

AIR COOLER MANUFACTURING

1. INTRODUCTION

The "Air Cooler Manufacturing" project in Uttarakhand, India, is a micro and small-scale investment initiative aimed at contributing to the region's industrial growth. This project seeks to manufacture high-quality air coolers to cater to the cooling needs of both residential and commercial sectors. It envisions providing affordable and efficient cooling solutions to the local market while fostering entrepreneurship and employment opportunities in the state.

2. PRODUCT & ITS APPLICATION

The primary focus of this project is on the production of air coolers, also known as desert coolers, room coolers, or evaporative coolers. These coolers operate on the principle of evaporation, offering an energy-efficient and environmentally friendly method to reduce air temperature. Designed to alleviate the discomfort of hot and dry conditions, these coolers find their application across a variety of settings. They are ideal for cooling residential areas such as bedrooms, living rooms, and kitchens, as well as providing an effective cooling solution for small offices and commercial spaces. Additionally, they are suitable for tempering the air in outdoor environments like patios, gardens, and open-air venues. By serving as an eco-friendly alternative to conventional air conditioning systems, these coolers also cater to the needs of regions plagued by sporadic electricity supply, ensuring continuous relief from heat.

3. DESIRED QUALIFICATION FOR PROMOTER

To successfully launch and manage an air cooler manufacturing unit in Uttarakhand, the entrepreneur must be equipped with or strive to acquire a range of skills and knowledge. Fundamental to this venture is a solid understanding of the manufacturing processes, quality control mechanisms, and the technology behind cooling systems. An entrepreneurial spirit is critical, characterized by a readiness to embrace calculated risks and seize market opportunities. Moreover, strong business acumen is required to devise a strategic business plan, manage financial resources efficiently, and execute cost-effective operations. The ability to conduct thorough market research is essential to grasp demand trends and competitive landscapes. A deep understanding of Uttarakhand's unique market conditions and consumer preferences can offer a competitive edge. Additionally, being well-versed in the regulatory and compliance frameworks governing manufacturing and business practices in Uttarakhand is indispensable for smooth operations and legal compliance.

4. INDUSTRY OUTLOOK AND TRENDS

The air cooler manufacturing sector in India is on an upward trajectory, spurred by factors such as escalating temperatures, heightened awareness around energy conservation, and a shift towards more economical cooling solutions. In regions like Uttarakhand, where the summer heat can be particularly intense, there's a consistent demand for air coolers from residential sectors, small offices, and commercial entities. Industry trends point towards a growing consumer preference for energy-efficient air coolers, highlighting the importance of developing products that minimize power consumption. Additionally, there's an emerging interest in air coolers equipped with smart features, including remote operation and Internet of Things (IoT) connectivity, reflecting a broader trend towards technologically advanced home appliances. The demand for eco-friendly cooling options is also on the rise, with consumers increasingly choosing coolers that utilize environmentally benign coolants and materials. Customization is another area where consumers are showing significant interest, seeking tailored cooling solutions that specifically cater to their individual needs. This trend presents unique opportunities for niche market products. Furthermore, the push towards local manufacturing signifies a promising avenue for new and existing manufacturers to efficiently and cost-

effectively satisfy the burgeoning demand for air coolers.

5. MARKET POTENTIAL AND MARKETING ISSUES; IF ANY

The air cooler manufacturing industry in India is experiencing robust growth, primarily driven by the nation's warm climate and a rising demand for cost-effective cooling solutions. Valued at approximately USD 1.2 billion in 2021, the market is projected to expand at a CAGR of around 10% through 2027. This growth trajectory is supported by the increasing middle-class population, urbanization, and a shift towards energy-efficient products. Leading brands like Symphony Limited, Bajaj Electricals Ltd, Orient Electric, and Maharaja Whiteline dominate the market, benefiting from their extensive product ranges and strong distribution networks.

However, the industry faces several challenges, including stiff competition from the unorganized sector and the seasonal nature of demand, which complicates sales and inventory management. Additionally, the growing affordability and popularity of air conditioners pose a competitive threat, particularly in urban and upper-middle-class markets. Air cooler manufacturers must also contend with the rising consumer preference for environmentally friendly and energy-efficient products. To maintain market relevance and growth, manufacturers need to focus on innovation and align their products with evolving consumer expectations, emphasizing energy efficiency and eco-friendliness.

6. RAW MATERIAL REQUIREMENTS

The production of air coolers involves a variety of essential raw materials and components, each playing a pivotal role in the assembly and functionality of the final product. Sheet metal forms the core body and frame, providing structure and durability, while evaporative cooling pads, made from cellulose or similar materials, facilitate effective cooling. The circulation of air is driven by high-quality fan blades and efficient motors, integral to the cooler's performance. A water distribution system, comprising pumps, pipes, and fittings, ensures even distribution of water across the cooling pads. Additionally, the cooling process is enhanced by natural or synthetic cooling media. Electrical components, including wiring, switches, and control panels, are fundamental for the operational integrity of air coolers. Plastic parts are used for external casings and control knobs, contributing to the aesthetic and functional design. Assembly relies on a variety of fasteners, such as nuts, bolts, and screws, ensuring the unit's stability and durability. Air filters are incorporated to improve the quality of air released, and paints and coatings are applied to the cooler's exterior for a finished look and added protection against rust. The selection and procurement of these raw materials are critical to the manufacture of high-quality air coolers, impacting their efficiency, durability, and overall performance.

Here is the list of suppliers:

- **Shiv Plastics:** No. 56- A/2, Rama Road, Industrial Area, New Delhi-110015, Delhi, India
- **A H Ambe Industries:** Moti Nagar Road, Near Hari Om Mandir, Gajja jain colony Ludhiana - 141010, Punjab, India
- **Lakhanpal Steel Works:** 2185, Main Road, Abdullapur Basti, Abdullapur Basti Ludhiana - 141003, Punjab, India

7. MANUFACTURING PROCESS

The manufacturing process of air coolers is a structured and detailed operation that begins with the design and prototyping phase, where product designs are crafted with considerations for size, cooling capacity, and energy efficiency. Following this, high-quality raw materials and

components are procured from reliable suppliers to ensure the foundation of the product is solid. The process continues with sheet metal fabrication, where sheet metal is cut, shaped, and assembled to form the body and frame of the air cooler. Cooling pads are then installed on the sides of the cooler to facilitate evaporative cooling. The fan and motor are assembled next, pivotal for efficient air circulation within the cooler. The assembly of the water distribution system, including pumps, pipes, and fittings, ensures an even distribution of water across the cooling pads. Electrical wiring is carefully connected to switches and control panels, integrating the electrical components essential for operation. Natural or synthetic cooling media are added to enhance the cooling effect, after which the air cooler undergoes rigorous quality control checks and performance testing to guarantee functionality and reliability. The finishing touches are then applied, including paints and coatings for a polished appearance and protection against rust. Once complete, the air coolers are packaged properly to ensure they are transported safely and finally distributed through an efficient network to wholesalers, retailers, and end-users. Throughout this manufacturing process, adherence to quality standards, energy efficiency, and environmentally friendly practices are paramount, with continuous quality control and safety regulations being essential to deliver reliable and efficient air coolers to the market.

The Bureau of Indian Standards (BIS) has a standard for evaporative air coolers (desert coolers) called IS 3315. This standard is for the guidance of manufacturers. According to IS 3315, air coolers must meet the following requirements:

- The air delivery must be at least the declared minimum capacity.
- The cooling efficiency must be at least 65%.

8. MANPOWER REQUIREMENT

Sr. No	Particulars	No. of Person	Months	Monthly Wages Amount/Person (Rs in Lakhs)	Monthly Wages - Total (Rs in Lakhs)	Annual Expenses (Rs in Lakhs)
1	Skilled	2	12	0.18	0.36	4.32
2	Semi-skilled	4	12	0.13	0.52	6.24
3	Unskilled	5	12	0.10	0.50	6.00
	Total					16.56

9. IMPLEMENTATION SCHEDULE

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	1.5
2	Construction (if applicable)	3
3	Procurement & installation of Plant & Machinery	4
4	Arrangement of Finance	2
5	Recruitment of required manpower	1
	Total time required (some activities shall run concurrently)	10

10. COST OF PROJECT

Sr. No.	Particulars	Amount (Rs in Lakhs)
1	Pre-operative Expenses	4.00
2	Land and Building	6.00
3	Machinery	36.40
4	Equipment and Furniture	1.20
5	Working Capital	8.00
	Total Project Cost	55.60

11. MEANS OF FINANCE

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

Sr. No.	Particulars	Percentage Share	Amount (Rs in Lakhs)
1	Promoter's Contribution	25%	13.90
2	Bank Finance	75%	41.70
	Total		55.60

12. LIST OF MACHINERY REQUIRED

A. Machinery

Sr. No	Particulars	Unit	Unit Cost (Rs in Lakhs)	Total Amount (Rs in Lakhs)
1	Sheet Metal Cutting Machine	1	4.50	4.50
2	Welding Machine	2	1.20	2.40
3	CNC Press Brake	1	5.80	5.80
4	Cooling Pad Cutting Machine	1	2.50	2.50
5	Fan Balancing Machine	1	1.20	1.20
6	Water Pumping System	1	0.80	0.80
7	Electrical Testing Equipment	Set	1.50	1.50
8	Painting Booth	Booth	2.00	2.00
9	Forklift	Forklift	3.50	3.50
10	Packaging Machinery	1	1.80	1.80
11	Material Handling Equipment	Set	1.00	1.00
12	Quality Control Tools	Set	1.00	1.00
	Total Amount			28.00
	Tax, Transportation, Insurance, etc.			5.60
	Electrification Expenses (Wiring)			2.80
	Grand Total			36.40

B. Furniture & Equipment

Sr. No	Particulars	Unit	Unit Cost (Rs in Lakhs)	Total Amount (Rs in Lakhs)
1	Office Furniture	Set	0.50	0.50
2	Warehouse Racks	Set	0.70	0.70
	Total Amount			1.20

1. Advanced Power Sources Limited

Survey No 172/1, Paikee 2,
 OLD GIDC Gundlav, Valsad,
 Gujarat, India.
 Ph: 9601 444 111 / 9601 444 222;
 email: info@apsl.in / sales.valsad@apsl.in.

2. Gujri Industries International Private Limited

Address – 588,
 Overlock Road Miller Ganj,
 Ludhiana - 141003, Punjab, India.

13. SALES REALIZATION CALCULATION

Sr. No	Product	Quantity (in units)	Sales in Percentage	Total Sales (Rs in Lakhs)
1	Air Cooler	600	100%	110.00
	Total		100%	110.00

14. PROFITABILITY CALCULATIONS

Sr. No	Particulars - Amount (Rs.)	Year-I (Rs in Lakhs)
A.	Sales Realization	
	Sales (Assuming 15% growth per year)	110.00
	Other Income (Assuming constant)	
	Total Sales Realization	110.00
B.	Cost of Production	
	i) Raw Materials	63.80
	ii) Utilities (Assuming constant)	1.40
	iii) Manpower (Salaries/wages)	16.56
	iv) Administrative Expenses (Assuming constant)	1.10
	v) Selling & Distribution Expenses (Assuming constant)	1.50
	viii) Interest (Assuming constant)	5.49
	Total Cost of Production	89.85
	No of Units Produced	599
	Cost of Goods Sold	0.15
	Gross Profit/Loss (A – B)	20.15
	Less: Depreciation	4.40
C.	PBIT (Profit Before Interest and Tax)	15.76
D.	Income-tax (Assuming 28% tax rate)	4.42
E.	Net Profit/Loss (C - D)	11.35
F.	Repayment	5.49
	Retained Surplus (E - F)	5.86

Assumed production capacity is 2 units per day and 600 per year.

15. BREAKEVEN ANALYSIS

Fixed Cost	Rs. in Lakhs
Depreciation	4.4
Interest	5.49
Manpower	4.97
Total Fixed cost	14.86

Variable cost	
Raw materials	63.8
Utilities	1.4
Manpower	11.59
Administrative expenses	1.1
Selling & distribution expenses	1.5
Total Variable cost	79.39
Contribution margin	20%
Break-Even Point in Value	74.30

16. STATUTORY/GOVERNMENT APPROVALS

To commence the business of air cooler manufacturing in Uttarakhand, several statutory and government approvals are required to ensure legal compliance. These approvals include:

- **Registration of Business:** Register the business with relevant authorities, such as the Uttarakhand State Industrial Development Corporation (USIDC). USIDC plays a pivotal role in facilitating investments, providing infrastructure support, and fostering industrial growth within the state.
- **Factory Licensing:** If the manufacturing unit falls under the definition of a factory as per the Factories Act, obtain licensing from the Directorate of Factories and Boilers. This department oversees industrial safety, health, and boiler-related matters in various states.
- **Environmental Clearance:** Obtain environmental clearance from both the State Pollution Control Board (SPCB) and the Ministry of Environment, Forest and Climate Change (MoEFCC). Compliance with environmental regulations is crucial, as non-compliance may lead to fines, legal actions, and even closure of non-compliant units. Environmental clearances are essential to ensure eco-friendly and sustainable manufacturing practices.
- **BIS Certification:** Secure certification from the Bureau of Indian Standards (BIS) for product testing and compliance. BIS certification is mandated by various government departments and ministries to ensure product safety, quality, and adherence to specified standards. It guarantees uniformity, consistency, and safety standards for the product.
- **Tax Registration:** Register for applicable taxes, such as the Goods and Services Tax (GST), depending on the type and turnover of the business. Tax registration is mandatory to comply with tax regulations and ensure proper tax filing and payment.
- **Customs and Duties:** If the manufacturing unit involves importing or exporting materials, adhere to customs and duties regulations related to international trade. These regulations are essential for the regulation, control, and revenue generation associated with international trade.

17. BACKWARD AND FORWARD INTEGRATIONS

A. Backward Integration

- **Raw Material Sourcing:** To ensure a steady supply of raw materials, consider backward integration by establishing partnerships with reliable suppliers or exploring opportunities for in-house raw material production if feasible.
- **Component Production:** Depending on the complexity of the manufacturing process, consider producing critical components in-house to enhance control over quality, reduce costs, and streamline production.

- **Quality Control:** Implement stringent quality control measures at various stages of manufacturing, from raw material inspection to final product testing. This ensures that the end product meets or exceeds industry standards and customer expectations.

B. Forward Integration

- **Distribution and Sales:** Develop a robust distribution network to reach customers efficiently, both within Uttarakhand and in neighboring regions.
- **Repair and Maintenance Services:** Offer post-sales services such as repair and

Disclaimer

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

maintenance to enhance customer satisfaction and build brand loyalty. Provide timely support to address any issues or maintenance requirements that customers may have.

18. TRAINING CENTERS AND COURSES

There are few specialized Institutes that provide training and certification.

All India Council for Technical Education (AICTE): Offers entrepreneurship oriented skill development courses of B. Voc.

Alfa Laval: Offers educational courses on air coolers. The courses have been grouped to gradually build the class attendee's understanding of air coolers.

Refrigeration and Air Conditioning Technician: This is a two year course that is delivered nationwide through a network of ITIs. The course mainly consists of Domain area and Core area.

Swayam portal (link: <https://swayam.gov.in/>) can also be accessed for enhanced learning on business commerce, accounting, production, marketing, and areas of entrepreneurship.

