

ACTION PLAN FOR ROOM AIR COOLER MANUFACTURING

Submitted By

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Annexure – The detailed bankable project report

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1.INTRODUCTION :

1.1 Introduction:

Atmanirbhar Bharat Abhiyaan or Self-reliant India campaign is the vision of new India envisaged by the Hon'ble Prime Minister Shri Narendra Modi. On 12 May 2020, PM raised a clarion call to the nation giving a kick start to the Atmanirbhar Bharat Abhiyaan and announced the Special economic and comprehensive package of INR 20 lakh crores to fight COVID-19 pandemic in India. The aim is to make the country and its citizens independent and self-reliant in all senses. He further outlined five pillars of AatmaNirbhar Bharat – Economy, Infrastructure, System, Vibrant Demography and Demand. [1]

To become self reliant it is must to increase domestic production, reduce import and increase export. As per public procurement policy, 358 items have been exclusively procured from the MSE sector, Manufacturing of these items are not difficult in India. Office of DC (MSME) new delhi took information of import of these items & its observed that, these items were importing in a huge amount. To become atmanirbhar it is decided to work on these reserved items and prepare action plan for increasing domestic production of these items. room air cooler is one of the item reserved to procure exclusively from Micro, Small Enterprises (MSE).

During summer where temperature goes beyond 40 Degree in many parts of the India creates un bearable situation. To beat heat at an affordable and effective way Air Coolers is the best option available in the market. In present market scenario different types of coolers are available such as room coolers (used for bedrooms, small room size offices) duct coolers(used for central cooling) Jumbo Coolers (Used for Large Halls, Big Offices).

1.2 Objective:

The prime objective of preparation of action plan is to find out a way to become atmanirbhar by reducing import and increasing domestic production of room air cooler. The other objectives of this study are stated below

1. To know the clusters already exist & Possibility to create clusters and its location in the country.
2. To study data about the imports & export of air cooler for the past three years
3. To understand demand of air cooler in the domestic market & export market
4. To understand technical details to manufacture air cooler
5. To suggest modern technology for implementation or available in the market
6. To prepare detailed bankable project report for manufacturing of air cooler
7. To know existing schemes & propose new scheme
8. To provide suggestions on decreasing import to become atmanirbhar.

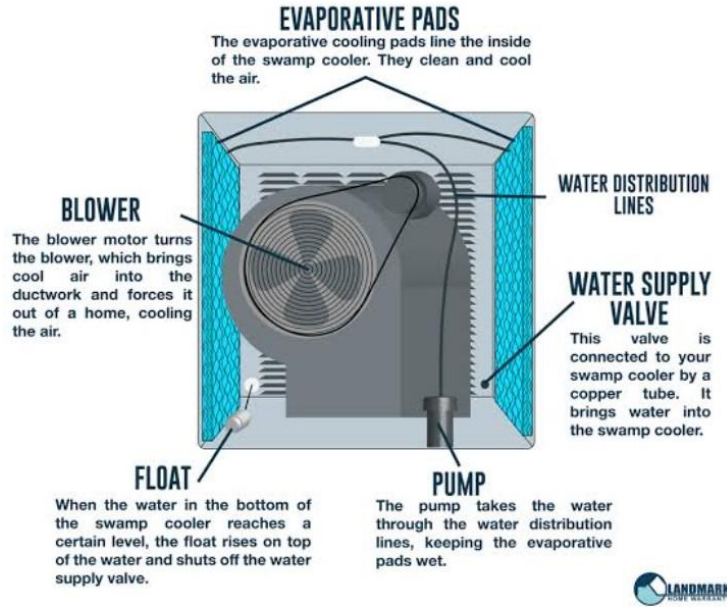
1.3 Methodology adopted:

The main objective of preparation of this action plan is to minimize import of room air cooler by increasing domestic production. Methodology adopted for preparing action plan is, contacted all stake holders by email and asked them information related to them. Visited room air cooler manufacturing unit, visited CIPET Raipur and taken inputs on plastic air cooler body manufacturing. Over a phone contacted Injection moulding machine manufacturer / supplier, Mould manufacturer, Raw material suppliers, HVAC sector industry associations, BIS, DGFT, FIEO etc and taken inputs. Intensive search on internet, Inspected various air cooler models available in market. Due to pandemic and lockdown situation in various state physical interaction with stake holders is not possible. After discussion with all stake holders & information gathered from internet few suggestions are given and new scheme is proposed for supporting room air cooler manufacturers.

2. ACTION PLAN FOR ROOM AIR COOLER MANUFACTURING

2.1 Nomenclature of the product:

Harmonised System of Nomenclature (HSN Codes) 84796000 are used for the EVAPORATIVE AIR COOLERS products under Goods and Service Tax classification. For room air cooler nomenclature (Systematic coding in alfa numeric value) is not available.



3. COMMERCIAL DETAILS

3.1 HSN code of room air cooler :

India is a member of World Customs Organization(WCO) since 1971. It was originally using 6-digit HSN codes to classify commodities for Customs and Central Excise. Later Customs and Central Excise added two more digits to make the codes more precise, resulting in an 8 digit classification.

The HSN structure contains 21 sections, with 99 Chapters, about 1,244 headings, and 5,224 subheadings. Each Section is divided into Chapters. Each Chapter is divided into Headings. Each Heading is divided into Sub Headings.

- First two digits represent the chapter number for Articles
- Next two digits represent the heading number
- Next two digits is the product code & last two digit represent deeper classification

Harmonised System of Nomenclature (HSN) Codes 84796000 is used for the evaporative air cooler

3.2NIC code of room air cooler :

The National Industrial Classification Code (“NIC Code”) is a statistical standard for developing and maintaining a comparable data base for various economic activities. This code has been developed with intent to ascertain and analyse as to how each economic activity is contributing towards national wealth.

27501, Manufacture of domestic electric appliances such as refrigerators, washing machines, vacuum cleaners, mixers, grinders etc. is NIC code for room air cooler.

3.3 Cluster already existing on room air cooler:

Cluster division of O/o DC (MSME) compiled data of ten clusters in each district, according to this data only one desert cooler cluster is available at sirsa, Hariyana. However air cooler is a product manufactured locally during summer season in all districts of Maharashtra, CG , Gujrat, MP, AP, Telangana, UP, Delhi, Orisa, Rajasthan state to fulfill local demand.

3.4 Possibility to create establish clusters on the product (City /Region / State in India):

Air cooler is a seasonal product and generally manufactured by fabrication units by assembling various outsourced parts like Fan, Pump, Cooling pads, switches in a manufactured GI sheet body. These units are not registered as air cooler manufacturer or registered as fabricators / unregistered in unorganized sector. There is possibility to create cluster in state where temperature during summer crosses 40 degree Celsius.

3.5 Probable areas or districts where the product manufacturing or project can be established:

Temperature is the most significant component to the experience of comfort. Our bodies perform within an internal temperature range much narrower than external temperatures. In the process our bodies’ metabolism generates heat, which must dissipate into the surrounding. When external temperature is high, this process becomes more difficult and we may overheat or feel warm. When external temperature is low, the rate of heat loss becomes more rapid, and we may feel uncomfortably cold. Humans generally feel comfortable between temperatures of 22 °C to 27 °C and a relative humidity of 40% to 60%

India Meteorological Department (IMD) is the National Meteorological Service of the country and the principal government agency in all matters relating to meteorology and allied subjects. It provide meteorological statistics required for agriculture, water resource management, industries, oil exploration and other nation-building activities. Climate services division, office of the additional director general of meteorology, pune published extremes of temperature & rainfall for Indian stations (Copy annexed). Table below shows the compiled state wise extreme temperature. [2]

SI No	State	Extreme temp. Oc	Date	Month	Year
1	Andhra Pradesh	49.9	28 /3	May / June	2003
2	Bihar	49.5	11	May	1988
3	Chhattisgarh	48.4	26	May	1984
4	Delhi	48.4	26	May	1998
5	Gujarat	47.3	10	May	1988
6	Haryana	47.8	29 / 17	May / June	1944/23
7	Jharkhand	48.5	06	May	1989
8	Madhya Pradesh	48.0	06	May	1993
9	Maharashtra	49.0	27 / 02	April / June	2005 / 07
10	Orissa	48.3	20	May	1972
11	Punjab	48.3	29	May	1944
12	Rajasthan	50.0 / 49.8	03	June / May	1995 / 98

13	Tamilnadu	44.9	05	June	1965
14	Uttar Pradesh	48.9 / 48.8	03 / 31	June / May	1995 /94
15	West Bengal	48.3	23	May	1981

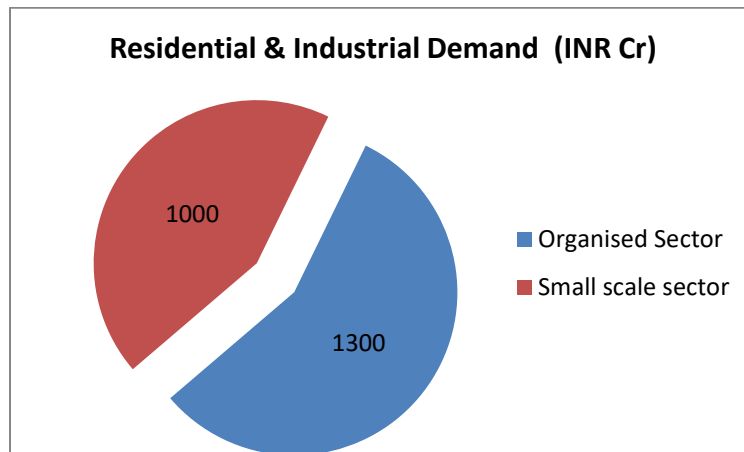
Table: Indian state wise extreme temperature

Indians are feeling comfortable at temperature 24 oC, however in most of the states temperature rises above 40 oC and hence there is large need of cooling residential & commercial places by using economic air cooling machine i.e. air cooler. Fifteen states mentioned in above table are probable areas where manufacturing of air cooler projects can be establish.

3.6 Number of industries registered as MSME is available in the manufacturing of the product:

Total enterprises registered under NIC code 27501 (Manufacture of domestic electric appliances such as refrigerators, washing machines, vacuum cleaners, mixers, grinders etc.) is 1359 which includes micro enterprises 1165, small enterprises 149 and medium enterprise 45. Exact national level data of registered Micro & Small enterprises engaged in manufacturing of only air cooler is unavailable.

Air cooler is a seasonal product and generally manufactured by fabrication units by assembling various outsourced parts like Fan, Pump, Cooling pads, switches in a manufactured GI sheet body. These units are not registered as air cooler manufacturer or registered as fabricators / unregistered in unorganized sector.



In the Residential sector, the organised players are Symphony, Videocon (brand Kenstar), Bajaj, Ambassador and Maharaja while In the Industrial and Commercial sectors the organised players are Symphony, Roots Cooling Systems (RCS), C. Doctor and Co., Desiccant Rotors International (DRI), United Engineering Corp., Zeco and Waves.

3.7 Number of industries available in large scale industries:

India has all the climates of the world, but the climate in most of the country is actually tropical, In few parts of the country highest temperature reaches to 50 degree Celsius for few days. Indians are feeling comfortable at 24degree, air cooler is less expensive and highly demanded product in summer. There are many large scale players in air cooler manufacturing some of them are

- Symphony
- Blue Star Limited
- Havells India Limited

- Singer India Limited
- Voltas Limited
- V Guard
- Crompton
- Bajaj air cooler
- Orient air coolers
- Cello air cooler

Apart from above there are many local brands in air cooler like Ram cooler, Himgiri coolers, Maharaja coolers etc having local market in state, there are many unorganized players who are manufacturing air cooler during summer season and sell locally without brand. Such unorganized sector of air cooler manufacturer also have huge contribution

3.8 Data about the imports for the past three years:

Indian companies import Air Cooler spares / air cooler from China, Italy, Japan and many other countries. Import of Air Cooler shipments has taken place under HS Code 84189900, 85340000, 84186920, 85291019 and the import consignment was cleared at Indian ports of Bombay Sea. Air cooler accessories like remote control, PCB, dust net, water pump, mould for injection moulding machine, water level sensors, cooling pads are majorly imported [3]. Mould used in plastic injection moulding machine is costly to manufacture in India and mostly imported. Reason of importing spares of air cooler is availability of air cooler spares at cheaper rate in china. e.g. remote control kit of air cooler, manufactured at china is available at Rs 300/- in India, whereas same kit manufactured in India is available at Rs 800/-

Year	Import in Cr	Remark	
2017 -18	106.1449	Majorly air cooler accessories / Mould for plastic injection moulding machines are imported from china	
2018-19	150.1786		
2019-20	142.7415		
Country	Currency	Equivalent INR	Remark
China	Chinese Yuan	11.41	1 Chinese Yuan = 11.41 INR
Italy	Euro	89.09	1 Euro = 89.09 INR
Japan	Japanese Yen	0.68	1 Yen = 0.68 INR
Korea	won	0.066	1 won = 0.066 INR

Indian import duty on evaporative coolers: Basic duty 7.5%, IGST 18%, Social welfare surcharge 10%, total customs duty on evaporative cooler is 35.5%.

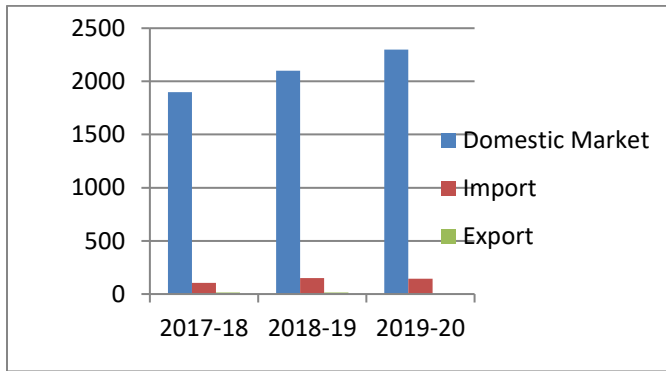
3.9 Data available for the exports for the past two years:

The top 5 trading partners of India are Saudi Arabia (1.43 USD Million), Nepal (0.54 USD Million), USA (0.47 USD Million), United Arab Emirates (0.37 USD Million), Australia (0.36 USD Million). The total export value of Air Cooler in these countries is 3.17 USD million. These top 5 countries account for over 44.71% of the total Air Cooler export from India.

Country	Currency	Equivalent INR	Remark
Saudi Arabia	Saudi Arabia Riyal	19.73	1 SAR = 19.7311 INR
Nepal	Nepalese Rupee	0.62	1 NR = 0.62 INR
USA	US Dollar	74.21	1 USD = 74.21 INR
United Arab Emirates	UAE Dirham	20.20	1 Dirham = 20.20 INR

Australia	Australian Dollar	57.22	1 AD= 57.22 INR
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Year	Import in Cr	Export in Cr
2017 -18	106.1449	13.6835
2018-19	150.1786	15.0115
2019-20	142.7415	

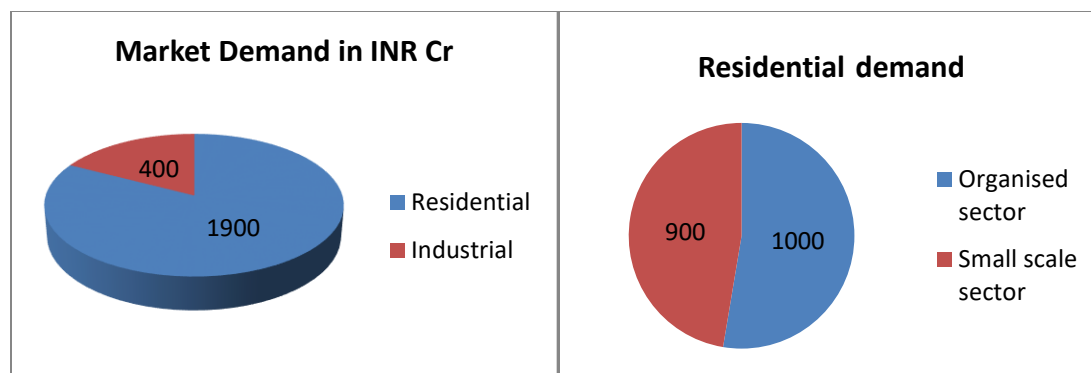


3.10 Scope for the number of unit's number of years can be established further:

India air cooler market is growing with a CAGR of more than 11% from last four years and the market is projected to grow further due to rising mercury, increasing disposable income, growing demand in middle class people and low price of air coolers as compared to air conditioners. Air cooler market is divided into two parts viz. residential and industrial. Residential and industrial air cooler market is growing with a CAGR of approximately 20% and 8% respectively from past four years. Keeping in point, low capital expenditure and electricity benefits of air coolers, the middle income group majorly fuelled the sales in residential market. These are scope to setup air cooler manufacturing units in different states of India. [4]

3.11 The demand of air cooler in the domestic market:

The total market size for Air Coolers in India only (excluding exports) for all applications, both in the organised and smallscale sectors together is estimated at Rs 2,300 crores. Since no reliable industry statistics are available, this estimate has been culled from information provided by some organised players spread over the country. Of this total, approximately Rs 1,900 crores is for the Residential sector which includes the organised (Rs 900 crores) and small-scale (Rs 1000 crores), and Rs 400 crores for the Industrial and Commercial sectors, which is all organised.[5]



The India air cooler market is anticipated to grow at a significant rate over the coming years due to government efforts for rural electrification and strengthening of the residential sector.[6]

3.12 Demand of air cooler in the export market:

Air Cooler is exported to over 91 countries. In the year 2020-2021 (Apr-Nov), India has exported **Air Cooler** worth of 7.09 USD million. The total volume of export in 2020-2021 (Apr-Nov) was around 302180. countries to which air coolers are exported Saudi Arabia, Bangkok, Sudan, Japan, srilanka, DUBAI, Nepal, etc [7]

The total volume of Air Cooler export around the world in year 2018 was 263410. The figures show the great potential for Indian exporters of Air Cooler to increase their participation in global trading and improve their numbers.

The top 5 trading partners of India are Saudi Arabia (1.43 USD Million), Nepal (0.54 USD Million), USA (0.47 USD Million), United Arab Emirates (0.37 USD Million), Australia (0.36 USD Million) . The total export value of Air Cooler in these countries is 3.17 USD million. These top 5 countries account for over 44.71% of the total Air Cooler export from India.

Saudi Arabia is the largest market for Air Cooler export from India. In 2020-2021 (Apr-Nov), Saudi Arabia imported 1.43 USD million worth Air Cooler from India.

Among the top countries, Saudi Arabia market share of the total Air Cooler export shipments from India is 20.17% . Followed by Nepal with the Air Cooler shipment value being 0.54 USD Million. The top 10 countries in total shared the share of 64.6% of the Air Cooler export value from India.

Considering the top trading partners which import Air Cooler from India, Australia recorded the fastest growth in their import shipments from India with 1700.0% rise in their shipment values. The least amount of Air Cooler is imported by Burkina Faso.

Between 2017 and 2018, India's Air Cooler export volume has increased to country's all top 10 Air Cooler export markets. Comparing the growing figures of previous years, countries like South Africa has shown significant growth of 250.0% in their Air Cooler import from India, followed by Djibouti which is up by 200.0%.

There are about 35 top exporting ports in India which trade Air Cooler from India, Nhava Sheva Sea exports the majority of Air Cooler shipments from India with the share of 41.0% , followed by Tughlakabad with 14.0%.

Moving to top importing ports for Air Cooler from India. Damietta port solely imports 107 shipments of Air Cooler from India and holds the largest share of 8.0%. [8]

4. TECHNICAL DETAILS

4.1 Sector in which the product is falling:

Air cooler basically comes under HVAC (**Heating, Ventilating, and Air Conditioning**) system. These coolers work on the principle of evaporative cooling and lower the temperature of air by the evaporation of water passing through cooling pads. Evaporative cooling differs from other air conditioning systems, which use vapour-compression or absorption refrigeration cycles

4.2 End users of the products/sectors :

An air conditioner circulates the internal air of the room over and over again, whereas an air cooler pulls fresh air from outside and then cools it down. an air cooler offers better quality of air for your room. When it comes to value for money, an air cooler definitely scores high over an AC, apart from the initial cost of purchasing, even the operating cost of an air cooler is less than an AC. Air cooler requires no installation. Many of the air coolers also come with castors, making it more convenient to move them around from one room to another.

A cooler can be used by everyone, especially people living around hot and dry weather. One can choose from a desert cooler, a window cooler or even a personal cooler, depending on the requirements.

Air coolers are one of the cheapest and less energy consuming techniques for the air-cooling solution. Since long time it is used at different places/sectors like common houses, industrial plants, commercial kitchens, laundries, dry cleaners, warehouses, hospitals factories, construction sites, athletic events, workshops, garages, poultry, dairy etc.

Typical Industrial applications are automobile plants, power plants, printing presses, paper mills, machine shops, plastic moulding, etc. Typical Commercial applications are warehouses for logistics, distribution centres, canteens, clubs, sports halls, schools, colleges, yoga ashrams, etc.

4.3 Governing Indian specification:

The evaporative air cooler (desert cooler) shall conform to the requirements for quality, safety and performance as per IS 3315:1994 EVAPORATIVE AIR COOLERS (DESERT COOLERS) — SPECIFICATION (Second Revision)

4.4 Governing international specification:

(a) INTERNATIONAL STANDARD (International Electrotechnical Commission) IEC 60335-2-88

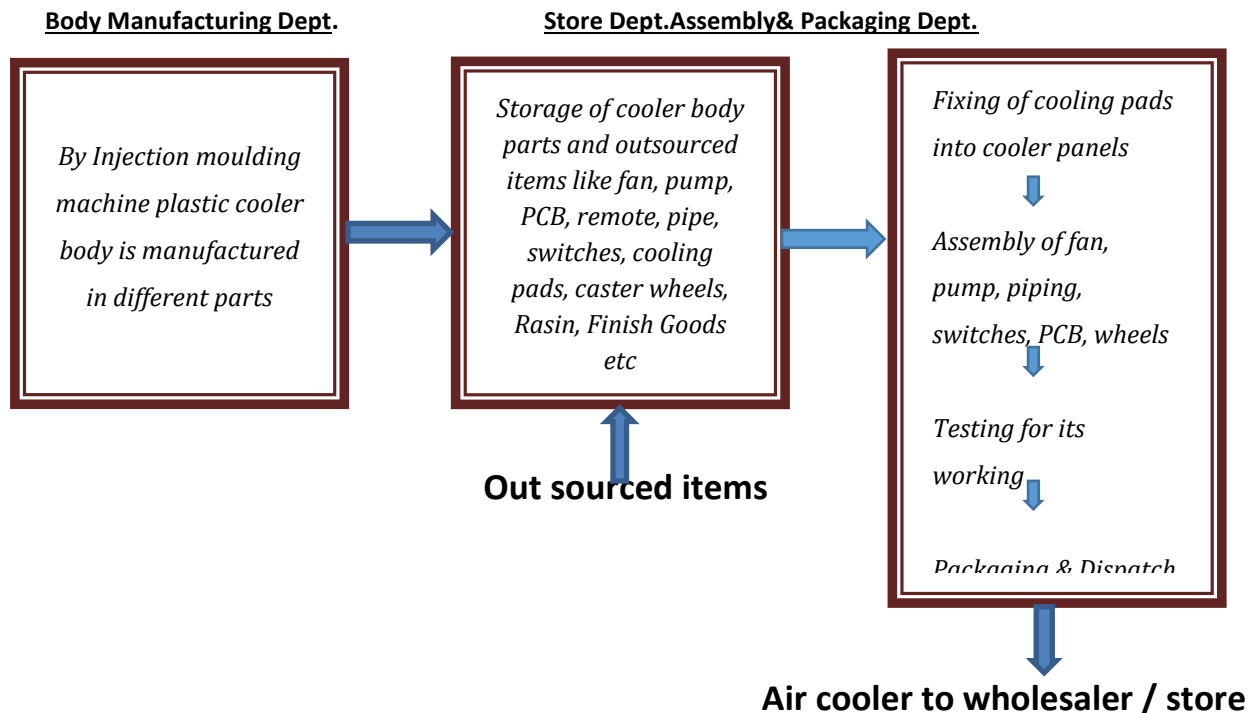
Part 2-88: Particular requirements for humidifiers intended for use with heating, ventilation, or air conditioning systems.

(b) ISO 18326:2018

Non ducted portable air-cooled air conditioners and air-to air heat pumps having a single exhaust duct- Testing and rating for performance.

4.5 Flow process chart of the manufacturing:

The difference between the outside air dry bulb temperature and the wet bulb temperature is the key factor which decides the use of evaporative coolers. Larger the difference, usefulness of evaporative coolers is better.



4.6 Qualitative parameters:

There are various qualitative parameters need to consider in Cooler manufacturing process, some are as below: -

- Fan / blower Height:** Humans are feeling more comfortable when cool air passes over face, cool air flow from top to bottom and not from bottom to top Hence cooler fan height should be appropriate.
- Water tank capacity-** Air coolers make use of an evaporative cooling method. In this method, water is converted into water vapor, which reduces the temperature of the air blown by the fan or blower. So, the size of water tank is very important for its running time. Larger the water tank, the longer the air cooler will run.
- Airflow-** Cooler should deliver standard quantity of Air flow for which it is designed. For efficient result cooler of right airflow should use at required space. Airflow of an air cooler is also measured in terms of CFM (cubic feet per minute). The CFM denotes the amount of air cycled into your room each minute. One can choose the right size for the air cooler by calculating the CFM required.
- Cooling Pads-** Cooling pads have a direct impact on the cooling of an air cooler. They absorb water and allow air to flow through them to cool it. Thicker the cooling pad, the better the cooling. Cooling pads are generally made of aspen, cellulose, wooden wool etc. material. Aspen pads are made of wood shavings and synthetic fibre. They are cheaper, need high maintenance and have a shorter life. Cellulose cooling pads are

also known as honeycomb pads, mostly because they look like a honeycomb. They are thicker in comparison to aspen pads and have low maintenance and a higher life. They cost a little more but are also known to be more efficient.

- (e) **Air Throw distance:** One of the important components in an air cooler is the fan and its blade profile. It makes all the difference since a good looking cooler may not perform if cannot throw good air. Also, the cooler is expected to cool the entire room which is where air throw distance becomes important. Longer air throw is achieved by the profile of fan blades which is where coolers that have high angled fan blades are able to deliver cool air longer distance.
- (f) **Design-** One of the major disadvantages of air coolers is that they take up more space and don't go well with the aesthetics of the room. These days, manufacturers have models with sleek and stylish designs. Tower air coolers are currently one of the most trending variants in the market. They take up less floor space but are still powerful enough to be used in big rooms.
- (g) **Inverter compatibility:** If an area that experiences frequent power cuts, one must opt for an inverter compatible air cooler to enjoy uninterrupted cooling. So, to cater wider market inverter compatibility may be one important parameter to consider.
- (h) **Convenience of control:** A remote control comes in handy if you want to access the speed settings and other features of your air cooler without having to hop out of your bed or chair. You also have the option of choosing smart coolers

Other air cooler quality parameters are Odor less, Less on maintenance, Effective in hard water use, Less Scaling and jamming resistance.

4.7 Details of the product Licenses / certification to obtained:

- a) Registration in the individual state Industry deptt. (Mandatory for getting power, loan, land etc)
- b) Udyam Registration (Mandatory after start of production)
- c) NOC from pollution control board (Mandatory for plastic cooler body production)
- d) Local authority permission & building plan approval (Mandatory)
- e) BIS certification
- d) Trademark registration
- f) Certification of plastic raw material from CIPET
- g) Any other particular state govt. statutory certification. (Mandatory)
- H) Vendor registration with CPSUs to supply air room cooler
- I) MSME Data bank
- J) BEE certification

4.8 Equipment required for the manufacturing of the product :

SI No	Type of Machine /Equipment
1	Injection Molding Machine 650 Tons, 200 Tons
2	Injection Molding Machine 80 Tons
3	Air compressor & chiller
4	Air drier for processing ABS material
5	Cooler assembly line table
6	Misc. tools like plier, screwdrivers, spanners, soldering, tester etc
7	Drill Machine
8	Material Handling Equipment

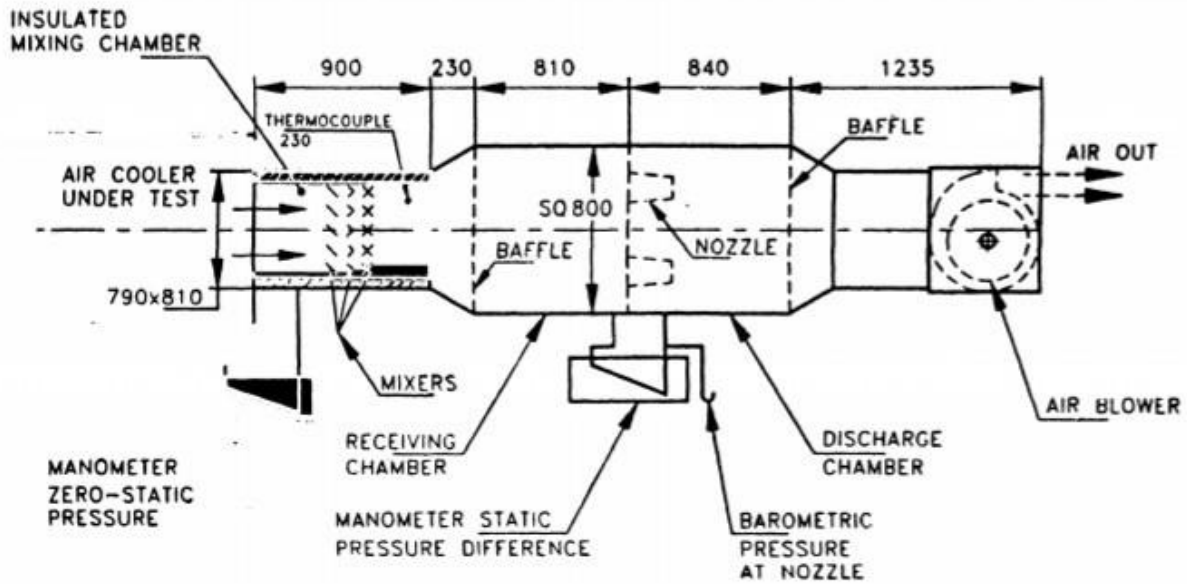
4.9 Test facilities required:

Air flow and temperature measuring apparatus: temperature and flow rate of air delivered by the air cooler are determined as per fig.1, the air cooler takes in air at ambient conditions. The air leaving cooler first passes through a mixing device to eliminate non-uniformity. The dry bulb temperature (DBT) shall be measured at the outlet of the mixing device for calculating cooling efficiency of the cooler. Flow rate is determined by measuring the pressure drop across one or more nozzles of the type shown in fig.2

Cooling efficiency: The extent to which the leaving air dry bulb temperature (DBT) approaches the wet bulb temperature (WBT) of entering air is expressed as cooling efficiency.[9]

Cooling efficiency = $[(\text{DBT of inlet air} - \text{DBT of outlet air}) / (\text{DBT of inlet air} - \text{WBT of inlet air})] \times 100$

The cooling efficiency shall be not less than 65 %



All dimensions in millimetres.

FIG. 1 TYPICAL AIR FLOW AND TEMPERATURE MEASURING APPARATUS

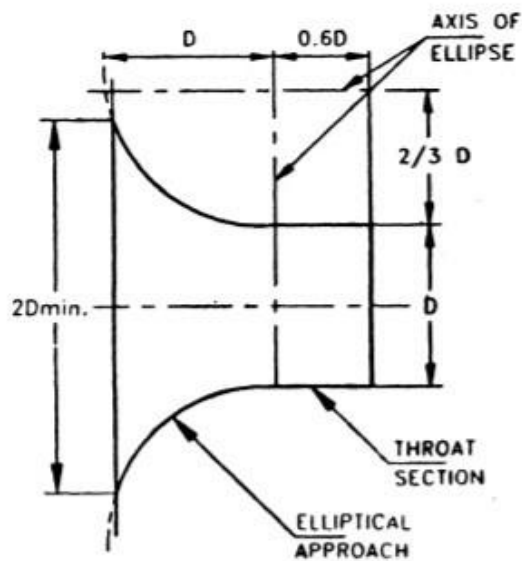


FIG. 2 AIR FLOW MEASUREMENT NOZZLE

Drop Test: For plastic body sample drop test is carried out, Body shall be subjected to drop test by dropping the cooler body from a height of 3m. the body shall not be damaged in the drop test

Endurance test: In endurance test each model kept running for 12 hours a day for 365 days, this test is carried out to know product running fault in advance.

Some testing equipment required in cooler manufacturing units are:

SI No	Description
1	Air flow and temperature measuring apparatus
2	Anemometer (For testing wind speed and wind pressure)
3	Insulation tester
4	High voltage tester
5	Multi meter
6	Tachometer

4.10 The technology existing the manufacturing of the product:

Air cooler are generally made up of G.I.Sheet or Fibre/Plastic material. As per material of cooler body manufacturing process varies from sheet metal work to Injection molding process. Coolers of G.I. sheet metal commonly require Shearing (cutting), bending, pressing, welding, assembly and painting process. Whereas Plastic coolers mainly requires Injection molding process to mold outer body then fixing different parts like switches, cooling pads, submersible motor, fan, piping work etc. are done to complete the assembly.

Latest technologies include IoT (Internet of Things), touch digital control panel, multistage air purification, high efficiency cooling pads, intelligent remote, anti-bacterial tank, manufacturing in several sub-categories such as personal, window, wall mounted, tower and desert air coolers

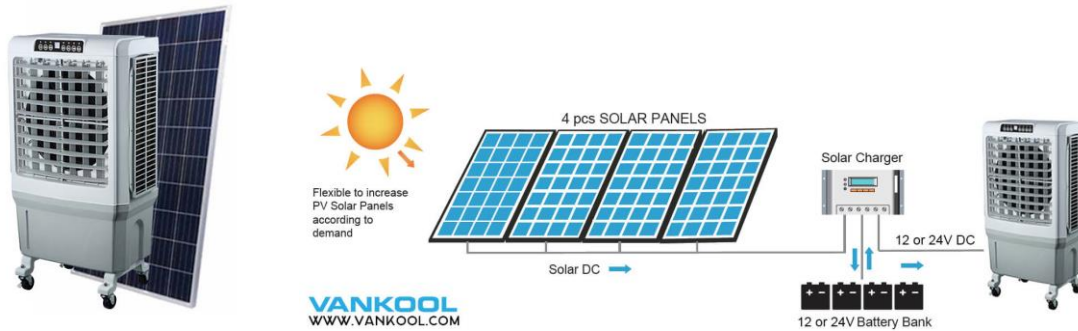
4.11 Suggested modern technology for implementation or available in the market:

Efforts should be made to use advanced technology and research not only to increase the productivity of room coolers but attention must be given to some crucial factors like level of comforts, environment friendly, energy efficient, easy handling, maintenance and durability. Now a days smart coolers are popular which are inverter compatible, wi-fi and IoT enabled, sleek and stylish along with more cooling efficiency. More emphasis should be given to automation which ensure the quality and higher productivity. Available technologies in market are

4.11.1 Solar / DC air cooler:

Unlike conventional air coolers that use electricity, solar air cooler is powered by energy produced directly from solar panels or battery. On a sunny day, the solar panel produces DC current which is directly used by the air cooler. A backup battery is charged by the solar panel and used during night times or low sunshine days. The advantage of using solar cooler is that it is economical because it totally eliminates the consumption of AC power. In addition, buying a solar power cooler is cheap as we will get back our money in a short period.

There are various benefits that you can be enjoyed when using solar energy. Use of solar energy has proved to be an effective way of generating renewable energy. This energy can be used in both air cooler and other appliances. Solar panels can last for over 25 years, The solar air cooler is versatile and can be used anywhere even in rural areas where electric grid is not available.



4.11.2 Inverter technology cooler:

The inverter technology is regarded as the best solution when it comes to economic and energy-saving operation. In an inverter model, the heating and cooling are automated in a seamless and power-saving manner whereas former technologies used to the consumer a lot of electricity regardless of the usage.

An **inverter** type air cooler adjusts the speed of the fan to control the air flow rate, thereby consuming less current and power. An **inverter** has precise temperature control and as the set temperature is attained, the unit adjusts its capacity to eliminate any temperature fluctuations.

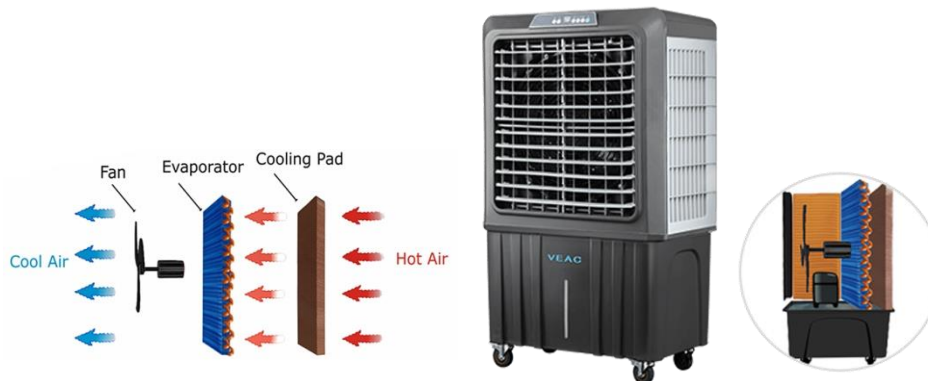
Voltas & Orient electrical are having inverter technology enabled air cooler models.

4.11.3 IOT enabled coolers:

Internet of Things (IoT) enabled air cooler. The air cooler comes with features such as an intelligent sensor that can read the temperature and humidity in the room, automatically adjust the fan and its cooling speed based on the temperature and humidity and a chamber for faster cooling, amongst other features. The benefits of **IOT coolers** It allows you to control your air cooler from anywhere without leaving your comfort zone. Features including turn on/off, fan speed, swing, mode, pump operation etc. Bajaj Electricals & Orient electrical are having IOT featured air coolers.

4.11.4 Evaporative air conditioner:

System integrate an evaporative cooling process and combining it with a refrigeration cycle to achieve optimal cooling performance at approximately 25°C. Two cooling systems enable better cooling. Energy saving up to 60% than conventional A/C. Plug & use, no installation.



4.11.5 Modular air cooler:

Air cooler is used in summer season and for other eight months it occupies house space, volume wise it is more and not easy to pack & carry. To address this problem of air cooler, modular air cooler is designed by orient company. Designed air cooler is foldable and packed in two small cartoon boxes for easy transport & store when not in use.

4.11.6 NICD Cooler:

Dengue and chikungunya have become important outbreak prone vector borne diseases in the country. The study carried out in delhi area revealed that more than 50% of the breeding places of dengue vectors are contributed by conventional coolers because water tank of the conventional air cooler is open type, which attracts mosquitoes for egg laying which results in prolific breeding of aedes aegypti mosquitoes and transmit dengue / chikungunya viruses. In order to overcome the problem, a mosquito proof desert cooler has been designed in 2009 by National Research Development Corporation and patented. Water tank of NICD (National Institute of Communicable Diseases) cooler is completely covered to prevent the entry of mosquitoes in to the water tank for egg laying, hence there is no risk of disease transmission due to cooler.[15]

4.12 Raw material required and availability:

Raw Material and different parts for room cooler are easily available in local markets, Room coolers are generally made up of GI sheet metal, Fibre or Plastic body. Some spare parts as below are required in the manufacturing of room coolers. –

Plastic granules (Resin) for manufacturing of air cooler body , Exhaust fan / Blower , Cooler pump , Honey comb Cooling pad, PCB & Remote, electric button & cable, rubber Pipe & connector, caster wheels, float valve, screw and Packaging material are the raw material required for manufacturing of room air cooler. All these materials are available in local market, it can also be purchased online or directly from manufacturer.

4.13 Covering Raw material standards Indian/International standards:

The evaporative air cooler (desert cooler) shall conform to the requirements for quality, safety and performance as per IS 3315:1994 Evaporative air cooler (Desert Coolers) — Specification (Second Revision)

Fan :Fan shall be tested as per IS 2312 : 1967 except air delivery and power consumption

Water pump :Pump set used in evaporative air coolers shall confirm to IS 11951 : 1987

Filter pad : Filter pads shall be made of wood wool or any other substitute placed in non corrosive wire mesh and tightened at places with side panels to avoid sagging.

Plastic cooler body: plastic cooler body should satisfy drop test. Size of fan opening shall be more than fan sweep but shall be not exceeding more than 25mm

Wiring: electrical wiring and connection shall confirm to the requirements given in IS 302-1 : 1979 , A three core cable confirming to IS 694:1990 or IS 9968 (Part 1) : 1988 of minimum 2m length shall be provided with each cooler [9]

5 PROJECT REPORT

5.1 The detailed bankable project report:

Detailed bankable project report with Financials, space/manpower requirement, Technology, Quality requirements etc. is attached as annexure to this report.

5.2 Details of test facilities available in India:

Test facilities for plastic air cooler body is available at CIPET all centers, Indian Institute of packaging technology, Govt. & Private testing labs

Central Power Research Institute (CPRI) is having a state of the art “Balanced Ambient Calorimeter” (BAC) test facility for testing the unitary and split air conditioners for cooling capacity up to 10500 watts. The BAC is integrated with dedicated software for accurate measurement of test data and analysis of results. The test facility is first of its kind in India. The laboratory is NABL Accredited as per IS/ISO/IEC 17025 standard. CPRI is recognized by BEE, as the only government check testing laboratory for star and labeling programme, for Cooling capacity test, power consumption test and maximum operating condition test. [10]

5.3 Details of Raw materials suppliers:

All raw material required for air cooler manufacturing is available locally, it can also be purchased online. Quality check parameter for raw material, raw material supplier is given below

Raw Material	Quality check parameters	Supplier
Plastic Resin	Plastic is recycled seven times, with each recycling its strength is reducing. Cost of plastic granules decrease with its each recycling. Color of granules	.Kalpataru Polymer Private Limited Address- A-404, Amar Orchid Nr.Rajvaibhav Complex Dombivali, West Thane -421202 Maharashtra, India
		R.K. Plastic and Company Address- EPIP, Baddi, Solan Himachal Pradesh
Cooler Fan	ISI Marked motor Stamping should be minimum one inch to get high speed Three wires for three speeds Copper motor winding Wide Blade angle	Suryavanshi Enterprises Address-5 th Floor Nizampur Road MahendraGarh, Narnaul-123001, Haryana India
Water pump & Electrical items	ISI Marked pump / switches Water discharge ltr per min. Water delivery height in m	Shree Gombi Enterprises Address- Rani Gunj, Secunderabad, Hyderabad, Telangana
Honey Comb Air Cooling Pad	Material, Thickness and density of cooling pads	Suvidha cooling towers pvt. Ltd Udyog Kendra II, Ecotech III, Greater Noida Goutam buddhnagar (UP) D P Engineers, Gandhi nagar, jheel, Delhi S K Aircon, Nagpur Maharashtra
PCB & Remote control	PCB base material thickness, soldering, components mounting, evenness of surface.	Amar Industries, Address- Sanskar Industries Area, Gondal Road, Rajkot-360022
		Shawa Techno crafts Private Limited Address -Plot No 1051, Vikas Industrial Area,

	Remote control range, efficiency, packaging material, smoothness of press button	Meerut Road, Opposite Uttam Toyota, Ghaziabad-201003, Uttar Pradesh India Argus Embedded Systems Private Limited Address-Plot No 36, Phse –III, 1 st Floor Kamalpura Colony, Banjara Hills Hyderabad-500073, Telengana , India
Caster wheels	Weight bearing capacity, free movement	Kalpar engineers private limited 1809-10-11 GIDC Phase IV, Wadhwan 363 035, Gujarat, India VIJAY PLASTIC AtikaDhebar Road (South), Nr. Kanta Gas Godown, Dhareshwar Estate, Rajkot – 360002 (Gujarat) India
Packaging Materials	Thickness of corrugated paper sheet / GSM, coating	Goel Printers and Packers Adress-K-207, 206 Sector 2, Bawna Industrial Area , Delhi-110039, India

It can also be purchased online from indiamart ,tradeindia, amazon and msmemart websites.

5.4 Details of the machinery suppliers:

Main machinery required for manufacturing of plastic body of air cooler is injection moulding machines of different capacities, it also requires compressor and chiller for mould. Manufacturing moulds for injection moulding machines is equally costs to machines, for large size of moulds of air cooler body.

Injection Moulding machine Brands in injection moulding machines are Toshiba, Ferromatik, Engel, Arburg	ShubhamPlast No 161/3/A GIDC Road, Makarpura Industrial Estate, Makarpura GIDC Vadodara
	Swami Samarth pet industries, pune Mob: 7977037388
	Plastomach India INC No 31 MoglaPada, T.P. Industrial Estate ,Andheri East Mumbai-400069
	GM Industries Paras Nagar, Gandhi Nagar , Bhopal-462036, Madhya Pradesh
	B.S. Technologies Khasra No. 320, Khewat No. 291/253, Killa No. 68 Village Rohad, Bahadurgarh, Jhajjar Haryana-124507 Mob: : +91 7496976867
	S.K Engineers. 102 Garden City Colony, OppFahamLawn, Near New Passport Office, Flora Garden Lawn, Almadina Hospital, University Road Bareilly. UP. Mob: 08081308899, 05226673786
Mould maker /Supplier	Mahendra Joshi YashasviPlastotech, Vasai, Mumbai Mob: 8425868732 , 9834751748

	Jekmin Industries Plot No 32 DinubhaiEstate , Near Hotel Royal Pride. Phase 3 Vatva GIDC, Ahmedabad, Gujarat, India
Air cooler assembly line	Mr. Harsimran Singh Param conveyors (Mob: 9654184778)
Tools supplier	Suppliers of tool kit lke portable drilling machine, spanners, screw drivers, tester etc is Locally available
Testing equipment supplier	Air flow and temperature measuring apparatus, get it manufactured from scientific equipment suppliers. Other testing equipment's are locally available

6. SCHEMES AND CONSULTANCY SERVICES

6.1 Existing schemes available and their details:

Effort is made to find out existing schemes from all ministries /departments which can help to start and run air cooler manufacturing units. Existing schemes are divided into 1. Other ministry / department schemes 2. Ministry of MSME schemes& policy.

6.1.1 Other ministry / department schemes:

Scheme for Setting Up of Plastic Parks

Name of Ministry	MINISTRY OF CHEMICALS AND FERTILISERS
Scheme for : Prospective / Existing entrepreneurs	Cluster development approach
Scheme objectives	1. Increase the competitiveness, polymer absorption capacity and value addition in the domestic downstream plastic processing industry through adaptation of modern, research and development led measurers. 2. Achieve environmentally sustainable growth through innovative methods of waste management, recycling, etc
Brief about scheme	The scheme support setting up of a need based "Plastic Parks" an eco system with requisite state of the art infrastructure and enabling common facilities to assist the sector move up the value chain and contribute to the economy more effectively. To facilitate growth and development of chemicals and Petrochemicals Industry by creation of knowledge products through studies, survey, data banks, promotional materials etc
Eligibility Criterion	The scheme will be demand driven. special purpose vehicle (SPV) formed by the State Government or any of its agencies such as State Industrial Development Corporation (SIDC) in association with user enterprises representing the plastic sector / sub sector

Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	Government of India would provide grant funding up to 50% of the project cost subject to a ceiling of Rs. 40 crore per project.The remaining contribution in the SPV will be from the State Government or State Industrial Development Corporation or similar agencies of State Government, beneficiary industries and loan from financial Institutions.
Contact details of Implementing Agency	www.chemicals.nic.in
Web link for more details	www.chemicals.nic.in

NiryatBandhu Scheme

Name of Ministry	MINISTRY OF COMMERCE & INDUSTRY
Scheme for : Prospective / Existing entrepreneurs	Prospective 1st generation entrepreneurs
Scheme objectives	Mentoring 1st generation entrepreneurs in the Field of international trade. It is expected that this online Certificate Program in Export & Import Business will significantly help Small & Medium Scale Enterprises in employment generation and improving their business turnover.
Brief about scheme	Through training programs, counselling sessions & facilitation. Online Certificate program is aimed at reaching out to the prospective exporters at their desktop
Eligibility Criterion	Entrepreneurs,Exporters / Importers,Employees of export house/status holders.Anyone with interest in Exports recommended by Regional Authority of DGFT
Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	N.A.
Contact details of Implementing Agency	http://dgft.gov.in/
Web link for more details	http://dgft.gov.in/

Public Procurement (Preference to Make in India), Order 2017

Name of Ministry	MINISTRY OF COMMERCE AND INDUSTRY
Scheme for : Prospective / Existing entrepreneurs	Existing entrepreneurs

Scheme objectives	To encourage 'Make in India' & promote manufacturing of goods and services
Brief about scheme	Purchase preference from local manufacturers. Min. local content shall ordinarily be 50%, Margin of purchase preference shall be 20%
Eligibility Criterion	MSMEs
Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	Govt. policy.
Web link for more details	http://dipp.nic.in/whats-new/public-procurement-preference-make-india-order-2017

Incentives offered under National Manufacturing Policy

Name of Ministry	Ministry of Commerce & Industry
Scheme for : Prospective / Existing entrepreneurs	Existing
Scheme objectives	Technology Acquisition and Development Fund(TADF)
Brief about scheme	For acquisition of appropriate technologies including Environment friendly technologies; Creation of a patent pool; Development of domestic mfg. of equipments used for controlling pollution & energy consumption
Eligibility Criterion	Registered MSME
Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	<u>Incentives offered:</u> Rollover relief from long term Capital Gains Tax Tax pass-through status for Venture Capital Funds Liberalization of norms for banks (RBI) & insurance companies (IRDA) Service entity for collection of statutory dues of SMEs
Contact details of Implementing Agency	https://dipp.gov.in/policies-rules-and-acts/policies/national-manufacturing-policy
Web link for more details	https://dipp.gov.in/policies-rules-and-acts/policies/national-manufacturing-policy

National manufacturing policy

Name of Ministry	Ministry of Commerce & Industry
Scheme for : Prospective / Existing entrepreneurs	Existing
Scheme objectives	To raise equity capital for growth and expansion of SMEs in a cost effective manner.
Brief about scheme	Grant on mandatory audits, 25% grant to SMEs for expenditure incurred on audits such as environmental, water for units in NIMZs subject to a maximum of Rs.1 lakh
Eligibility Criterion	MSMEs
Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	Incentive for production of green equipment/devices (controlling pollution, reducing energy consumption and water conservation) 5% interest reimbursement & 10% capital subsidy Incentive & access to the patent pool Up to a maximum of Rs. 20 lakhs for the purpose of acquiring patented technologies
Contact details of Implementing Agency	https://www.bsesme.com/

Promoting Innovations In Individuals, Start-ups And MSMEs (PRISM)

Name of Ministry	Ministry of Science & Technology
Scheme for : Prospective / Existing entrepreneurs	Prospective / Existing entrepreneurs
Scheme objectives	Incubation of innovative ideas to setup new enterprises in a phased manner via Grants, technical guidance & mentoring.
Brief about scheme	PRISM Phase-I Cat-I: PoC/Prototype/Models (Idea into demonstrable models/ prototypes.) PRISM Phase-II Enterprise Incubation Successful PRISM innovators (Enterprise Incubation)
Eligibility Criterion	Innovators

Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	PRISM Phase-I Maximum support may be limited to 2.00 lakh or 90% of the total project cost whichever is lower. PRISM Phase-II Maximum support may be up to 50.00 lakh limited to 50% of the total project cost. The support may be provided for scaling up technology based innovations, including patenting/design registration/trademark registry/technology transfer to develop a marketable product/process towards enterprise creation.
Web link for more details	www.dsir.gov.in

Seed Money Scheme (SMS)

Name of Ministry	Directorate of Industries, State Govt. of Maharashtra/MSME
Scheme for : Prospective / Existing entrepreneurs	Prospective
Scheme objectives	The objective of the scheme is to encourage unemployed person to take up self-employment ventures through industry, service and business, by providing soft loans to meet part of the margin money to avail institutional finance.
Brief about scheme	Project cost upto Rs. 25 lakhs for industry, service and business activity.
Eligibility Criterion	Start up
Financial Assistance by :Reimbursement / Subsidy / Grant / Loan	Seed Money assistance at 15 per cent of the project cost approved by financial institutions is offered. In case of projects costing up to Rs. 10 lakhs, the quantum of assistance ranges upto 15 per cent for General category and 20% for SC/ST and OBC/NT/VT/Handicapped upto 20 per cent.
Contact details of Implementing Agency	DIC of Respective District of Maharashtra
Web link for more details	DIC gov of Maharashtra

6.1.2 Ministry of MSME Schemes & Policy:

1. Public procurement policy: As per MSME Development act 2006, Public procurement policy is enacted from year 2012 and made it mandatory from 2015. All central ministries its departments and CPSEs to procure minimum 25% of its annual procurement from Micro and Small enterprises, out of these procurement 4% is earmarked to procure from SC / ST enterprises and 3% from women entrepreneurs. In addition to it 358 items are reserved for exclusive procurement from MSEs, room air cooler is one of them

A. International Cooperation Scheme

IC Scheme provides financial assistance on reimbursement basis for airfare, space rent, freight charges, advertisement & publicity charges and entry/registration fee on reimbursement basis in case of participation in international exhibitions/trade fairs.

B. Building Awareness on Intellectual Property Rights (IPR)

IPR protection plays a key role in gaining competitive advantage in terms of technological gains for achieving higher economic growth in a market driven economy. The purpose of the scheme is to enhance awareness among the MSMEs about Intellectual Property Rights, to take measures for protecting their ideas and business strategies. The MSME enterprises can avail reimbursement of expenditure incurred towards availing Patents (Upto Rs 1 Lakh), Trademark (Upto Rs 0.10 Lakh) and geographical Indications (Upto Rs 2 Lakh).

C. Credit Linked Capital Subsidy for Technology Upgradation (CLCSS-TUS)

Upgradation of both the process of manufacture and corresponding plant and machinery is necessary for the small enterprises to reduce the cost of production and remain price competitive at a time when cheaper products are easily available in the global market. CLCSS provides 15% subsidy for additional investment up to ₹ 1 cr for technology upgradation by MSEs.

D. Lean Manufacturing Competitiveness for MSMEs

Under the Scheme, MSMEs will be assisted in reducing their manufacturing costs, through proper personnel management, better space utilization, scientific inventory management, improved processed flows, reduced engineering time and so on. Financial assistance is provided for implementation of lean manufacturing techniques, primarily the cost of lean manufacturing consultant (80% by GoI and 20% by beneficiaries).

E. Design Clinic for Design Expertise to MSMEs

The key objective of the scheme is to provide expert advice and cost-effective solutions on real-time design problems for the MSMEs in India and to enhance their competitiveness in the global markets through new product development or value addition for existing problems. Government of India contribution 75% for micro, 60% for SMEs for the project range ₹15 lakh to ₹40 lakh. The objectives behind the scheme is improving the manufacturing competitiveness of Indian MSMEs through design. To promote export and substitute import by creating innovative product, To assist the MSMEs by engaging external design expertise in the form of consultancy Provide financial support to take-up design activity. The funding assistance will be granted to the MSME for engagement of design consultants and professionals and other admissible items under the project.

F. Interest Subvention Scheme for MSMEs-2018

An interest subvention scheme is a scheme introduced by the Reserve Bank of India wherein relief is provided upto 2 per cent of interest to all the legal MSMEs on their outstanding fresh/incremental term loan/working capital during the period of its validity. The range of the scheme to working capital/term loan is limited to the extent of 100 lakhs. In order to claim relief under this scheme, the amount of the loan should not be declared as Non-Performing Asset (NPA) at the date of filing of the claim amount. Interest subvention scheme is launched in 2018 for encouraging both manufacturing and service enterprises to increase productivity and provide incentives to MSMEs for on-boarding on GST platform which helps in formalization of economy, while reducing the cost of credit. All MSMEs who have valid GSTN Number and registered on Udyam portal are eligible for subvention in fresh or incremental loan. The interest relief will be calculated at two percentage points per annum (2% p.a.), on outstanding balance from time to time from the date of disbursement / drawl or the date of notification of this scheme, whichever is later, on the incremental or fresh

amount of working capital sanctioned or incremental or new term loan disbursed by eligible institutions. MSMEs may apply directly to eligible lending institutions under the scheme.

G. Financial Support to MSMEs in ZED Certification Scheme

The objectives of the scheme include inculcating Zero Defect & Zero Effect practices in manufacturing processes, ensure continuous improvement and supporting the Make in India initiative. The ZED Certification scheme is an extensive drive to create proper awareness in MSMEs about ZED manufacturing and motivate them for assessment of their enterprise for ZED and support them. After ZED assessment, MSMEs can reduce wastages substantially, increase productivity, expand their market as IOPs, become vendors to CPSUs, have more IPRs, develop new products and processes etc. The scheme envisages promotion of Zero Defect and Zero Effect (ZED) manufacturing amongst MSMEs and ZED Assessment for their certification.

H. Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE)

The Credit Guarantee Scheme for Micro and Small Enterprises (CGS) was launched by the Government of India (GoI) to make available collateral-free credit to the micro and small enterprise sector. The Ministry of Micro, Small and Medium Enterprises, GoI and Small Industries Development Bank of India (SIDBI), have established a Trust named Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) to implement the Credit Guarantee Scheme for Micro and Small Enterprises. New as well as existing Micro & Small Enterprises. Guarantee coverage ranges from 85% (For Micro Enterprise up to Rs 5 lakh) to 75% (For others). 50% coverage is for Retail Activity. The credit facilities which are eligible to be covered both for term loans and/or working capital are collateral free. Loan up to a limit of Rs. 200 lakh is available for individual MSE on payment of guarantee fee to bank by the MSE.

I. Procurement and Marketing Support Scheme (P&MS)

The Scheme aims at the Promoting new market access initiatives like organising/participation in National/international Trade Fairs/exhibitions/MSME expo etc. To create awareness and educate the MSMEs about importance of packaging in marketing, latest developments in international/national trade for market access developments. Various activities covered and useful for individual enterprise are follows:-

- (A)Participation of individual MSEs in domestic trade fairs/ exhibitions across the country:
- (B)Capacity building of MSMEs in modern packaging technique:

J. Micro & Small Enterprises Cluster Development (MSE-CDP)

The Scheme supports financial assistance for establishment of Common Facility Centres (CFCs) for testing, training centres, R&D, Effluent Treatment, raw material depot, complementing production processes etc. and to create/upgrade infrastructural facilities (IDs) in the new/existing industrial areas/clusters of MSE's such as power distribution network, water, telecommunication, drainage and pollution control facilities, roads, banks, raw materials, storage and marketing outlets, common service facilities and technological backup services for MSEs in the new/existing industrial estates/areas. Hard interventions, i.e., setting up of CFCs with maximum eligible project cost of Rs 20.00 cr with GoI contribution of 70% (90% for special category States and for clusters with more than 50% women/micro/village/ SC/ST units). Infrastructure development in the new/ existing industrial estates/areas in which the maximum eligible project cost is Rs 10.00 cr, with GoI contribution amounting to 60% of project cost (80% for special category States and for clusters with more than 50% women/micro/SC/ST units).

6.2 Proposed schemes / Policy:

6.2.1 Air cooler park in SEZ:

In all SEZs 10% of land is reserved for micro and small enterprises, in most of the SEZs this reserved land is vacant. Condition of acquiring this land in SEZ is to fulfil export obligation (Net export will be more than net import i.e. +ve NEF) within period of five years after commencement of production. Setting up of air cooler park on SEZ land reserved for MSEs. This air cooler park will have units which manufacture all raw materials required for air cooler like honeycomb pad, fan motor, injection moulding, injection moulding machine mould manufacturing, remote control for coolers etc. Units established in air cooler park will be given benefits like land at subsidized rate, exemption in stamp duty, power subsidy, exemption in taxes for first five years, transport subsidy for transporting of air coolers from air cooler park to port for export. Creating common facilities under MSE CDP scheme at air cooler park will boost India's air cooler production & export.

6.2.2 Mandatory GeM platform for procurement of 358 items:

Government e market place is a platform created by Govt. of India for government procurement where suppliers are from only India. All reserved 358 items can be made mandatorily to procure from GeM platform, It can be done by notifying amendment in public procurement policy. It will help CPSUs / Govt. ministries to get vendor for all reserved items and there will be no import of these items.

6.2.3 Reimbursement of Plastic mould manufacturing cost to CIPET / MSME TC:

Room cooler manufacturers are basically manufacturing cooler body of GI sheet or Plastic body and other parts like fan motor, pump, cooling pads are outsourced and assembled in body. In plastic cooler body making, mould (die) cost contributes huge investment for individual entrepreneur. Air cooler spares and mould (Die) for injection moulding machines to manufacture air cooler bodies are mainly imported. CIPET, Govt. of India is a premier organization providing all support in plastic manufacturing, including mould manufacturing. 80% of mould manufacturing cost (Mould manufactured from MSME TC & CIPET) reimburses to entrepreneur and 20% mould manufacturing cost bear by entrepreneur.

6.3 Details of agencies who can provide guidance:

There are many agencies in India working in heating ventilation and air conditioning (HVAC) sector, some such agencies / organisations who can provide guidance on air room cooler from design, manufacturing, testing, marketing to export are given below table

Guidance Topic	Agency / Organisation Name	Address	Contact details
Cooler plastic body manufacturing / Testing	Central Institute of Petrochemical Engineering & Technology (CIPET) Govt. of India	CIPET : Centre for Skilling and Technical Support (CSTS), CIDA Phase-II, Cherlapally, HCL Post, Hyderabad - 500 051. All CIPET branched in India	Ph No.: +91-40-27264040 Mobile No.: +91-9959333415 Fax No.: +91-40-27264051 hyderabad@cipet.gov.in / cipethyderabad@yahoo.co.in
Air cooling system	The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE)	ISHRAE 1103-1104, 11th Floor, Chiranjiv Tower, 43, Nehru Place,	Tel: (011) 41635655

		New Delhi-110019, India	info@ishraehq.in 011- 29234925 www.ishrae.in
Energy Management	Indian Association of Energy Management Professionals (IAEMP)	IAEMP, K-8-82, Kalinga Nagar, Ghatikia, Bhubaneswar-751029	Mobile: 07739802112 e-mail: iaempodisha@gmail.com web: www.iaemp.in
Trade, Commerce and Industrial environment	The Associated Chambers of Commerce & Industry of India (ASSOCHAM)	ASSOCHAM 4th Floor, YMCA Cultural Centre and Library Building, 01, Jai Singh Road, New Delhi-110 001	Tel: 011-46550555 (Hunting Line) • Fax: 011-23017008, 23017009 www.assochem.org
Address the issues of indoor environment	Society for Indoor Environment (SIE)	Mob: 9876543210 president@societyforindoorenvironment.com www.societyforindoorenvironment.com	
Manufacturing	Refrigeration & A/c Manufacturers Association (RAMA)	C/o Blue star Ltd 1 st floor, Elegance Tower, Jasola New Delhi- 110025	Ph: 011-41494100 Email: info@rama.com Web: www.rama-india.org
Marketing	Refrigeration & A/c Traders association Ltd (RATA)	RATA, 110, Unique Industrial Estate, Bombay Dyeing Compound, Off Veer Savarkar Marg, Prabhadevi, Mumbai-400025.	Mob: 77387 45000 Ph: 22- 2438 1140 info@rataindia.com . www.rataindia.com
Association	All India Air Conditioning & Refrigeration Association (AIACRA)	AIACRA DSM-165, DLF Towers, 15 Shivaji Marg, Najafgarh Road, Motinagar, New Delhi - 110015.	Phone No.: +91-011-42657225 E-mail : aiacraindia@gmail.com Website : www.aiacra.com
How to start Enterprise & Govt. Schemes	MSME DI Raipur	MSME DI Bhanpuri Industrial Area, Near Urkura Rly Station, Raipur	Ph : 07712562312 Emai: dcdi-raipur@dcmmsme.gov.in www.msmediraipur.gov.in
Export	DGFT FIEO	DGFT New secretariat building, 1 st floor, Civil lines, Nagpur	Ph: 0712-2541256 www.dgft.gov.in www.fieo.org
Export Insurance	ECGC	3 rd floor, Udyog Bhavn, Ring Road no. 1, Telebandha,	Ph: 0771-4918826 Ph: 1800224500 Email: raipur@ecge.in

7. SUGGESTIONS ON REDUCING IMPORT AND INCREASING EXPORT:

- 7.1 Mandatory GeM platform for procurement of 358 items: Government e market place is a platform created by Govt. of India for government procurement where suppliers are only Indian enterprises (Udyam Registration & ITR is mandatory to onboard GeM platform). All reserved 358 items can be made mandatorily to procure from GeM platform. It will help CPSUs / Govt. ministries to get vendors for all reserved items and there will be no import of these items.
- 7.2 Air cooler spares and mould (Die) for injection moulding machines to manufacture air cooler bodies are mainly imported. Manufacturing of large size of moulds of air cooler body for injection moulding machines is contribute huge amount of fixed cost for entrepreneur. Eighty percent cost of mould manufactured by CIPET & MSME TCs if reimbursed to entrepreneurs, it will reduce the cost of production, reduce import of air cooler mould and increase domestic production which can increase export.
- 7.3 Following cluster approach in manufacturing of air cooler and its spares at established air cooler park at SEZ, will reduce cost of raw material production, transportation cost etc, reduced cost of raw material will support to reduce import of cooler raw material / spare.
- 7.4 Increase import duty on 358 reserved items. Indian import duty on evaporative cooler is Basic duty 7.5%, IGST 18%, Social welfare surcharge 10%, total customs duty on evaporative cooler is 35.5%. For domestic manufacturer IGST applicable is 18%.
- 7.5 In unorganized sector fabricators are manufacturing air cooler in summer season, many of these enterprises are unregistered. At national level there is a need to register such units and build their capacity under credit linked capital subsidy scheme (CLCSS) by upgrading technology and skill. Lean manufacturing scheme can be implemented in a cluster of such units to minimize production waste. Consortia marketing and centralized raw material bank for such unorganized manufacturer will be helpful.

8. CONCLUSION:

- 8.1 Room air cooler is reserved in 358 items for exclusive procurement from MSEs by CPSUs and Govt. departments. Room air cooler is domestic electrical appliance and used everywhere in summer, it is also procured by general public to whom it is not mandatory to procure it from MSEs. Other than central govt. organisations and general public are procuring it from open market and also importing to suit their needs / passion.
- 8.2 The total market size for Air Coolers in India only (excluding exports) for all applications, both in the organised and smallscale sectors together is estimated at Rs 2,300 crores. Since no reliable industry statistics are available, this estimate has been culled from information provided by some organised players spread over the country. Of this total, approximately Rs 1,900 crores is for the Residential sector which includes the organised (Rs 900 crores) and small-scale (Rs 1000 crores), and Rs 400 crores for the Industrial and Commercial sectors, which is all organised
- 8.3 Air cooler is a seasonal product and India is having infrastructure, raw material and technical knowhow to manufacture air cooler. Indian largescale company Symphony is having presence in more than sixty countries and producing more than 20 lakh coolers annually, apart from it there are many companies who are producing branded air coolers in India.
- 8.4 There are many unorganized players who are manufacturing air cooler during summer season and sell locally without brand. Such unorganized sector of air cooler manufacturer also has huge contribution. These units are not

registered as air cooler manufacturer or registered as fabricators / unregistered. Exact national level data of enterprises manufacturing room air cooler is unavailable.

- 8.5 Injection moulding machine for manufacturing air cooler body involves huge fixed cost, hence it is recommended for mass production. For small quantity & seasonal production plastic cooler body can also be outsourced and only assembly of outsourced parts is recommended.
- 8.6 Attempt is made to find out exact reason of air cooler import in India, Import of Air Cooler shipments has taken place under HS Code 84189900, 85340000, 84186920, 85291019 and the import consignment was cleared at Indian ports of Bombay Sea. Air cooler accessories like remote control, PCB, dust net, water pump, mould for injection moulding machine, water level sensors, cooling pads are majorly imported from china. Mould used in plastic injection moulding machine is costly to manufacture in India and mostly imported. Reason of importing spares of air cooler is availability of air cooler spares at cheaper rate in china.
- 8.7 During discussion with raw material supplier its reveals that branded air coolers with more features are facing competition with room air conditioners, while unbranded air coolers are gaining market in rural / cities.
- 8.8 While getting raw material quotation its observed that, cost of china remote control kit in India is 2.5 times cheaper than Indian kit of same specifications. Raw material cost affects profitability of enterprise.
- 8.9 Government e market place is a platform created by Govt. of India for government procurement where suppliers are from only India. All reserved 358 items can be made mandatorily procure from GeM platform. It will help CPSUs / Govt. ministries to get vendor for all reserved items and there will be no import of these items.
- 8.10 Air cooler spares and mould (Die) for injection moulding machines to manufacture air cooler bodies are mainly imported. Manufacturing of large size of moulds of air cooler body for injection moulding machines is contribute huge amount of fixed cost for entrepreneur. Eighty percent cost of mould manufactured by CIPET & MSME TCs if reimbursed to the entrepreneurs, it will reduce the cost of production, reduce import of air cooler mould and increase domestic production which can increase export.
- 8.11 Following cluster approach in manufacturing of air cooler and its spares at established air cooler park at SEZ, will reduce cost of raw material production, transportation cost etc, reduced cost of raw material will support to reduce import of cooler raw material / spare.
- 8.12 In unorganized sector fabricators are manufacturing air cooler in summer season, many of these enterprises are unregistered. At national level there is a need to register such units and build their capacity under credit linked capital subsidy scheme (CLCSS) by upgrading technology and skill. Lean manufacturing scheme can be implemented in a cluster of such units to minimize production waste. Consortia marketing and centralized raw material bank for such unorganized manufacturer will be helpful.

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“We want an economy with mass production and production by masses. The SME sector can help in generating substantial employment for the youth.”

Hon. Shri. Narendra Modi
Prime Minister of India

5.1 THE DETAILED BANKABLE PROJECT REPORT

INTRODUCTION :

India has all the climates of the world, but the climate in most of the country is actually tropical and affected by the monsoon regime, with a dry and a rainy season. In few parts of the country highest temperature reaches to 50 degree Celsius, the hottest period generally runs from April to mid-june. Indians are feeling comfort at temperature 25 degree Celsius and relative humidity 50%.

Before invention of cooling systems / machines, ancient were using various natural techniques to keep house cool like to soak mats and hang them up in doorways and windows, letting the sun evaporate the water thus cooling the house down. People integrated rooftop gardens into their homes etc

During summer where temperature goes beyond 40 Degree in many parts of the India creates un bearable situation. To beat heat at an affordable and effective way Air Coolers is the best option available in the market. In present market scenario different types of coolers are available such as room coolers (used for bedrooms, small room size offices) duct coolers(used for central cooling) Jumbo Coolers (Used for Large Halls, Big Offices).

Need &Scope :

India air cooler market is growing with a CAGR of more than 11% from last four years and the market is projected to grow further due to rising mercury, increasing disposable income, growing demand in middle class people and low price & low running cost of air coolers as compared to air conditioners.

Air cooler market is divided into two parts viz. residential and industrial. Residential and industrial air cooler market is growing with a CAGR of approximately 20% and 8% respectively from past four years. Keeping in point, low capital expenditure and electricity benefits of air coolers, the middle income group majorly fuelled the sales in residential market. Whereas, industrial cooling is slowly gaining increasing importance as corporate are now looking to create an amiable working environment for their shop floor teams. According to “India Air Cooler Market Outlook 2021”, air cooler market is anticipated to cross a market size of INR 9000 crore by 2021.

Objective:

As per public procurement policy, 358 items have been reserved for manufacturing in the MSE sector, Room air cooler is one of them. Import of room air cooler for 2019-20 is 142 Cr., Manufacturing of room air coolers are not difficult in India. Government is giving stress to encourage domestic manufacturing to become atmanirbharbharat. It is essential to focus on these 358 items so as to ensure import to the minimum level.

The objectives of the project report preparation on room air cooler are stated below

10. 1.To study concept, philosophy and scope of room air cooling
11. 2.To understand market & scope of room air cooler in India
12. 3.To create realistic document for start of enterprise,for import substitute item.
13. 4.To increase domestic manufacturing of room air cooler to minimise its import& increase export.

Methodology adopted :

The main objective of preparation of this project report is to minimise import of room air cooler by increasing domestic production, hence cooler with all advanced feature like remote control operation, aesthetic look plastic body, water level indicator, timer, Ice chamber, caster wheel etc is considered while design of project report. This advanced room air cooler is a mechatronics product with plastic body. Methodology adopted for preparing project report is, first of all decided specification & features of room air cooler. Called information from various organisations, visited Central

Institute of Petrochemical Engineering and Technology (CIPET) Raipur to get information of plastic cooler body manufacturing, Visited cooler manufacturing units, Discussed with HVAC sector industries association, Discussed with BIS, FIEO & DGFT, information searched on internet, referred HVAC books etc. Due to covid pandemic and lockdown situation in state physical interaction with stake holders was not possible. It is proposed to get validated this prepared project report from CIPET & cooler manufacturer.

Working principle of air cooler :

Room coolers are of evaporative types coolers. In such coolers hot air from outside is passed over water. The water takes up the heat from the outside air and it evaporates. Hence due to the transfer of heat from air to water, the temperature of air decreases making it comparatively cooler. This cool air is then directed inside the room. This process when repeated, bring down the overall temperature of the room making it pleasant during hot period.

The outside air is drawn into the cooler with help of a fan where it passes through cooling pads. The evaporation of water takes places with these cooling pads. A pump is used to bring the waters on top of the cooling pads and is then allowed to trickle down through the pads.

The difference between the outside air dry bulb temperature (DBT) and the wet bulb temperature (WBT) is the key factor which decides the use of evaporative coolers. Larger the difference, usefulness of evaporative coolers is better.

Advantage of air cooler:

As the working of the air cooler involves only evaporation without uses of refrigerant gases, is an environment friendly way of space cooling without adding to global warming with an affordable initial & operating cost.

Project Implementation schedule:

1. Preparation of the project report: 2 weeks
 2. Provisional online registration with state govt. as MSE: 1 day
 3. Clearance from Pollution Control Board for plastic body manufacturing unit: 1 month
 4. Site development & Industry shed construction: 3 months
 5. Power & Water connections : 1 month
 6. Financial Arrangements and loan disbursement from bank : 3 months
 7. Procurement of machinery and Equipment as per project report: 1 month
 8. Installation of Machines and Equipment's : 2 weeks
 9. Recruitment of staff, skilled persons, marketing team: 1 month
 10. Commencement of production :6 month's onwards (Best time for commencement of production is January)
- Above many activities can start simultaneously and actual production will start after six months. In implementation schedule it is assumed that land was purchased and in the hand of promoter. Disbursement of bank loan is taken for payment to machinery, loan moratorium period is nine months.

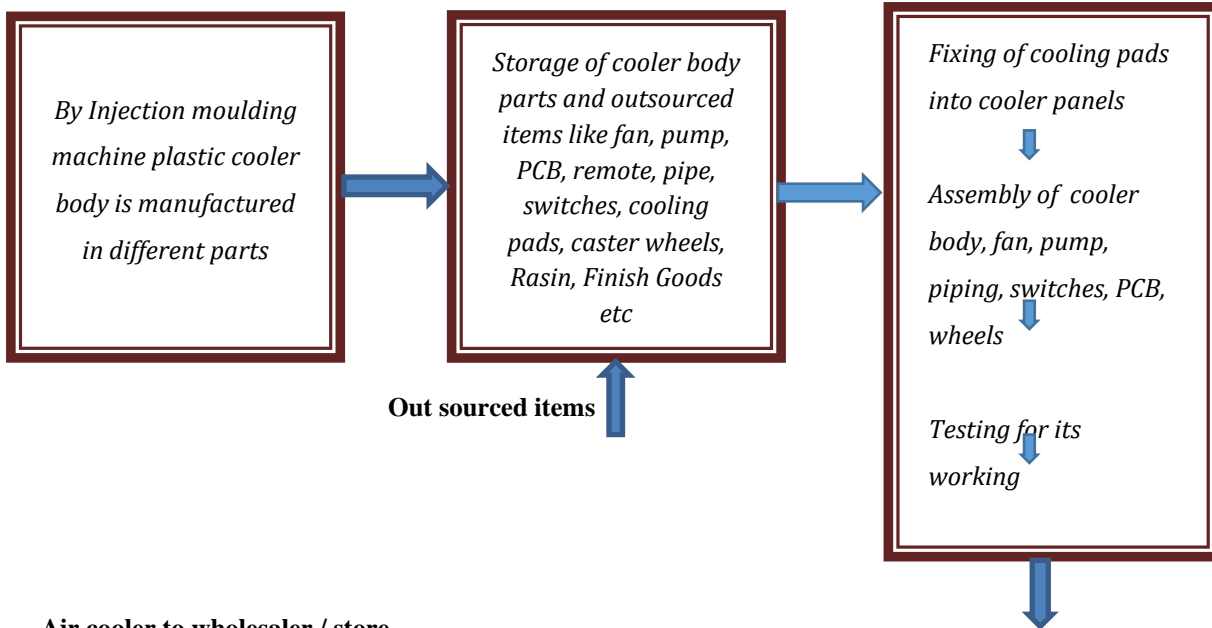
MANUFACTURING PROCESS:

Proposed enterprises majorly have three departments 1. Air cooler body manufacturing department 2. Store department and 3. Air cooler assembly & packaging department.

Air cooler body can be manufactured by GI sheet metal, Glass fibre material or plastic body. As per the use of cooler body material, manufacturing machines, process and cost varies. Here air cooler manufacturing is for import substitute or for export hence for aesthetic look design with advanced feature plastic body is suggested. Other air cooler parts

like fan, pump, Honeycomb cooling pad, PCB with remote, switches, caster wheels, float valve etc are outsourced from its manufacturers / supplier.

Body Manufacturing Dept, Store Dept, Assembly & Packaging Dept.



Air cooler to wholesaler / store

Basis and Assumption :

1. Land was purchased and in the hand of promoter
2. Loan moratorium period is nine months.
3. Interest on Capital Investment - 10.65 % Per Annum
4. Depreciation on Plant and Machinery – 15%
5. Depreciation on Furniture - 15 %
6. Total Working Hrs in a Day – 8 Hrs Single Shift
7. Total No of Working days in a Month – 25 Days i.e. 300 days in a year
8. Complete single shift production in a year will be sold out during summer season.
9. Promoter is having sufficient capital to repay loan during off season.

Air coolers models for manufacturing:

This project report of air cooler manufacturing is prepared for manufacturing of six models of air coolers with following technical specifications. Six models are to meet different requirements of customers.

Parameter	Small			Big		
	Model A	Model B	Model C	Model A	Model B	Model C
Air cooler body	Plastic	Plastic	Plastic	Plastic	Plastic	Plastic
Tank capacity in ltr	25	25	25	55	55	55
Cooling area (sft)	200	200	200	400	400	400
Fan / Blower	Fan	Fan	Fan	Fan	Fan	Fan
Cooling medium	Wood wool	HC Pad	HC Pad	Wood wool	HC Pad	HC Pad
Cooling Medium sides	3	1	1	3	1	1
Remote control operations	No	No	Yes	No	No	Yes
Water level indicator	Yes	Yes	Yes	Yes	Yes	Yes
Inverter compatibility	Yes	Yes	Yes	Yes	Yes	Yes
Ice chamber	Yes	Yes	Yes	Yes	Yes	Yes
Caster wheels	4	4	4	4	4	4
Dimension (WxDxH) in Cm	41x28x83	41x28x83	41x28x83	61x40x110	61x40x110	61x40x110
Net weight in Kg	9	9	9.5	14.5	14.5	15
Price INR	4000	4900	5400	6500	7200	7900
Production qty. / year	4800	4800	4800	3000	3000	3000

FINANCIAL CALCULATION

Fixed Cost :

Land -Total land requirement considering future expansion for proposed unit is 4000m² preferably in industrial area. Cost of land in industrial area is depends on development of particular industrial area, in average land in industrial area is available at 1000 Rs per square meter.

Building and Shed -Initially building and shed is required to accommodate office, store, machinery & equipments, assembly and packaging section. Total RCC building required is of 150m² and shed of 400m².

Cost of RCC building construction = 150 x 0.10 = 15 Lakh

Cost of Shed construction = 400 x 0.065 = 26 Lakh

Total building and shed construction cost is 41 lakh

Machineries :

Sl No	Type of Machine /Equipment	Unit Price	Quantity Required	Total Price
1	Injection Molding Machine 650 Tons	75 Lakh	1	75 Lakh
2	Injection Molding Machine 200 Tons	40 Lakh	1	40 Lakh
3	Injection Molding Machine 80 Tons	20 Lakh	1	20 Lakh
4	Air Dryer for processing ABS material	2.5 Lakh	1	2.5 Lakh
5	Air compressor & chiller	3 Lakh	2	6 Lakh
6	Cooler assembly line table	1 Lakh	1	1 lakh
7	Misc. tools like plier, screwdrivers, spanners, soldering, tester etc	0.01	10 sets	0.10 Lakh
8	Drill Machine	0.013 Lakh	10 Nos	0.13 Lakh
9	Material Handling Equipment	Lumsump		1.5 Lakh

10	Wire Cutter/Stripper	0.0023 Per Piece	5 Piece	0.0115 Lakh
Total				146.24 Lakh

Testing Equipment:

Testing equipments are not needed inhouse, testing & certification service can be outsourced whenever needed from approved laboratory. However few testing equipments are considered for raw material and fault checking.

SI No	Description	Unit Price In Lakh	Quantity	Total Price In Lakh
1	Air flow & Temp measuring apparatus		1 No	1.59 Lakh
2	Melt Flow Index Tester	0.345 Lakh	1 No	0.345 Lakh
3	Heat Deflection and Vicat Softening Temperature	0.25 Lakh	1 No	0.25 Lakh
4	Multi meter	0.010 Lakh	5 Nos	0.05 Lakh
5	Tachometer	0.035 Lakh	2 Nos	0.07 Lakh
Total				2.305 Lakh

Mould Cost:

Mold cost is depends on design and size of mold, each cooler body can be manufactured in 5-7 big & small parts depends on design, and those parts are then assembled. For manufacturing one part one mold is required, cost of mold is depends on criticality and size for each mold. Discussed with CIPET Raipur officers and estimated lumpsum cost of all moulds for two models (Small & Big) of **Rs170 Lakhs** taken as mold cost.

Furniture:

For office and store furniture like racks, cabinets, Desktop, printer, table, chair, ceiling fan, lights are needed which can be purchased under furniture for which lumpsum **Rs3 Lakh** is required

Preoperative Expenses:

Initially to make all manufacturing arrangements & followup with different organization like power connection, water connection, permissions from various departments, statutory compliances, machinery supply, security etc provision of one time expenses is needed which are before start of production and known as preoperative expenses, take it Lumpsum **Rs3 Lakh**

Total Fixed Cost = 41 + 146.24 + 2.305 + 170 + 3 + 3

=365.55 Lakh

Working Capital (Per Month):

Average production capacity of injection molding machine 650 ton is 60 Kg/ Hr. and big cooler plastic body weight is 8 Kg/ cooler body and small cooler plastic body weight is 5 Kg/ cooler body.. Hence per month production capacity

of air cooler plastic body is 1950 which includes 1200 small cooler body & 750 Big cooler plastic body, annual production is 23400 coolers.

1.Raw Material:

SI No	Type of Raw Materials	Unit Price (In Lakh)	Quantity Required	Total Price (Lakh)
1	ResinPPCP, Resin ABS (Depends upon type of parts to be moulded)	0.00130/Kg 0.00270/Kg	9000Kg 3000 Kg	11.7 Lakh 8.1 Lakh
2	Cooler Fan motor	0.00950 Per Piece 0.01500 Per Piece	1200 Piece 750 Piece	11.4 Lakh 11.25
3	Water Pump	0.0010 Per Piece	1950 Piece	1.95 Lakh
4	Cooling Pad , Honeycomb Wood wool	0.00170 Per Sft 0.00100 per cooler	4400 sft 650 coolers	7.48 Lakh 0.65 Lakh
5	Caster wheels	0.00060 Per piece	7800 Pieces	4.68 Lakh
6	Speed Regulator	0.00030 Per Piece	1950 Piece	0.583 Lakh
7	Electrical switches / Indicator	0.00024 Per Piece	5850 Piece	1.404 Lakh
8	PCB+sensors+display +remote	0.00300 Per Piece	650 Piece	1.95 Lakh
9	Servo Motor	0.00120	650 Piece	0.78 Lakh
10	Plastic Pipe	0.00065 Per Mtr.	3000 Mtr	2.00 Lakh
11	Water Distributor , Power supply Cable, Connection wires, Flux, Adhesive etc	Lumpsum	-	2.00 Lakh
12	Packing Materials	0.0010 Per Piece	1950 Piece	1.950 Lakh
13	Misc. items	Lumpsum	-	0.123 Lakh
Total				68.00 Lakh

2. Salary and Wages:

SI No	Employee	Salary Per Month	Total No of Person Employed	Total Salary
1	Injection molding machine operator	0.30 Lakh	3Nos	0.90 Lakh
2	Skilled Worker	0.20 Lakh	5Nos	1.00 Lakh
3	Un Skilled Worker	0.15 Lakh	5Nos	0.75 Lakh
4	Manager	0.40 Lakh	1 No	0.40 Lakh
5	Store, Account and Establishment Staffs	0.20 Lakh	2 Nos	0.40 Lakh
6	Sales Executive	0.20 Lakh	3Nos	0.60 Lakh
7	Security guards	0.15 Lakh	2 Nos	0.30 Lakh
Total				4.35 Lakh

3. Postage and Stationary& Publicity - 0.010 Lakh

4. Utilities (Power & Water bills) - 0.25 Lakh

5. Miscellaneous Expenses - 0.10 Lakh

Total Working Capital (Per Month)=68+4.35+0.010+0.25+0.10

= 72.71 Lakh

Total Capital Investment –

TCI= Fixed Cost + 3 Months Working Capital

= 365.55+(3 x 72.71)

= 583.68Lakh

Cost of Production (Per Annum):

SI No	Description	Cost (in Lakh)
1	Raw Materials	816 Lakh
2	Salary and Wages	52.20 Lakh
3	Utilities	3.00 Lakh
4	Other Contingent Expenses	1.32 Lakh
5	Depreciation on Machinery and Equipment(15%)	22.17 Lakh
6	Interest on Total Capital Investment(10.65%)	62.16 Lakh
	Total	956.85 Lakh

Turn Over Per Annum:

Air cooler Model	Specification	Annual Production	Price* (INR)	Sales value (Lakh)
Small -A	25 Ltr, Wood wool	4800	3600	172.80
Small – B	25 Ltr, Honeycomb pad	4800	4200	201.60
Small – C	25 Ltr, Honeycomb pad, Remote control	4800	4700	225.60
Big –A	55 Ltr, Wood wool	3000	5800	174.00
Big – B	55 Ltr, Honeycomb pad	3000	6500	195.00
Big –C	55 Ltr, Honeycomb pad, Remote control	3000	7200	216.00
Total				1185.00

*18 % GST will be charged extra

Net Profit= Turn Over Per Annum- Cost of Production Per Annum

=1185-956.85

=228.15Lakh per annum

Net Profit Ratio = (Profit/ Total Sales) x 100 %

= (228.15 / 1185) x 100

= 19.25 %

Rate of Return = (Profit / Total Capital Investment) x 100 %

= (228.15 / 583.68) x 100 %

= 39%

Break Even Point (BEP):

Fixed Cost-

SI No	Description	Value (In Lakh)
1	Depreciation	22.17
2	Interest on Total Capital Investment	62.16
3	40% of Salary and Wages	20.88
4	40 % of Other Contigent Expenses	0.52
5	40% Utilities	1.20
	Total	106.93 Lakh

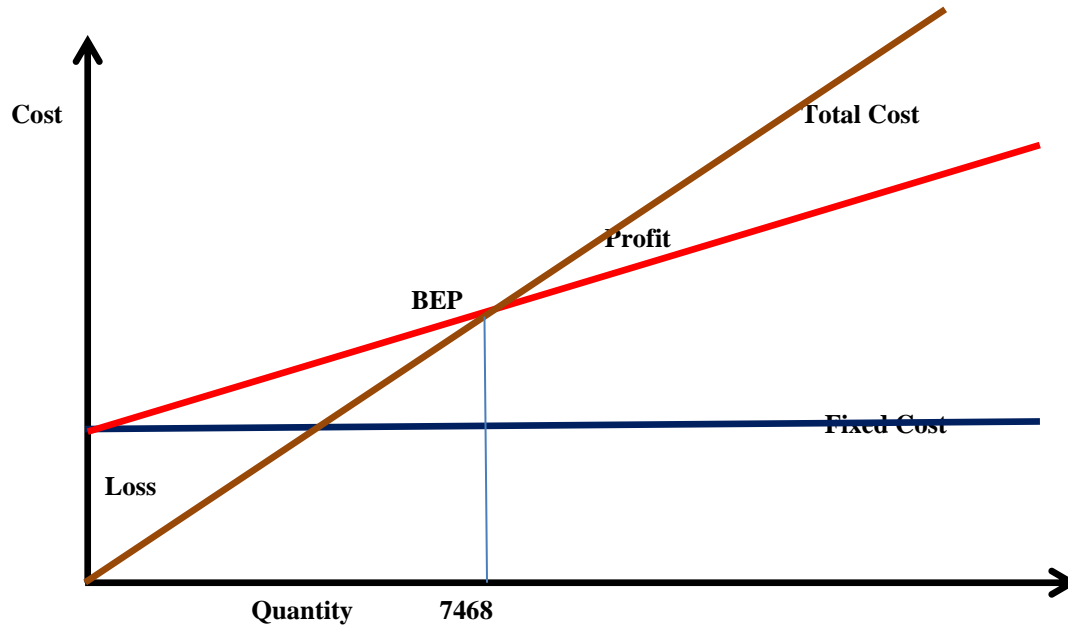
Break Even Point = [Fixed Cost/(Fixed cost+Profit)] x 100%

$$= [106.93 / (106.93 + 228.15)] \times 100\%$$

$$= 31.91\%$$

Note: For no profit no loss $0.3191 \times 23400 = 7468$ units must be sold (each model $7468/6 = 1245$) in a year.

BEP Chart:
Sales Income



Capacity Utilisation:

Unit will work with 60% capacity during first year of operation then each year capacity will be increase by 10% , fifth year and onwards unit will work with full capacity. Following table shows first five years capacity utilization and corresponding net profit after payment of bank monthly installments

Amount in INR Lkh

Year	Capacity utilisation	Cost of production	Sales Income	Profit	Bank EMI	Net Profit
1 st	60 %	574.11	711	136.89	102.72	34.17
2 nd	70 %	669.80	829.5	159.70	102.72	56.98
3 rd	80 %	765.48	948	182.52	102.72	79.80
4 th	90 %	861.17	1066.5	205.33	102.72	102.61
5 th onwards	100 %	956.85	1185	228.15	102.72	125.43

Bank Loan :

Promoter will contribute 15% of total capital investment i.e $584 \times 0.15 = 87.6$ Lakh (say 88 lakh) in land and building and remaining will be financed by the bank.

$$\text{Bank loan amount} = 584 - 88$$

$$= 496 \text{ Lakh}$$

Loan Values	Loan Summary
Loan Amount – 496 Lakh	Monthly Payment- 9,07,285 Rs

Annual Interest Rate- 10.65%	Number of Payment- 84
Loan Period – 7 Years	Total Interest –2,26,49,922 Rs
Start Date of Loan EMI–Jan 2022	Total Cost of Loan –7,62,11,922 Rs

Interest to pay for first nine months moratorium period $=[(496 \times 0.1065)/12] \times 9$

=39.62 Lakh

Interest during moratorium period is added into loan repayment amount from first installment.

Loan repayment schedule –

Payment No	Payment Date	EMI Payment	Principal	Interest	Ending Balance
1	01-01-2022	907,285	431,922	475,363	53,130,078
2	01-02-2022	907,285	435,755	471,529	52,694,323
3	01-03-2022	907,285	439,623	467,662	52,254,700
4	01-04-2022	907,285	443,524	463,760	51,811,176
5	01-05-2022	907,285	447,461	459,824	51,363,715
6	01-06-2022	907,285	451,432	455,853	50,912,283
7	01-07-2022	907,285	455,438	451,847	50,456,845
8	01-08-2022	907,285	459,480	447,804	49,997,365
9	01-09-2022	907,285	463,558	443,727	49,533,806
10	01-10-2022	907,285	467,672	439,613	49,066,134
11	01-11-2022	907,285	471,823	435,462	48,594,311
12	01-12-2022	907,285	476,010	431,275	48,118,301
13	01-01-2023	907,285	480,235	427,050	47,638,066
14	01-02-2023	907,285	484,497	422,788	47,153,569
15	01-03-2023	907,285	488,797	418,488	46,664,772
16	01-04-2023	907,285	493,135	414,150	46,171,637
17	01-05-2023	907,285	497,512	409,773	45,674,126
18	01-06-2023	907,285	501,927	405,358	45,172,199
19	01-07-2023	907,285	506,382	400,903	44,665,818
20	01-08-2023	907,285	510,876	396,409	44,154,942
21	01-09-2023	907,285	515,410	391,875	43,639,532
22	01-10-2023	907,285	519,984	387,301	43,119,548
23	01-11-2023	907,285	524,599	382,686	42,594,949
24	01-12-2023	907,285	529,255	378,030	42,065,695
25	01-01-2024	907,285	533,952	373,333	41,531,743
26	01-02-2024	907,285	538,691	368,594	40,993,053
27	01-03-2024	907,285	543,471	363,813	40,449,581
28	01-04-2024	907,285	548,295	358,990	39,901,286
29	01-05-2024	907,285	553,161	354,124	39,348,126
30	01-06-2024	907,285	558,070	349,215	38,790,055

31	01-07-2024	907,285	563,023	344,262	38,227,032
32	01-08-2024	907,285	568,020	339,265	37,659,012
33	01-09-2024	907,285	573,061	334,224	37,085,951
34	01-10-2024	907,285	578,147	329,138	36,507,804
35	01-11-2024	907,285	583,278	324,007	35,924,526
36	01-12-2024	907,285	588,455	318,830	35,336,072
37	01-01-2025	907,285	593,677	313,608	34,742,395
38	01-02-2025	907,285	598,946	308,339	34,143,449
39	01-03-2025	907,285	604,262	303,023	33,539,187
40	01-04-2025	907,285	609,625	297,660	32,929,562
41	01-05-2025	907,285	615,035	292,250	32,314,527
42	01-06-2025	907,285	620,493	286,791	31,694,034
43	01-07-2025	907,285	626,000	281,285	31,068,034
44	01-08-2025	907,285	631,556	275,729	30,436,478
45	01-09-2025	907,285	637,161	270,124	29,799,317
46	01-10-2025	907,285	642,816	264,469	29,156,501
47	01-11-2025	907,285	648,521	258,764	28,507,980
48	01-12-2025	907,285	654,276	253,008	27,853,704
49	01-01-2026	907,285	660,083	247,202	27,193,621
50	01-02-2026	907,285	665,941	241,343	26,527,679
51	01-03-2026	907,285	671,852	235,433	25,855,827
52	01-04-2026	907,285	677,814	229,470	25,178,013
53	01-05-2026	907,285	683,830	223,455	24,494,183
54	01-06-2026	907,285	689,899	217,386	23,804,284
55	01-07-2026	907,285	696,022	211,263	23,108,263
56	01-08-2026	907,285	702,199	205,086	22,406,064
57	01-09-2026	907,285	708,431	198,854	21,697,633
58	01-10-2026	907,285	714,718	192,566	20,982,914
59	01-11-2026	907,285	721,061	186,223	20,261,853
60	01-12-2026	907,285	727,461	179,824	19,534,392
61	01-01-2027	907,285	733,917	173,368	18,800,475
62	01-02-2027	907,285	740,431	166,854	18,060,044
63	01-03-2027	907,285	747,002	160,283	17,313,043
64	01-04-2027	907,285	753,632	153,653	16,559,411
65	01-05-2027	907,285	760,320	146,965	15,799,091
66	01-06-2027	907,285	767,068	140,217	15,032,023
67	01-07-2027	907,285	773,876	133,409	14,258,148
68	01-08-2027	907,285	780,744	126,541	13,477,404
69	01-09-2027	907,285	787,673	119,612	12,689,731
70	01-10-2027	907,285	794,663	112,621	11,895,068
71	01-11-2027	907,285	801,716	105,569	11,093,352

72	01-12-2027	907,285	808,831	98,453	10,284,520
73	01-01-2028	907,285	816,010	91,275	9,468,511
74	01-02-2028	907,285	823,252	84,033	8,645,259
75	01-03-2028	907,285	830,558	76,727	7,814,701
76	01-04-2028	907,285	837,929	69,355	6,976,771
77	01-05-2028	907,285	845,366	61,919	6,131,405
78	01-06-2028	907,285	852,869	54,416	5,278,537
79	01-07-2028	907,285	860,438	46,847	4,418,099
80	01-09-2028	907,285	868,074	39,211	3,550,025
81	01-10-2028	907,285	875,778	31,506	2,674,247
82	01-11-2028	907,285	883,551	23,734	1,790,696
83	01-12-2028	907,285	891,392	15,892	899,303
84	01-01-2029	907,285	899,303	7,981	0
Total		76211922	53562000	22649922	

MACHINERY & RAW MATERIAL SUPPLIERS:

Machinery & Mouldsuppliers :

Injection Moulding machine Brands in injection moulding machines are Toshiba, Ferromatik, Engel, Arburg	ShubhamPlast No 161/3/A GIDC Road, Makarpura Industrial Estate, Makarpura GIDC Vadodara
	Swami Samarth pet industries, pune Mob: 7977037388
	Plastomach India INC No 31 MoglaPada, T.P. Industrial Estate , Andheri East Mumbai-400069
	GM Industries Paras Nagar, Gandhi Nagar , Bhopal-462036, Madhya Pradesh
	B.S. Technologies Khasra No. 320, Khewat No. 291/253, Killa No. 68 Village Rohad, Bahadurgarh, Jhajjar Haryana-124507 Mob: : +91 7496976867
	S.K Engineers. 102 Garden City Colony, OppFahamLawn,Near New Passport Office, Flora Garden Lawn, Almadina Hospital, University Road Bareilly. UP. Mob: 08081308899, 05226673786
Mould maker / Supplier	Mahendra Joshi YashasviPlastotech, Vasai, Mumbai Mob: 8425868732 , 9834751748
	Jekmin Industries Plot No 32 DinubhaiEstate , Near Hotel Royal Pride. Phase 3 Vatva GIDC, Ahmedabad, Gujarat, India
Air cooler assembly line	Mr. Harsimran Singh Param conveyors (Mob: 9654184778)

Tools supplier	Suppliers of tool kit like portable drilling machine, spanners, screw drivers, tester etc is Locally available
Testing equipment supplier	Air flow and temperature measuring apparatus, get it manufactured from scientific equipment suppliers. Other testing equipment's are locally available

Raw materials suppliers :

All raw material required for air cooler manufacturing is available locally, it can also be purchased online. Quality check parameter for raw material , raw material supplier is given below

Raw Material	Quality check parameters	Supplier
Plastic Resin	Plastic is recycled seven times, with each recycling its strength is reducing. Cost of plastic granules decrease with its each recycling. Color of granules	.Kalpataru Polymer Private Limited Address- A-404, Amar Orchid Nr.Rajvaibhav Complex Dombivali, West Thane -421202 Maharashtra , India
		R.K. Plastic and Company Address- EPIP, Baddi, Solan Himachal Pradesh
Cooler Fan	ISI Marked motor Stamping should be minimum one inch to get high speed Three wires for three speeds Copper motor winding Wide Blade angle	Suryavanshi Enterprises Address-5 th Floor Nizampur Road MahendraGarh, Narnaul-123001, Haryana India
Water pump & Electrical items	ISI Marked pump / switches Water discharge ltr per min. Water delivery height in m	Shree Gombi Enterprises Address- Rani Gunj, Secunderabad , Hyderabad , Telangana
Honey Comb Air Cooling Pad	Material , Thickness and density of cooling pads	Suvidha cooling towers pvt. Ltd Udyog Kendra II, Ecotech III, Greater Noida Goutambuddhnagar (UP) D P Engineers, Gandhi nagar, jheel , Delhi S K Aircon , Nagpur Maharashtra
PCB & Remote control	PCB base material thickness, soldering, components mounting, evenness of surface. Remote control range, efficiency, packaging material, smoothness of press button	Amar Industries , Address- Sanskar Industries Area, Gondal Road, Rajkot-360022
		Shawa Techno crafts Private Limited Address -Plot No 1051, Vikas Industrial Area, Meerut Road, Opposite Uttam Toyota, Ghaziabad- 201003,Utter Pradesh India
		Argus Embedded Systems Private Limited Address-Plot No 36, Phse –III, 1 st Floor Kamalpura Colony, Banjara Hills Hyderabad-500073, Telengana , India

Caster wheels	Weight bearing capacity, free movement	KALPAR ENGINEERS PRIVATE LIMITED 1809-10-11 GIDC Phase IV, Wadhwan 363 035, Gujarat, India VIJAY PLASTIC AtikaDhebar Road (South), Nr. Kanta Gas Godown,Dhareshwar Estate, Rajkot – 360002 (Gujarat) India
Packaging Materials	Thickness of corrugated paper sheet / GSM, coating	Goel Printers and Packers Adress-K-207,206 Sector 2, Bawna Industrial Area , Delhi-110039, India

It can also be purchased online from indiamart ,tradeindia, amazon and msmemart websites.

DIFFERENCE BETWEEN:

Room Cooler	Desert cooler
Room Cooler or Personal cooler is favorable for the places which have humid weather conditions and areas which are closer to coastal places.	Desert cooler mostly suitable for places that have dry climatic conditions, Specially for the places which are away from coastal areas.
They are explicitly intended to be used in small or up to 200 sq feet sized rooms.	They are capable of cooling larger rooms than room coolers.
They have smaller water tanks and consume less power.	Desert coolers are also larger in size and Consume more energy.
Room coolers are kept inside room	Mostly Desert cooler is kept outside the room. If desert coolers are used in side room its cooling capacity will get reduced.
Water tank capacity upto 40Ltr	Water tank capacity above 40 Ltr
Room cooler taking inside air and cooling it	Desert cooler taking fresh outside air and cool air supplying in room
Room coolers are generally using honeycomb cooling pads.	Desert coolers are generally using wood wool cooling pads.
Room coolers comparatively smaller devices that are locomotive hence can be strolled and utilised in different rooms. It is essentially used to provide cooling to an individual at study room, office cabin,	Desert coolers are usually stationary and are perfect for huge bedrooms, drawing hall or any room with wider space. Desert coolers are regularly seen at hotels, restaurants, banquets, pray halls and so on.

Cooling pads

Wood wool	Honeycomb pad
The performance of wood wool cooling pads is far better in dry climates and hot regions of the country.	The Honeycomb pads offer a great cooling experience in humid climates and especially in the coastal areas.
The only con with wood wool pad is that they demand more maintenance to sustain performance.	These pads demand less maintenance and can last longer.

Easily available and cheap in cost	Very expensive.
It is advised to replace the wood wool cooling pads every year,	Honeycomb cooling pads need replacement once in 3 years.
Natural Fragrance	Emanate offensive odour in the initial stage,
Natural look	Honeycomb cooling pads is better in appearance.

Note: The air coolers with bigger and 3 sided cooling pads will offer better cooling compared to the coolers with a smaller and single-sided cooling pad. Also, the air coolers having cooling pads of higher thickness offer better cooling efficiency compared to the coolers with thin pads.

Room cooler Vs Room Air conditioner

Room Air Cooler	Room Air Conditioner
Work on water evaporation principle	Work on refrigerant vapor compression cycle
Room air coolers work well in hot & dry climates	Room air conditioner are quite favourable in humid conditions
Useful only for air cooling	Room air conditioner can even heat up the rooms during winters. (If included in design).
Room air cooler is environment friendly	Room air conditioner use refrigerant which is harmful to the environment.
Room air coolers, consumes about 80% less electricity than room air conditioner	Room air conditioner consume lot of electricity which means your electricity bills will be higher.
Room air cooler If kept near window take fresh outside air	Room air conditioner recirculating inside air
Low cost	High initial cost& required installation

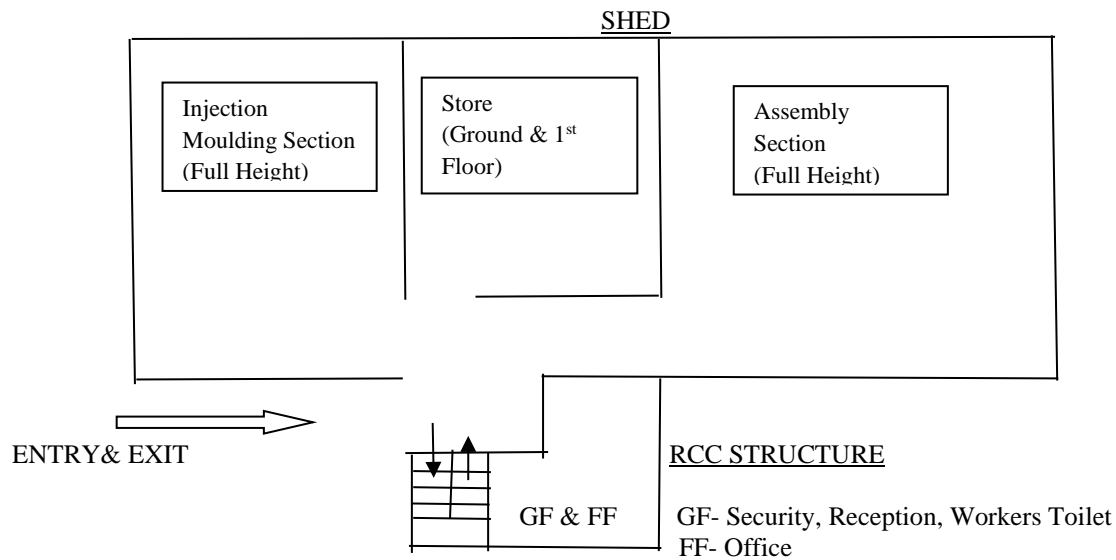
Manufacturing air Cooler Body

Manufacturing GI sheet body	Manufacturing Plastic body
For manufacturing GI sheet air cooler body simple mechanical machineries are required which are comparatively very cheap	For manufacturing plastic air cooler body, high capacity plastic injection moulding machines are required which are very costly
Cost of machinery goes around 10 lakh	Cost of injection moulding machines of capacities 650 ton & 150 ton goes in tune of 100 lakh
Mould is not required	Mould is required which is costly
Steel body coolers are more efficient than the plastic body cooler as they are fitted with comparatively bigger size cooling pads	Plastic body cooler are comparatively fitted with smaller size cooling pads
Look depends on design and color used	Plastic body coolers are good looking
Annual maintenance is required to keep cooler body rust free	No rusting, No annual maintenance is required for plastic air cooler body
Economical for less quantity and mass production	Economical only in mass production

DOCUMENT FOR BANK LOAN CASE:

1. Application Form
2. Self Attested copy of KYC Documents
3. Bank Statements (not more than 45 days old)
4. Current year performance and projected turnover on letterhead
5. Government approvals for power, Pollution, Building plan alongwith documentary proofs
6. Project report containing cost of project, means of finance, expenditure incurred and projections alongwith justifiable details
7. Orders in hand and status along with order copies/Letters of intent/Contract agreements
8. Proforma invoices of assets to be purchased, copy of allotment letter/conveyance deed in case of land, architect certificate for validating cost of building to be constructed
9. CIBIL score and other case specific documents.

ANNEXURE: SAMPLE FACTORY BUILDING PLAN



SAMPLE ENTERPRISE BUILDING LAYOUT PLAN& Its 3D VIEW