PROJECT PROFILE

NAME OF THE PRODUCT	**:**	**PET Bottle**
PODUCTION CAPACITY	**:**	Pet bottles (12, 00, 000 nos.) Bottle Cap (60, 00, 000 nos.)
CAPITAL INVESTMENT	**:**	**Rs. 25, 91, 300/-**
MONTH & YEAR OF PREPARATION	**:**	**JUNE - 2020**
PREPARED BY	**:**	**MSME DEVELOPMNT INSTITUTE** **GOVT. OF INDIA, MINISTRY OF MSME,** **111 & 112 B.T.ROAD** **KOLKATA - 700108** **WEST BENGAL**

1. INTRODUCTION OF THE PRODUCT:

The global plastics industry is observing a continuous shift of production bases to low-cost Asian countries. With increasing foreign investment and rise in the number of new manufacturing establishments in the region, Asia has become the largest and the fastest growing market for plastics in the world. In particular, China and India offer enormous growth opportunities due to expanding production activities in the countries. Packaging sector is the largest application sector for the plastic industry, representing almost 60.0% of the total plastics demand .plastic consumption for packaging in India is expected to reach 12.0 million tons by 2025. The FMCG sector compiled with the rise in capital investment pose as the key growth drivers for the packaging industry in the country. The demand for packaging of these products has to lead the development of the plastic packaging industry in the country. Among the vast family of plastics, Polyethylene Terephthalate, popularly known as PET, is expected to grow the fastest.

2. MARKET & DEMAND ASPECTS:

PET jar, PET bottles were the products of the firm. Polyethylene terephthalate (sometimes written poly ethylene terephthalate), commonly abbreviated PET, PETE, or the obsolete PETP, is the most common thermoplastic polymer resin of the polyester family and is used in fibers for clothing, containers for liquids and foods, thermoforming for manufacturing.

The global PET bottle market reached a volume of more than 19 Million Tons in 2019, registering a CAGR of more than 2.3% during 2011-2019. The market is further projected to reach a volume of nearly 19 Million Tons by 2024, at a CAGR of nearly 2.1% during 2019-2024. Polyethylene terephthalate (PET) refers to a thermoplastic polymer resin of the polyester family which is widely used for manufacturing plastic bottles. In comparison with PP, HDPE and PVC bottles, PET bottles are more durable, transparent, lightweight, non-reactive, cost-effective and thermally stable. Moreover, they are environment-friendly and can be recycled repeatedly which further reduces their manufacturing cost. Primarily used in the packaging of drinking water and beverages, PET bottles are also gaining prominence as a packaging solution for salad dressings, household cleaners, medicines, dish detergents and mouthwashes. The rising trend of westernization, inflating disposable incomes and altering food patterns of consumers have

increased the demand for bottled beverages, particularly in developing countries like India and China.

PET bottles are bottles made-up of a plastic resin chemically known as polyethylene terephthalate and abbreviated as PET. Due to some inherent properties of PET resin, these bottles are transparent, light-weight, high in strength and impermeable to carbon dioxide. Their manufacturing is based on a stretch blow-moulding process, which provides strength and high resistance to bear internal pressure and enables them to be stacked like glass bottles.

Primarily used in the packaging of water and beverages, PET bottles are also gaining shares in other industries like- juices, salad dressings, household cleaners, medicines, dish detergents, mouthwashes, etc. Being light in weight and easy to handle, they are preferred in the packaging of carbonated soft drinks (CSD's) and are continuously replacing glass bottles due to their tendency to break and the inconvenience created while returning them after consumption.

3. BASIS AND PRESUMPTION:

a) The scheme is based on single shift of 8 hours per day and 300 working days per annum.

b) The interest rate on the borrowed capital has been taken as 12 % per annum.

c) The cost in respect of Raw Materials, Packing Materials, Machinery & Equipments has been taken at the time of preparation of project profile and may vary from place to place and time to time.

d) The rental Value of production shed is taken as per the prevailing rates and may vary from place to place.

e) The plant capacity utilization has been taken as 50 % for the first year, which masy subsequently increase to 60% and 70% in the second and third year respectively.

4. IMPLEMENTATION SCHEDULE:

Preparation of The project implementation will take about nine months. The break-up of activities with relative time for each activity is as follows:

Sl. No.	Activity	Estimated time periods (Months)
01.	Scheme preparation & approval	0 – 1
02.	Registration under MSME Act 2006 and sanction of loan	1 - 3
03.	License from FDA	2 – 3
04.	Placement of Orders for Machines	2 – 3
05.	Power Connection	1 - 2
06.	Installation of Machines	3 - 4
07.	Recruitment of Staff & Trial run	4 - 5
08.	Commercial Production	5 th onwards

5. POLUTION CONTROL NEEDS:

There is no such harmful effluent coming out of this factory. But dumping of wastage may create problem. Proper attention should be given to dump the scrap. The unit should obtain No Objection Certificate from the State Pollution Control Board. Workers must be provided hand gloves and masks during operation.

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6. TECHNICAL ASPECTS:

Polyethylene Terephthalate is a thermoplastic polymer that can be either opaque or transparent, depending on the exact material composition. As with most plastics, PET is produced from petroleum hydrocarbons, through a reaction between ethylene glycol and terephthalic acid. To produce plastic bottles, the PET is first polymerized to create long molecular chains.

Polymerization itself can be a complicated process and accounts for many of the inconsistencies between one batch of manufactured PET and another. Typically, two kinds of impurities are produced during polymerization: diethylene glycol and acetaldehyde. Although diethylene glycol is generally not produced in high-enough amounts to affect PET, acetaldehyde can not only be produced during polymerization but also during the bottle manufacturing process. A large amount of acetaldehyde in PET used for bottle manufacturing can give the beverage inside an odd taste.
Once the plastic itself has been manufactured, the bottle manufacturing process can begin. To ensure that the PET is appropriate for use, numerous tests are done post-manufacturing to check that the bottles are impermeable by carbon dioxide (which is

important for bottles that carry soda). Other factors, such as transparency, gloss, shatter resistance, thickness, and pressure resistance, are also carefully monitored.

The first stage of a typical 2-step Reheat and Blow Machine (RBM) bottle manufacturing process is injection moulding. Plastic pellets are plasticized in the barrel of an injection moulding machine where the plastic is melted by heat and the shearing action of a feed screw. The plastic is then injected into multiple-cavity moulds where it assumes the shape of long, thin tubes. These tubes, called parisons, usually include the formed necks and threads that will be used to cap the bottles that are yet to come. PET parisons, or pre-forms, are easily shipped to bottling facilities as they are much more compact than fully formed bottles.

During the re-heat process, the parisons are loaded into a feeder and run through an unscrambler, which orients the parisons for feeding into the blow moulding machine. The parisons are heated by passing by quartz heaters and then enter the mould. Here, a thin steel rod, called a mandrel, slides into the neck of the parison where it fills the parison with highly pressurized air, and stretch blow moulding begins: as a result of the pressurized air, heat, and pressure, the parison is blown and stretched into the mould axially and radially, where it assumes a bottle shape. This process produces what is called a bi-axially oriented bottle which provides a CO_2 barrier ideal for containing carbonated beverages.

The mould must be cooled relatively quickly, so that that the newly formed component is set properly. There are several cooling methods, both direct and indirect, that can effectively cool the mould and the plastic. Water can be coursed through pipes surrounding the mould, which indirectly cools the mould and plastic. Direct methods include using pressurized air or carbon dioxide directly on the mould and plastic.

Once the bottle (or, in continuous manufacturing, bottles) has cooled and set, it is ready to be removed from the mould. If a continuous moulding process has been used, the bottles will need to be separated by trimming the plastic in between them. If a non-continuous process has been used, sometimes excess plastic can seep through the mould during manufacturing and will require trimming. After removing the bottle from the mould and removing excess plastic, the plastic bottles are ready for transportation or filling.

Other bottle manufacturing processes combine the formation of the parisons and the blow moulding in a single continuous process. One such machine is a continuous extrusion machine wherein an extruder is continuously producing a parison. In the extrusion blow moulding process, the parison forms vertically and its wall thickness is varied by changing the size of the orifice through which the parison extrudes. Mould halves close over the suspended parison and transfer it to the blow moulding station where the bottle is formed as in the second step of the RBM process described above. Varying the wall thickness solves the problem of non-

uniformity of the hanging parison as the weight of the formed portion would otherwise stretch the hot and still-forming section above it. Wall thickness is thus increased as the parison forms to create a uniform thickness throughout the formation.

Another manufacturing process is the reciprocating blow moulding machine. These machines move the screw linearly within the injector barrel to accumulate a shot. Then the screw pushes the shot over the mandrel to create the parison after which it is formed in the usual manner.

Raw Materials:

PET is a plastic resin derived from petroleum hydrocarbons. The producer creates long chains of plastic molecules through a process called polymerization, and then mixes the material with several chemical compounds. They cut the resin into small pellets and send it on to the bottle manufacturer. The bottle plant mixes PET resin pellets with "regrind" -- recycled plastic that has been reduced to flakes. Plastic loses some of its physical properties when repeatedly heated, so manufacturers must limit the amount of regrind they use, typically capping this ingredient at 10% of the total mix. Unless producing clear bottles, dyes are introduced to the mix as well.

Building a Preform:

An extruder melts the PET and regrind mix at temperatures of about 500 degrees Fahrenheit. A screw inside the extruder compresses the PET mix and injects the nearly molten material into molds. The mold produces a bottle preform, which is sometimes called a parison. The preform looks like a thick-walled test tube, often including the bottle’s characteristic screw top. The preform cools as it travels to a machine called a blow molder, and may need to be brought back up to the manufacturer’s specified temperature for that operation. If necessary, the bottle manufacturer raises the temperature of the preform in a small oven.

Stretching the Preform:

The preforms enter a two-part mold that closes around it. The inside of this mold is shaped exactly like the finished bottle. Inside, a long needle pushes up through the preform, which is suspended with the screw end facing downward. The needle stretches the preform upward toward the top of the mold -- which will be the bottom of the bottle -- and simultaneously blasts enough pressurized air into the preform to force it against the sides of the mold. This stretch blow molding process must happen quickly in order to maintain the bottle’s integrity and consistent shape. Some manufacturers weld a separate bottom piece to the bottle during blow molding, while others produce a bottom from the preform along with the rest of the bottle.

Cooling and Trimming:

The bottle must be cooled almost instantly or it will lose its shape when gravity causes it to creep downward in its malleable, heated state. Some manufacturers cool the bottle by circulating cold water or liquid nitrogen through the mold, others elect to fill it with a shot of air at room temperature. The mold typically yields a clean bottle, but some flashing may occur at the bottle seams, where the two mold halves met. If so, operators trim away the excess material and add it to the regrind.

7. FINANCIAL ASPECTS:

Land:	10, Gunth .	Own.
Shed:	1500 sft.@Rs. 300/- per Sq. ft	Rs. 4, 50, 000/-
Boundary work and others expenses L.S.		Rs. 1, 88, 000/-
		Rs. 6, 38, 000/-

i) Machinery & Equipments:

Sl. No.	Specification.	No.	Rate	Value
1.	Blow moulding machine to make Pet bottles from preform pet of cap.250 ml to 2.5 lit. (2 KW)	1	8, 00, 000	8, 00, 000
2.	Injection moulding machine to make diff. Plastic Cap with 3 KW motor)	1	3, 00, 000	3, 00, 000
3.	Scrap grinder (5 HP motor)	1	50, 000	50, 000
4.	Office furniture	LS		58, 000
5.	Installation charges @ 10%			1, 15, 000
	Total			**13, 23, 000**

PRE-OPERATIVE EXPDITURE:

Project profile	1500
Travel and transport	10000
Stationery	5000
Telephone	2000
Sale Tax Registration (GST)	5000
Other misc. expr.	12000
	Rs. 35, 500/-

Fixed capital Investment = Rs. 6, 38,000/- + Rs. 13, 23, 000/- + Rs. 35, 500/-
= Rs. 19, 96, 500/-

WORKING CAPITAL ANALYSIS:

i) Staff and labour payment (Per month):

Sl. No.	Designation	No.	Salary	Total Amount (In Rs.)
01.	Manager	Self		
02.	Supervisor	2	10000	20, 000
03.	Skilled Labour	4	8000	32, 000
04.	Unskilled Labour	10	6000	60, 000
05.	Mechanic	1	8000	8, 000
05.	Clerk cum Accountant	1	8000	8, 000
06.	Watchman cum Peon	1	6000	6, 000
			Total	**1, 34, 000**

ii) Raw materials to prepare 500 lit. of alcoholic hand sanitizer:

Sl. no	Materials	Qty.	Rate	Value in Rs.
1.	Preform pet bottle	1,00,000	@ 2.00/pc	2,00,000
2.	HDPE	2500 kg	@ 80/kg	2,00,000
3.	Lubricants filler etc		L.S	25, 000
			Total	**4, 25, 000**

ii) Utility:

Sl. No.	Description	Rate	Quantity	Value (Rs.)
01.	Power	Rs. 6/ unit	1000 KWH	6, 000
02.	Water		L.S	2, 000
			Total	**8, 000**

iii) Other Expenses (Per Month):

Sl. No.	Description	Quantity	Value
01.	Postage & Stationery	L.S	10, 000
02.	Telephone	L.S	1, 500
03.	Repair & Maintenance	L.S	1, 500
04.	Insurance @ 2% of Machinery & Equipment Cost	L.S	2, 500
05.	Marketing & Travelling Expenses	L.S	200
06.	Other Misc. Expenses	L.S	12, 000
		Total	**27, 700**

WORKING CAPITAL (PER MONTH):

= Rs. 1, 34, 000 + Rs. 4, 25, 000 + Rs. 8, 000 + Rs. 27, 700 = **Rs. 5, 94, 700/-**

TOTAL CAPITAL INVESTMENT:

Fixed capital Rs. 19, 96, 500

Working capital (1 month) Rs. 5, 94, 700

Total = Rs. 25, 91, 200/-

Means of finance:

Promoter contribution @ 25% Rs. 6, 47, 800/-

Bank finance @ 75% Rs. 19, 43, 400/-

FINANCIAL ANALYSIS

(a) COST OF PRODUCTION (PER ANNUM):

Sl. No.	Description	Value (Rs.)
01.	Raw Material & Packaging Material	51, 00, 000
02.	Salary & Wages	16, 08, 000
03.	Utilities	96, 200
04.	Other Expenses	3, 32, 400
05.	Depreciation on Machinery & Equipments @ 10% p.a.	1, 20, 800
06.	Interest on borrowed capital @ 12 % p.a.	2, 33, 208
	Total	**74, 90, 608**

(b) TURNOVER (PER ANNUM):

Item	Quantity & Rate	Value in Rs.
Pet bottles	16,00,000 @ 3.00/ bottle	48, 00, 000
Caps	60 lakhs @ 0.60/pc.	36, 00, 000
		84, 00, 000

(C) NET PROFIT PER YEAR:

Net Profit = Total turnover - Total cost of production

= 84, 00, 000 - 74, 90, 608

= **9, 09, 392**

(D) **Profit Ration on Sales :**

Profit ratio on Sale: = $\frac{\text{Profit x 100}}{\text{Turnover}}$ = **10.82 %**

(e) Rate of Return (ROR) on Total Capital Investment:

$$\text{ROR} = \frac{\text{Net Profit per annum}}{\text{Total Capital Investment}} \times 100$$

$$= \frac{9,\,09,\,392}{25,\,91,\,200} \times 100$$

= **35.09 %**

(f) Break Even Analysis:

(i) Fixed Cost

Sr. No.	Description	Amount (Rs.)
01.	Depreciation on Machinery & Equipments @ 10% p.a.	1, 20, 800
02.	Interest on Total Capital Investment @ 12 % p.a.	2, 33, 208
03.	40 % of Salary & Wages	6, 43, 200
04.	40 % of Other Expenses	1, 32, 960
	Total	**11, 30, 168**

(ii) Break Even Point (BEP):

$$B.E.P. = \frac{\text{Fixed cost} \times 100}{\text{Fixed cost + Profit}} = 55.41\%$$

ADDRESSES OF MACHINERY AND EQUIPMENT:

Address of Raw material suppliers:

1. M/s. Sun Temple International ,C/o-P.K.Badapanda ,Khan Nagar Nua sahi, Link Road Santosh Petrol Pump Lane ,Cuttack-753012 ,9437356700 ,9861810015 ,Tel-0671-2367123

{Dealls in (all type of Acid ,Chemicals ,Solvent ,perfume,Essence ,Colour)

Specialise : Raw material & chemicals for **MAKING:-ATAR .AGARBATI,LIQUID BLUE (Ujala type) ,LIQUID ACID (Harpic type) ,HAND WASH , SANITIZER, SOAP,DETERGENT ,ROOM FRESHNER ,PHYNYLE**

Cosmetic Chemical, CHALK/CANDLE MOULD .all type of SPRAYERS

Raw Material Suppliers:

1) M/s. Sony Purfumary Works, C/o. Sri P.K. Nayak, Near Santha Nirankari Sathsangha Bhawan, Rajendra Nagar, Madhupatna, Cuttack. Tel-641442
2) M/s. Mother India Chemicals, Near Durga Mandap, Khapuria. Tel-644491
3) M/s. R.K. Trading , Bakharabad, Cuttack-2, Tel-622021
4) United Chemical Company, Agarpara, Kolkata-700058
5) Akshar Exim Company Pvt. Limited, Dakhin Mart, Kaikhali, Kolkata
6) Naveen Enterprise, South DumDum. Kolkata

Pet bottles/tin containers:

1. M/s.Sai chem Industries, Madhupatna, Cuttack-751010.
2. M/s.Chauhan Brothers, Jayshree Cinema Backside, Badambadi, Cuttack. Tel. 318644.
3. Essence & Bottle Supply (India) Pvt.Ltd., P.O.Box : 372, 14, Radha bazar Street, Calcutta-700001. Tel.2254994.
4. KKR Industries, Bura Bazar Market, Kolkata
5. Chirag Group of company, Dhakuria, Kolkata