Elbow 45 degree (40mm)	1,190		48		384,000	21,600	17.78
Elbow 90 degree(25mm)	2,159		86		688,000	75,600	9.10
Elbow 90 degree(32mm)	2,842		114		912,000	64,800	14.07
Elbow 90 degree(40mm)	2,313		93		744,000	32,400	22.96
Bridge(25mm)	3,470		139		1,112,000	75,600	14.71
Bridge(32mm)	3,195		128		1,024,000	54,000	18.96
Bridge(40mm)	1,542		62		496,000	21,600	22.96
Clamp(25mm)	386		15		120,000	75,600	1.59
Clamp(32mm)	441		18		144,000	54,000	2.67
Clamp(40mm)	242		10		80,000	21,600	3.70
Cross T joint(25mm)	2,247		90		720,000	64,800	11.11
Cross T joint(32mm)	2,809		112		896,000	54,000	16.59

Cross T joint(40mm)	1,807		72		576,000	21,600	26.67
End Cap(25mm)	529		21		168,000	43,200	3.89
End Cap(32mm)	837		33		264,000	43,200	6.11
End Cap(40mm)	275		11		88,000	10,800	8.15
Over Cross Socketed(25mm)	936		37		296,000	54,000	5.48
Over Cross Socketed(32mm)	881		35		280,000	43,200	6.48
Over Cross Socketed(40mm)	264		11		88,000	10,800	8.15
Plug PPRC(25mm)	529		21		168,000	43,200	3.89
Plug PPRC(32mm)	837		33		264,000	43,200	6.11
Plug PPRC(40mm)	275		11		88,000	10,800	8.15
Total	34,017		1,361		10,888,000	1,080,000	

Table 26: Gross Weight per Unit

Types	Net Weight (Grams)	Wastage 2%	Gross Weight (Grams)
	A	$B=(A*2\%)$	$C=(A+B)$
Elbow 45 degree (25mm)	22	0.44	22.44
Elbow 45 degree (32mm)	35	0.7	35.7
Elbow 45 degree (40mm)	54	1.08	55.08
Elbow 90 degree (25mm)	28	0.56	28.56
Elbow 90 degree (32mm)	43	0.86	43.86
Elbow 90 degree (40mm)	70	1.4	71.4
Bridge (25mm)	45	0.9	45.9
Bridge (32mm)	58	1.16	59.16
Bridge (40mm)	70	1.4	71.4
Clamp (25mm)	5	0.1	5.1
Clamp (32mm)	8	0.16	8.16
Clamp(40mm)	11	0.22	11.22
Cross T joint (25mm)	34	0.68	34.68
Cross T joint(32mm)	51	1.02	52.02
Cross T joint(40mm)	82	1.64	83.64
End Cap(25mm)	12	0.24	12.24
End Cap(32mm)	19	0.38	19.38
End Cap(40mm)	25	0.5	25.5
Over Cross Socketed(25mm)	17	0.34	17.34
Over Cross Socketed(32mm)	20	0.4	20.4
Over Cross Socketed(40mm)	24	0.48	24.48
Plug PPRC(25mm)	12	0.24	12.24
Plug PPRC(32mm)	19	0.38	19.38
Plug PPRC(40mm)	25	0.5	25.5

8.4.4. Fixed Cost Estimate

Table 27 provides details of fixed cost for the project.

Table 27: Fixed Cost Estimate PPRC Pipes and Fittings

Fixed Cost	Pipes Cost (PKR)	Fittings Cost (PKR)
Administration expense	5,451,183	1,028,817
Administration benefits expense	272,559	51,441
Office expenses (stationery, entertainment, janitorial services, etc.)	545,118	102,882
Insurance expense	260,010	49,072
Depreciation expense	1,039,198	1,486,368
Amortization of pre-operating costs	138,924	26,220
Total	7,706,992	2,744,800

8.4.5. Human Resource Requirement

For the 1st year of operations, the PPRC pipe and pipe fittings manufacturing unit shall require the workforce at a salary cost as projected in Table 28.

Table 28: Human Resource Requirement

Designation	No. of Persons	Average Monthly Salary(PKR)	Total Salary(PKR)
Owner	1	100,000	1,200,000
Admin and Accounts Manager	1	60,000	720,000
Admin Assitant	1	40,000	480,000
Accounts Assistant	1	40,000	480,000
Procurement Officer	1	40,000	480,000
Quality Controller	1	50,000	600,000
Sales and Marketing Manager	1	60,000	720,000
Assistants - Sales and Marketing	1	40,000	480,000
Mechanical Foreman	1	45,000	540,000
Supervisors	2	60,000	1,440,000
Pipes Production			
Machine Operator	1	35,000	420,000
Helper - Pipe Production Line	1	20,000	240,000

Labor - Cutting	1	20,000	240,000
Labor - Stacking	2	20,000	480,000
Fittings Production			
Injection Molding Machine Operator	1	35,000	420,000
Machine Operator Helper	2	25,000	600,000
labor-crusher	1	20,000	240,000
labor-mixer	1	20,000	240,000
labor-packing	2	20,000	480,000
Store Incharge	1	25,000	300,000
Security Guard	3	20,000	720,000
Office Boy	1	25,000	300,000
Total	28		11,820,000

9. CONTACT DETAILS

Details of suppliers of Machinery and Equipment are provided in Table 29.

Table 29: Contact Details of Suppliers

Supplier Name	Origin	Product	Contact Details	Email	Website
RON Extrusions Engineering	Lahore, Pakistan	Machinery	042-37910766	info@ronextrusions.com	www.ronextrusions.com/about-us.htm
High-tech Machinery	Lahore, Pakistan	Machinery	0315-4782666	info@hitech-machinery.com	www.hitech-machinery.com/
Shijiazhuang Forever Machinery	China	Machinery	0086-311-83839996	daisyli@frv.cn	www.tubemills.cn/
Prime Mechanical Works (PVT) Ltd	Karachi/Lahore, Pakistan	Machinery	04235923024 04235923025 03008443167	info@primemachines.net	www.primemachines.net
Qingdao fullwin Plastic machinery	China	Machinery	0086-15254294721	info@fullwinmachinery.com	www.fullwinmachinery.en.alibaba.com/
Euro Asia Trading	Karachi, Pakistan	Raw Material	0309-0955223	info@euroasiatrading.net	https://www.plastic1.com/plastic-suppliers/euro-asia-trading
Haidery Packages Pvt. Ltd.	Wah cant, Pakistan	Raw Material	0342-2228866		www.haiderypackages.com

10. USEFUL LINKS

Table 30: Useful Links

Organization	Website
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 Industries and Production	www.moip.gov.pk
Government of Punjab	www.punjab.gov.pk
Government of Sindh	www.sindh.gov.pk/
Government of Balochistan	www.balochistan.gov.pk/
Government of Khyber Pakhtunkhwa	www.kp.gov.pk/
Industries Department Government of Khyber Pakhtunkhwa	www.industries.kp.gov.pk
Industries and Commerce Department Sindh	www.industries.sindh.gov.pk
Department of Industries and Commerce, Azad Jammu and Kashmir	www.industries.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
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
Punjab Small Industries Corporation (PSIC)	www.psic.gop.pk
Sindh Small Industries Corporation (SSIC)	www.ssic.gos.pk/
Small Industries Development Board Khyber Pakhtunkhwa (KPSIDB)	www.small_industries_de.kp.gov.pk/
Industries and Commerce Department Balochistan (ICDB)	http://www.dgicd.gob.pk/
Azad Kashmir Small Industries Corporation (AJKSIC)	https://sic.ajk.gov.pk/
All Pakistan PVC & Plastic Pipe Manufacturers Association	http://appppma.org/

11. ANNEXURES

11.1. Income Statement

Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue (pipes)	82,585,015	106,077,909	133,478,386	165,327,960	202,251,829	222,679,263	245,169,869	269,932,026	297,195,160	327,211,871
Revenue (pipe fittings)	15,586,506	20,020,867	25,191,971	31,203,405	38,172,165	42,027,554	46,272,337	50,945,843	56,091,373	61,756,602
Total Revenue	98,171,521	126,098,776	158,670,357	196,531,365	240,423,994	264,706,817	291,442,206	320,877,869	353,286,533	388,968,473
<i>Cost of sales</i>										
Material Cost										
Pipes Material Cost	57,302,736	73,603,601	92,615,794	114,715,054	140,335,184	154,509,037	170,114,450	187,296,009	206,212,906	227,040,410
Fittings Material Cost	6,369,480	8,181,597	10,294,787	12,751,380	15,599,188	17,174,706	18,909,352	20,819,196	22,921,935	25,237,051
Direct Electricity	4,412,049	4,809,133	5,241,955	5,713,731	6,227,967	6,788,484	7,399,447	8,065,398	8,791,283	9,582,499
Direct Labour	5,340,000	5,857,980	6,426,204	7,049,546	7,733,352	8,483,487	9,306,385	10,209,105	11,199,388	12,285,728
Machinery repair and maintenance	1,002,500	1,103,753	1,215,232	1,337,970	1,473,105	1,621,888	1,785,699	1,966,055	2,164,626	2,383,254
Vehicle running and maintenance cost	153,236	168,713	185,752	204,513	225,169	247,911	272,951	300,519	330,871	364,289
Total cost of sales	74,580,000	93,724,776	115,979,724	141,772,195	171,593,965	188,825,514	207,788,284	228,656,281	251,621,010	276,893,230
Gross Profit	23,591,521	32,374,000	42,690,632	54,759,171	68,830,029	75,881,303	83,653,922	92,221,588	101,665,524	112,075,243
	24%	26%	27%	28%	29%	29%	29%	29%	29%	29%
<i>General administration & selling expenses</i>										
Administration expense	6,480,000	7,108,560	7,798,090	8,554,505	9,384,292	10,294,568	11,293,142	12,388,576	13,590,268	14,908,524
Administration benefits expense	324,000	355,428	389,905	427,725	469,215	514,728	564,657	619,429	679,513	745,426
Electricity	696,596	759,290	827,626	902,113	983,303	1,071,800	1,168,262	1,273,406	1,388,012	1,512,933
Communications expense (phone, internet etc.)	486,000	533,142	584,857	641,588	703,822	772,093	846,986	929,143	1,019,270	1,118,139
Office expenses (stationery, entertainment, janitorial services, etc.)	648,000	710,856	779,809	855,451	938,429	1,029,457	1,129,314	1,238,858	1,359,027	1,490,852
Promotional expense	736,286	945,741	1,190,028	1,473,985	1,803,180	1,985,301	2,185,817	2,406,584	2,649,649	2,917,264
Distribution and selling expenses	981,715	1,260,988	1,586,704	1,965,314	2,404,240	2,647,068	2,914,422	3,208,779	3,532,865	3,889,685
Insurance expense	309,083	277,758	246,433	215,108	183,783	152,458	121,133	102,920	70,941	38,962
Depreciation expense	2,525,566	2,525,566	2,525,566	2,525,566	2,525,566	2,525,566	2,381,926	2,894,443	2,894,443	2,894,443
Amortization of pre-operating costs	165,144	165,144	165,144	165,144	165,144	-	-	-	-	-
Bad debt expense	245,429	315,247	396,676	491,328	601,060	661,767	728,606	802,195	883,216	972,421
Subtotal	13,597,819	14,957,719	16,490,837	18,217,827	20,162,033	21,654,807	23,334,264	25,864,332	28,067,205	30,488,650
Operating Income	9,993,701	17,416,281	26,199,795	36,541,344	48,667,996	54,226,496	60,319,658	66,357,255	73,598,318	81,586,594
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	388,375	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	83,325	-	-	-
Earnings Before Interest & Taxes	9,993,701	17,416,281	26,199,795	36,541,344	48,667,996	54,226,496	60,791,358	66,357,255	73,598,318	81,586,594
Subtotal	-	-	-	-	-	-	-	-	-	-
Earnings Before Tax	9,993,701	17,416,281	26,199,795	36,541,344	48,667,996	54,226,496	60,791,358	66,357,255	73,598,318	81,586,594
Tax	1,227,144	1,576,235	1,983,379	2,456,642	3,005,300	3,308,835	3,643,028	4,010,973	4,416,082	4,862,106
NET PROFIT/(LOSS) AFTER TAX	8,766,557	15,840,046	24,216,416	34,084,702	45,662,696	50,917,661	57,148,331	62,346,282	69,182,237	76,724,488

11.2. 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	2,140,518	5,547,814	9,561,912	14,524,541	21,193,241	25,786,245	74,712,519	133,842,568	198,802,546	300,360,739
Accounts receivable		8,068,892	9,216,588	11,702,841	14,597,331	17,957,070	20,758,800	22,855,439	25,163,839	27,705,386	30,503,630
Finished goods inventory		1,553,750	1,952,600	2,416,244	2,953,587	3,574,874	3,933,865	4,328,923	4,763,673	5,242,104	5,768,609
Spares Inventory	83,542	100,809	121,646	146,790	177,131	213,743	257,923	311,235	375,566	453,194	-
Raw material inventory	2,653,009	3,751,896	5,197,846	7,088,373	9,547,285	11,573,228	14,029,079	17,006,064	20,614,768	24,989,242	-
Pre-paid building rent	-	462,000	508,200	559,020	614,922	676,414	744,056	818,461	900,307	990,338	-
Pre-paid insurance	309,083	277,758	246,433	215,108	183,783	152,458	121,133	102,920	70,941	38,962	-
Total Current Assets	4,045,633	16,355,623	22,791,126	31,690,288	42,598,581	55,341,028	65,631,102	120,135,561	185,731,661	258,221,772	336,632,978
<i>Fixed assets</i>											
Land	-	-	-	-	-	-	-	-	-	-	-
Building / Infrastructure	896,460	806,814	717,168	627,522	537,876	448,230	358,584	268,938	179,292	89,646	-
Machinery & equipment	20,050,000	18,045,000	16,040,000	14,035,000	12,030,000	10,025,000	8,020,000	6,015,000	4,010,000	2,005,000	-
Furniture & fixtures	986,000	838,100	690,200	542,300	394,400	246,500	98,600	1,873,056	1,592,098	1,311,139	1,030,181
Office vehicles	333,300	283,305	233,310	183,315	133,320	83,325	33,330	507,817	431,644	355,472	279,299
Office equipment	1,553,500	1,320,475	1,087,450	854,425	621,400	388,375	155,350	2,951,108	2,508,442	2,065,776	1,623,110
Security Against Building	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000	1,260,000
Total Fixed Assets	25,079,260	22,553,694	20,028,128	17,502,562	14,976,996	12,451,430	9,925,864	12,875,919	9,981,476	7,087,033	4,192,590
<i>Intangible assets</i>											
Pre-operation costs	825,720	660,576	495,432	330,288	165,144	-	-	-	-	-	-
Legal, licensing, & training costs	-	-	-	-	-	-	-	-	-	-	-
Total Intangible Assets	825,720	660,576	495,432	330,288	165,144	-	-	-	-	-	-
TOTAL ASSETS	29,950,614	39,569,893	43,314,686	49,523,138	57,740,721	67,792,458	75,556,966	133,011,480	195,713,137	265,308,805	340,825,568
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		852,722	1,060,771	1,312,666	1,617,827	1,924,357	2,188,778	2,494,961	2,850,336	3,263,768	2,056,043
Other liabilities											
Total Current Liabilities	-	852,722	1,060,771	1,312,666	1,617,827	1,924,357	2,188,778	2,494,961	2,850,336	3,263,768	2,056,043
<i>Other liabilities</i>											
Total Long Term Liabilities	-	-	-	-	-	-	-	-	-	-	-
<i>Shareholders' equity</i>											
Paid-up capital	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614	29,950,614
Retained earnings		8,766,557	12,303,302	18,259,859	26,172,280	35,917,488	43,417,575	100,565,905	162,912,187	232,094,424	308,818,911
Total Equity	29,950,614	38,717,171	42,253,915	48,210,472	56,122,894	65,868,102	73,368,188	130,516,519	192,862,801	262,045,037	338,769,525
TOTAL CAPITAL AND LIABILITIES	29,950,614	39,569,893	43,314,686	49,523,138	57,740,721	67,792,458	75,556,966	133,011,480	195,713,137	265,308,805	340,825,568

11.3. 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		8,766,557	15,840,046	24,216,416	34,084,702	45,662,696	50,917,661	57,148,331	62,346,282	69,182,237	76,724,488
Add: depreciation expense		2,525,566	2,525,566	2,525,566	2,525,566	2,525,566	2,525,566	2,381,926	2,894,443	2,894,443	2,894,443
amortization of pre-operating costs		165,144	165,144	165,144	165,144	165,144	-	-	-	-	-
Accounts receivable		(8,068,892)	(1,147,695)	(2,486,254)	(2,894,490)	(3,359,739)	(2,801,731)	(2,096,639)	(2,308,399)	(2,541,548)	(2,798,244)
Finished goods inventory		(1,553,750)	(398,849)	(463,645)	(537,343)	(621,287)	(358,991)	(395,058)	(434,750)	(478,432)	(526,505)
Spares inventory	(83,542)	(17,268)	(20,837)	(25,144)	(30,341)	(36,612)	(44,180)	(53,312)	(64,331)	(77,628)	453,194
Raw material inventory	(2,653,009)	(1,098,887)	(1,445,950)	(1,890,527)	(2,458,912)	(2,025,943)	(2,455,851)	(2,976,985)	(3,608,704)	(4,374,474)	24,989,242
Pre-paid building rent	-	(462,000)	(46,200)	(50,820)	(55,902)	(61,492)	(67,641)	(74,406)	(81,846)	(90,031)	990,338
Advance insurance premium	(309,083)	31,325	31,325	31,325	31,325	31,325	31,325	18,213	31,979	31,979	38,962
Accounts payable		852,722	208,048	251,895	305,161	306,530	264,421	306,183	355,375	413,431	(1,207,725)
Other liabilities		-	-	-	-	-	-	-	-	-	-
Cash provided by operations	(3,045,633)	1,140,518	15,710,598	22,273,957	31,134,910	42,586,187	48,010,580	54,258,254	59,130,049	64,959,978	101,558,193
<i>Financing activities</i>											
Short term debt principal repayment		-	-	-	-	-	-	-	-	-	-
Issuance of shares	29,950,614	-	-	-	-	-	-	-	-	-	-
Cash provided by / (used for) financing activities	29,950,614	-	-	-	-	-	-	-	-	-	-
<i>Investing activities</i>											
Capital expenditure	(25,904,980)	-	-	-	-	-	-	(5,331,981)	-	-	-
Acquisitions											
Cash (used for) / provided by investing activities	(25,904,980)	-	-	-	-	-	-	(5,331,981)	-	-	-
NET CASH	1,000,000	1,140,518	15,710,598	22,273,957	31,134,910	42,586,187	48,010,580	48,926,273	59,130,049	64,959,978	101,558,193

12. KEY ASSUMPTIONS

12.1. Operating Cost Assumptions

Table 31: Operating Cost Assumptions

Description	Details
Inflation rate	10.1%
Electricity growth rate	9.0%
Machinery maintenance cost (% of machinery cost)	5.0%
Communications expense (% of administration expense)	7.5%
Promotional expense (% of revenue)	0.75%
Machinery & equipment insurance rate (% of machinery cost)	1.5%
Office equipment price growth rate	9.6%
Office vehicles price growth rate	6.2%

12.2. Revenue Assumptions

Table 32: Revenue Assumptions

Description	Details
Sale price growth rate	10.1%
Initial capacity utilization	60%
Capacity growth rate	10%
Maximum capacity utilization	100%

12.3. Financial Assumptions

Table 33: Financial Assumptions

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

12.4. Cash Flow Assumptions

Table 34 Cash Flow Assumptions

Description	Days
Account Receivable Days	30
Account Payable Days	20

12.5. Debt Related Assumptions**Table 35: Debt Related Assumptions**

Description of Cost	Details
Project Life (Years)	10
Debt: Equity	50:50
Discount Rate	13%
Debt Tenure	5 years
Grace Period	1 Year
Interest Rate (KIBOR+3%)	10.3%

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