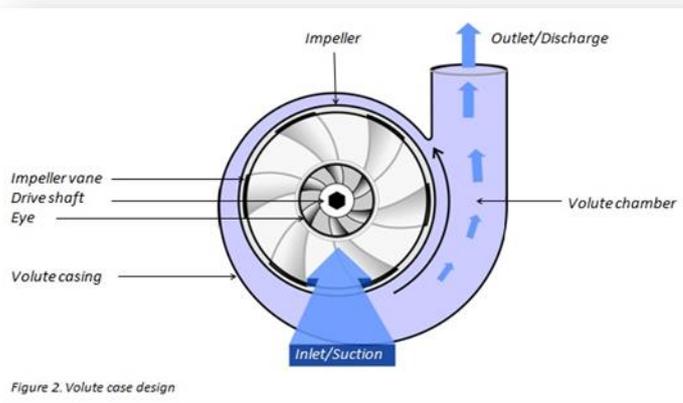
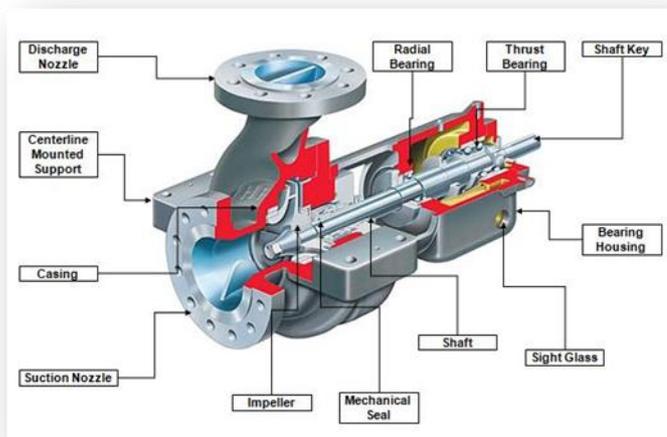
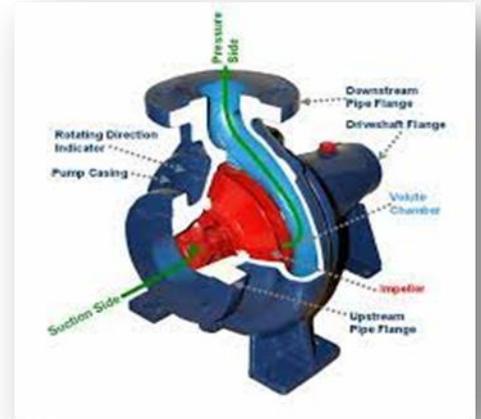
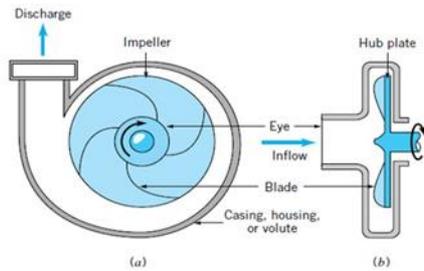


# PROJECT REPORT ON CENTRIFUGAL PUMP SUCTION AND DELIVERY 150 mm X 150 mm

## The Centrifugal Pump

(Radial-flow turbomachines)



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- **HSN CODE OF THE PRODUCT** – 84137010

The subject product **Other centrifugal pumps primarily designed to handle water** is classified under Chapter Heading Chapter 84 - Nuclear Reactors, Boilers, Machinery And Mechanical Appliances; Parts Thereof of the Customs Tariff Act.

Other relevant HSN code to this product is 8413 91 20 for the parts of centrifugal pumps.

- **NIC CODE OF THE PRODUCT** – 28132

This code is for manufacture of fluid power equipment This class includes manufacture of hydraulic and pneumatic components (including hydraulic pumps, hydraulic motors, hydraulic and pneumatic cylinders, hydraulic and pneumatic valves, hydraulic and pneumatic hose and fittings), manufacture of air preparation equipment for use in pneumatic systems, manufacture of fluid power systems, manufacture of hydraulic transmission equipment.

- **CLUSTERS ALREADY EXISTING OF THE PRODUCT:**

Sl. No.	Name of the cluster	Location
1.	Motors and Pumps	Coimbatore, Tamil Nadu
2.	Rajkot Pumps	Rajkot, Gujarat

- **POSSIBILITY TO ESTABLISH CLUSTERS OF THE PRODUCT:**

**Pump Types based on the operation/ construction:**

**Positive Displacement Type:** High pressure, low volume

- Gear Pumps: up to 3000 psi, 150 gpm, low cost, long life, high efficiency.
- Vane Pumps: low cost, reliable, up to 1500 psi
- Lobe Pumps: quieter and higher flows than Gear Pumps
- Reciprocating: single or double acting, for clean fluids, low speed (200 rpm), small flow, high pressures.

**Non-positive displacement pumps.**

Centrifugal Pumps: large volume, low Pressure.

- Diffuser/volute types: velocity converted to static pressure, low cost, high reliability, many fluids

Propeller (Axial) Pumps:

- Large size range, large flow rate, low head
- Can handle dirty fluids and sludge

## **Pumps and application:**

### **Chemical Process Pumps:**

Chemical Process Pump is in general a horizontal single stage centrifugal pump with polypropylene materials lining in side of pump, in general. They are manufactured with special non-reacting and non corrosive material.

### **Metering Pumps:**

Diaphragm type positive displacement pumps are suitable for Hazardous -Non Hazardous liquids. They are manufactured with Polypropylene-S.S 316, U.H.M.W. The range is upto 200LPH at 4 Kg/ Cm<sup>2</sup>. Diaphragm type heads are suitable for service conditions involving hazardous toxic, radio active or poisonous liquid where product leakage is not at all permitted. The diaphragm is hydraulically actuated and has a long life as it is always. Typical applications pumps are the accurate dosing and mixing of acids, alkalis, slurries, viscous liquids etc. which may be pumped at elevated, ambient or low temperatures, twenty-four hours a day.

### **Barrel Pumps:**

Barrel Pump is most useful for handling of highly corrosive chemicals, Solvent, Acids, Petroleum products, Diesel oil, toxic chemicals, etc., from std 200 CT barrel to for transfer purpose. They are manufactured with S.S. 316 & Polypropylene materials.

### **High Pressure Centrifugal Pumps:**

High Pressure Centrifugal Pump is special designed; Suction / Discharge port can be changed by direction of rotation of motor. It is most suitable for lower capability & High pressure.

### **Hand Operated Diaphragm Pumps:**

Range of hand operated diaphragm pumps that are seal less in design and are most useful for handling of highly corrosive chemicals & solvent.

<b>Type of the pump</b>	<b>Application</b>
Single stage end suction pump	Domestic and agriculture
Double suction pump	Low head pumping station, petroleum industries
Monoblock pump	Circulating systems, pumping volatile liquids, domestic applications
Multistage pump	Boiler feed pumping unit, domestic application in multi storied buildings

**The centrifugal pumps** are generally used in hydrocarbon industries, refineries, petrochemical industries, fertilizers industries as well as nuclear power plants apart from agricultural and domestic applications to pump the water, mainly but it is used for transfer of other fluid also. The multistage pumps find applications mostly in power generation & reverse osmosis process. Prime movers for the pumps are either electrical motors or Internal Combustion engines. Groupwise, the centrifugal pumps are broadly divided as: (1) Industrial Pumps Group (2) Project & Engineering Pumps Group and (3) Agricultural & Domestic Pumps Group.

The clusters can be established of the enterprises manufacturing Mono-set Pumps, Horizontal/ Vertical Open Well Submersible Pumps, Bore well Submersible Pump-sets and Jet Centrifugal Pump Combination etc. in the locations where raw material used for manufacturing of these pumps like Steel castings, Cast Iron castings, Mild Steel, Bronze, Brass, Stainless steel, Special type of plastics, Bearings, and other hardware are available. The foundries, engineering etc, are the ancillary industries for these clusters.

**PROBABLE AREAS/DISTRICTS WHERE THE PRODUCT MANUFACTURING PROJECT CAN BE ESTABLISHED:**

<b>S.N.</b>	<b>Name of the Areas and Districts</b>
1.	Vadodara, Gujarat
2.	Ahmedabad, Gujarat
3.	Jamnagar, Gujarat
4.	Mehsana, Gujarat
5.	Belgaum, Hubballi, Karnataka
6.	Hatkalangle, Kolhapur, Maharashtra
7.	Sundargarh, Rourkela, Odisha
8.	Jharasuguda, Odisha
9.	Patancheru, Telangana
10.	Hyderabad, Andhra Pradesh

11.	Agra, Uttar Pradesh
12.	Kaithal, Haryana
13.	Kurukshetra, Haryana
14.	Bhopal, Madhya Pradesh
15.	Indore, Madhya Pradesh
16.	Renigunta, Andhra Pradesh
17.	Narsaraopet, Guntur, Andhra Pradesh
18.	Vijayawada, Andhra Pradesh
19.	Shimoga District, Karnataka
20.	Chennai, Tamilnadu
21.	Batala, Punjab
22.	Jalandhar, Punjab

• **NUMBER OF INDUSTRIES REGISTERED AS MSME IN THE MANUFACTURING OF THE PRODUCT :**

S.N.	State Name	Micro	Small	Medium	Total
1	Andhra Pradesh	32	3	0	35
2	Arunachal Pradesh	0	0	0	0
3	Assam	5	1	0	6
4	Bihar	29	4	0	33
5	Chhattisgarh	32	3	0	35
6	Goa	5	1	0	6
7	Gujarat	1168	222	30	1420
8	Haryana	117	34	5	156
9	Himachal Pradesh	4	2	0	6
10	Jharkhand	57	12	0	69
11	Karnataka	202	52	11	265
12	Kerala	25	4	0	29

13	Madhya Pradesh	99	15	2	116
14	Maharashtra	886	182	40	1108
15	Manipur	2	0	0	2
16	Meghalaya	0	0	0	0
17	Mizoram	0	0	0	0
18	Nagaland	0	0	0	0
19	Odisha	17	5	4	26
20	Punjab	132	36	6	174
21	Rajasthan	130	18	1	149
22	Sikkim	0	0	0	0
23	Tamil Nadu	857	175	23	1055
24	Telangana	75	35	1	111
25	Tripura	1	0	0	1
26	Uttar Pradesh	239	45	7	291
27	Uttarakhand	5	6	1	12
28	West Bengal	204	34	2	240
29	Andaman And Nicobar Islands	0	0	0	0
30	Chandigarh	11	3	2	16
31	Dadar And Nagar Haveli	2	0	1	3
32	Daman And Diu	0	0	0	0
33	Delhi	164	46	7	217
34	Jammu And Kashmir	15	0	0	15
35	Ladakh	1	0	0	1
36	Lakshadweep	0	0	0	0
37	Puducherry	4	0	0	4
<b>Total</b>		<b>4520</b>	<b>938</b>	<b>143</b>	<b>5601</b>

- **NUMBER OF LARGE SCALE INDUSTRIES:** Following are the major players engaged in manufacturing of centrifugal pump. These companies are either having their own manufacturing units and/or having contract manufacturing from other MSEs engaged in manufacturing of centrifugal pump.

1. Kirloskar Brothers Limited  
Yamuna, Survey No. 98/(3-7), Baner, Pune 411 045
2. KSB Limited  
Mumbai-Pune Road, Pimpri, Pune 411 018, Maharashtra
3. LUBI Pumps  
Near Kalyan Mills, Naroda Road, Ahmedabad – 380025.

• **DATA ABOUT THE IMPORTS OF THIS PRODUCT FOR THE PAST**

**THREE YEARS:** (as per the data available in DCMSME website):

Centrifugal Pumps suction and delivery 150 mm x 150 mm	Value (Rs. Crore)		
	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>FY 2019-20</b>
	140.235074	167.151975	148.760188

• **DATA FOR THE EXPORTS OF THIS PRODUCT FOR THE PAST**

**THREE YEARS:** (as per the data available in DCMSME website):

Centrifugal Pumps suction and delivery 150 mm x 150 mm	Value (Rs. Crore)		
	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>FY 2019-20</b>
	250.902274	218.119778	267.613395

• **SCOPE FOR THE NUMBER OF UNITS ON NUMBER OF YEARS CAN BE ESTABLISHED FURTHER:**

Year	2021-22	2022-23	2023-24
<b>In Gujarat</b>	1	1	1
<b>In Maharashtra</b>	1	1	1
<b>In Karnataka</b>	1	1	1
<b>In Andhra Pradesh</b>	1	1	1
<b>In Tamil Nadu</b>	1	1	1
<b>In Haryana</b>	1	1	1

<b>In Uttar Pradesh</b>	1	1	1
<b>In Madhya Pradesh</b>	1	1	1
<b>In Odisha</b>	1	1	1

- **THE DEMAND IN THE DOMESTIC MARKET:**

**Indian Pumps – Market Segmentation by Share in Value is as below:**

<b>Industries</b>	<b>Market Share</b>
Agriculture	27%
Building Services	19%
Water & Wastewater Management	17%
Power Generation	12%
Oil & Gas	8%
Metal & Mining	4%
Others	13%

Agriculture and Building Services comprise 46% of the market by value. Owing to increased consumption, the pump manufacturers have been concentrating only on the needs of the domestic market, mainly to the agriculture and building services. This segment of the Indian pump market is highly fragmented as well as competitive. The pump's market, especially in the agricultural segment, is dominated by the un-organised sector which offers products as much as 30-40% cheaper than that by the organised players. The biggest markets for agricultural pump sets are the central Indian states of Madhya Pradesh, Maharashtra, Tamil Nadu, Karnataka, Uttar Pradesh, Bihar and Andhra Pradesh.

The Industrial Sector comprises the remaining 54% of the market by value. This segment of the India pump market consists of sectors like Water & Sewage Treatment, Power Generation, Oil & Gas, Metals & Mining and Others. Being technologically intensive, it is a relatively hard sector for small and medium enterprises (SMEs) to penetrate.

Indian Pumps – Market Segmentation by Pump Type:

- Centrifugal Pumps: 95%
- Positive Displacement Pumps: 5%

The pump market in India by revenue is expected to grow at a CAGR of over 7% during the period 2021-2026. The following factors are likely to contribute to the growth of the

pump market in India during the forecast period: (1) Demand for Energy-efficient Pumps (2) Demand for Solar Pumps (3) Increased Export of Centrifugal Pumps and (4) Growth in the Agricultural Sector.

- **DEMAND OF THE EXPORT MARKET:**

The market volume of the Indian pump industry is approximate Rs 16,000 crore and the sector employs around 20 lakh people directly and indirectly. The share of Indian pumps and motors in the global market is around 2 per cent. The global centrifugal pump market is projected to reach a size of USD 48.8 billion by 2026, at a CAGR of 5.9%, from an estimated USD 36.6 billion in 2021. Increasing investments in construction industry attributing to rapid urbanization, and high demand for centrifugal pumps in the agricultural sector are the key factors driving the growth of the centrifugal pump market. According to the World Health Organization (WHO), half of the global population is expected to live in water-stressed areas by 2026. Hence, water and wastewater treatment infrastructures are expected to develop significantly worldwide in the coming years. Prominent countries in Asia Pacific, including China, Japan, and India, are witnessing increased population growth. Thus, the existing water resources in such countries are expected to be exhausted sooner or later. This, in turn, is projected to drive the demand for centrifugal pumps. The modular designs of wastewater treatment plants have also reduced the initial massive investments, making them economically-viable solutions. These plants can readily be expanded as the capacity requirements of wastewater flow and treatment plants increase. The growing global population and increasing water usage across multiple industries are expected to promote the establishment of new water treatment plants globally, thereby enabling the growth of the water and wastewater sector. This, in turn, is expected to fuel the demand for centrifugal pumps. Wastewater reuse is a key solution to overcome water insufficiency and meet the growing water requirements. Centrifugal pumps are used extensively in wastewater treatment plants to process used water. Thus, the growing number of global wastewater treatment plants is expected to increase the demand for centrifugal pumps.

The reasons for not increase in the demand for Centrifugal Pump ( governed by **IS: 6595**) at the expected level in domestic as well as export market are :

The market of the Centrifugal Pump is being replaced by Mono-set Pump as well as Horizontal/ Vertical Open well Submersible Pump due to following reasons:

1. The Centrifugal Pumps are being used either for specific industrial applications or

where electricity supply is not available. So, in the agricultural sector where electricity supply is not available these pumps are coupled with the prime mover other than electrical motor like Internal Combustion Engines like Diesel Engines. But since the Rural Electrification has considerably increased in the world, the demand of this centrifugal pump is not increasing up to expected level.

2. The Centrifugal Pumps are coupled with prime mover by means of flanged coupling, Love-joy coupling etc. types of coupling. In this type of the coupling the perfect alignment is required as the Prime Mover and Centrifugal Pumps are mounted on separate shafts. Any short of little misalignment will affect the performance of the pump i.e. it will reduce the flow rate (Q) or it will reduce the Total Head (TH) and it will increase the Pump Power Input (P) which will reduce the overall efficiency of the Pump. This happens also in the case when pump is driven by pulley through belt. While in Mono-set /Monoblock Pump, since the motor and the pump are mounted on the same shaft, this problem is eliminated. So, in certain circumstances, the market of the centrifugal Pumps is being replaced by Mono-set /Monoblock Pumps which are governed by **IS:9079**.

3. The use of Vertical as well as Horizontal Open well Submersible Pumps has also affected the demand of the Centrifugal Pump. The Open well Submersible Pumps are mounted on the bottom surface of the fluid tank source from which the fluid has to be lifted. Hence these type of the pumps are more efficient due to the submergence and also the fluid surrounding the pump acts as a coolant which will result in less power consumption of the motor. The Open Well Submersible Pumps are governed by **IS: 14220**.

#### **Technical details**

- **SECTOR IN WHICH THE PRODUCT IS FALLING:** Mechanical Industry
- **END USERS OF THE PRODUCTS/SECTORS:** The pumps are used in the industrial sector includes industries such as oil & gas, water & wastewater, mining & metal, power generation, chemicals, pharmaceuticals, pulp & paper, agriculture, automotive, food & beverage, textiles industries etc.. Centrifugal pumps are also used for dewatering activities in construction sites, production activities in oilfields (artificial lift), and water and sewage treatment plants, as well as in the manufacturing plants and sand, sludge & slurry removal in mines. The main sector in which this pump is used is agricultural sector used by farmers.

- **GOVERNING INDIAN SPECIFICATIONS:**

<b>Specification No.</b>	<b>Details of Specification</b>
IS:10981-1983	Code of Acceptance Test For Centrifugal, Mixed Flow And Axial Pumps-Class B
IS/ISO/TR 17766 : 2005	Centrifugal pumps handling viscous liquids- Performance corrections
IS 16537 : 2016 ISO 21049 : 2004	Pumps - Shaft sealing systems for centrifugal and rotary pumps
IS 15657 : 2006	Centrifugal pumps for petroleum, petrochemical and natural gas industries
IS 13538 : 1993	Centrifugal, mixed flow and axial pumps - Code for hydraulic performance tests - Precision class
IS 13518 : 1992	End - Suction centrifugal pumps (Rating 16 Bar) - Designation, nominal duty point and dimensions
IS 13139 : 1992	End - Suction centrifugal pumps - Baseplate and installation dimensions
IS 12699 : 1989	Selection, installation, operation and maintenance of jet centrifugal pump combination - Code of practice
IS 9694 : Part 1 : 1987	Code of practice for the selection, installation, operation and maintenance of horizontal centrifugal pumps for agricultural applications: Part 1 selection (First Revision)
IS 9694 : Part 2 : 1980	Code of practice for the selection, installation, operation and maintenance of horizontal centrifugal pumps for agricultural applications: Part 2 installation
IS 9694 : Part 3 : 1980	Code of practice for the selection, installation, operation and maintenance of horizontal centrifugal pumps for agricultural applications: Part 3 operation
IS 9694 : Part 4 : 1980	Code of practice for the selection, installation, operation and maintenance of horizontal centrifugal pumps for agricultural applications: Part 4 maintenance
IS 9137 : 2019	Code for Hydraulic Performance Acceptance Tests for Centrifugal, Mixed and Axial Flow Pumps — Class C ( First Revision )

IS 6595 : Part 1 : 2018	Horizontal centrifugal pumps for clear, cold water - Specification: Part 1 agricultural and rural water supply purposes (Fourth Revision)
IS 6595 : Part 2 : 1993	Horizontal centrifugal pumps for clear, cold water: Part 2 general purpose (Other than agricultural and rural water supply) - Specification (Second Revision)
IS 10572 : 1983	Methods of sampling of pumps
IS 11723 : 1985	Balancing of rotating rigid bodies
IS 10804 (part 1):2018	Recommended pumping system for agricultural purposes: part 1 Surface pumps (third revision)
IS 10804 (part 2):2018	Recommended pumping system for agricultural purposes: part 1 Submersible pump sets (third revision)
IS 11346 :2002	Code of acceptance tests for agricultural and water supply pumps
IS/ISO 21940-11 : 2016	Mechanical vibration-rotor balance : part 2 Procedures and tolerances for rotors with rigid behavior
IS:1520-1980	Horizontal pumps for clear, cold, fresh, water.
IS:1543-1964	Specification for Single Cylinder Fuel Injection Pumps
IS 1710 : 1989	Specification for Pumps - Vertical Turbine Mixed and Axial Flow, for Clear Cold Water
IS 2161 : 1996	Coolant pumps for general purpose machine tools – specification
IS 2254 : 1985	Dimensions of vertical shaft motors for pumps
IS:5120-1977	Technical requirements for rotodynamic special purpose pumps.
IS 5600 : 2002	Pumps - Sewage and Drainage – Specification
IS 5639 : 1970	Specification for Pumps Handling Chemicals and Corrosive Liquids
IS 5659 : 1970	Specification for Pumps for Process Water
IS 6070 : 1983	Code of practice for selection, operation and maintenance of trailer fire pumps, portable pumps, water tenders and motor fire engines
IS 6536 : 1972	Pumps for handling volatile liquids
IS 6595 : Part 1 : 2002	Horizontal Centrifugal Pumps for Clear, Cold Water - Specification - Part 1 : Agricultural and Rural Water Supply Purposes
IS 6595 : Part 2 : 1993	Horizontal centrifugal pumps for clear, cold water: Part 2 General purposes other than agricultural and rural water supply – Specification

IS 6596 : 1972	Specification for Pumps for Handling Paper Stock
IS 7538 : 1996	Three-phase squirrel cage induction motors for centrifugal pumps for agricultural applications
IS 8034 : 2002	Submersible Pumpsets – Specification
IS 8418 : 1999	Specification for Horizontal Centrifugal Self-Priming Pumps
IS 8472 : 1998	Pumps - Regenerative or clear, cold water – Specification
IS 9079 : 2002	Electric Mono-set Pumps for Clear, Cold Water for Agricultural and Water Supply Purposes – Specification
IS 9137 : 1978	Code for acceptance test for centrifugal, mixed flow and axial pumps - Class C
IS 9201 : 1987	Pumps for handling slurry
IS 9225 : 1979	Specification for Bicycle Air Pumps
IS 9283 : 1995	Motors for Submersible Pump sets – Specification
IS 9418 : 1980	Dimensions for Mounting Flanges for In-line Fuel Injection Pumps for Multi-cylinder Compression Ignition Engines
IS 9464 : 1980	Specification for Horizontal Centrifugal Pumps for Marine Use
IS 9542 : 1980	Horizontal centrifugal mono-set pumps for clear, cold, fresh water
IS 9772 : 1981	Specification for Air Operated High Pressure Grease Pumps
IS 9773 : 1981	Specification for Volume Grease Pumps
IS 10069 : 1992	Hydraulic fluid power - Positive displacement pumps, motors and integral transmissions - Determination of steady-state performance
IS 10129 : 2004	Hydraulic Fluid Power - Dimensions and Identification Code for Mounting Flanges and Shaft Ends of Displacement Pumps and Motors
IS 10596 : Part 1 : 1983	Code of practice for selection, installation, operation and maintenance of pumps for industrial applications: Part 1 Selection
IS 10596 : Part 2 : 1983	Code of practice for selection, installation, operation and maintenance of pumps for industrial applications: Part 2 Installation
IS 10596 : Part 3 : 1983	Code of practice for selection, installation, operation and maintenance of pumps for industrial applications: Part 3 Operation
IS 10596 : Part 4 : 1983	Code of practice for selection, installation, operation and maintenance of pumps for industrial applications: Part 4 Maintenance

IS 11053 : 1983	Process pumps
IS 11147 : 1984	Recommendations for parameter definitions and letter symbols for hydraulic fluid power pumps, motors and integral transmissions
IS 11341 : 1985	Specification for Covers for Deck Openings for Pumps for Inland Vessels
IS 11382 : 1986	Dimensions for stuffing box cavities of end-suction process pumps
IS 11501 : 1986	Specification for Engine Mono-set Pumps for Clear, Cold, Fresh Water for Agricultural Purposes
IS 11951 : 1987	Specification for Pump set for Desert Coolers
IS 12469 : 1988	Specification for Pumps for Fire Fighting System
IS 12717 : 1989	Functional requirements of fire fighting equipment - High capacity portable pump set
IS 13537 : 1993	Technical specification for centrifugal pumps class 2
IS 13593 : 1992	Specification for UPVC pipe fittings to be used with the UPVC pipes in the suction and delivery lines of agricultural pumps
IS 13876 : Part 3 : 1993	Guide for marking systems for fluid power components - Part 3 Pumps and motors
IS 14582 : 1998	Single-phase small A.C. electric motors for centrifugal pumps for agricultural applications
IS 14601 : 1998	Method for presenting performance data for hydraulic pumps
IS 14602 : 1999	Installation methods of positive displacement hydraulic pumps and motors – Guidelines
IS 14848 : 2000	Hydraulic Fluid Power - Pumps and Motors - Geometric Displacements
IS 15265 : 2003	Flexible PVC Pipes or Polymer Reinforced Thermoplastic Hoses for Suction and Delivery Lines of Agricultural Pumps – Specification
IS 15301 : 2003	Installation and Maintenance of Fire Fighting Pumps - Code of Practice
SP 58 : 1995	Handbook on Pumps for Drinking Water Supply
IS/IEC 41 : 1991	Field Acceptance Tests to Determine the Hydraulic Performance of Hydraulic Turbines, Storage Pumps and Pump Turbines
IS/ISO 4412-1 : 1991	Hydraulic Fluid Power - Test Code for Determination of Airborne Noise Levels - Part 1 : Pumps

- **GOVERNING INTERNATIONAL SPECIFICATION:**

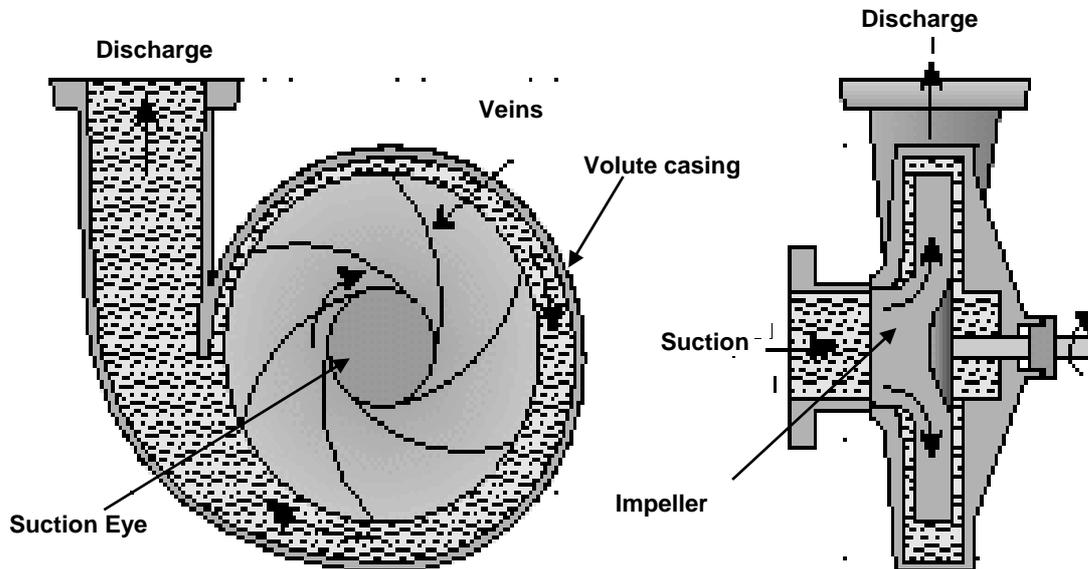
<b>Specification No.</b>	<b>Details of Specification</b>
DIN EN ISO 5199	Technical specifications for centrifugal pumps
ISO 9905:1994(en)	Technical specifications for centrifugal pumps — Class I
BS 5257:1975	Specification for horizontal end-suction centrifugal pumps (16 bar) - Principal dimensions and nominal duty point
ANSI/API 610-1995	Centrifugal Pumps for General Refinery Service
API STD 610	Centrifugal Pumps for Petroleum, Petrochemical, and Natural Gas Industries
API STD 682	Pumps - Shaft Sealing Systems for Centrifugal and Rotary Pumps
ASME B73.1-2001	Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process
ASME B73.2-2003	Specifications for Vertical In-Line Centrifugal Pumps for Chemical Process
ASME B73.3	Specification for Seal less Horizontal End Suction Centrifugal Pumps for Chemical Process

- **FLOW PROCESS CHART OF THE MANUFACTURING:**

**Working principle:**

A centrifugal pump is one of the simplest pieces of equipment in any process plant. Its purpose is to convert energy of a prime mover (a electric motor or turbine) first into velocity or kinetic energy and then into pressure energy of fluid that is being pumped. The energy changes occur by virtue of two main parts of pump, the impeller and the volute or diffuser. The impeller is the rotating part that converts driver energy into the kinetic energy. The volute or diffuser is the stationery part that converts the kinetic energy into pressure energy. The process liquid enters the suction nozzle and then into eye (center) of a revolving device known as an impeller. When the impeller rotates, it spins the liquid sitting in the cavities between the vanes outward and provides centrifugal acceleration. As liquid leaves the eye of the impeller a low pressure area is created causing more liquid flow toward the inlet. Because the impeller blades are curved, the fluid is pushed in a tangential and radial direction by the

centrifugal force. This force acting inside the pump is the same one that keeps water inside a bucket that is rotating at the end of a string. Figure shown below depict a side cross- section of a centrifugal pump indicating the movement of the liquid.



The key idea is that the energy created by the centrifugal force is kinetic energy. The amount of energy given to the liquid is proportional to the velocity at the edge or vane tip of the impeller. The faster the impeller revolves or the bigger the impeller is, then the higher will be the velocity of the liquid at the vane tip and the greater the energy imparted to the liquid.

This kinetic energy of liquid coming out of an impeller is harnessed by creating a resistance to the flow. The first resistance is created by the pump volute (casing) that catches the liquid and slows it down. In the discharge nozzle, the liquid further decelerated and its velocity is converted to pressure according to Bernoulli's principle. Therefore, the head (pressure in terms of height of liquid) developed is approximately equal to the velocity energy at the periphery of the impeller expressed by the following well-known formula:

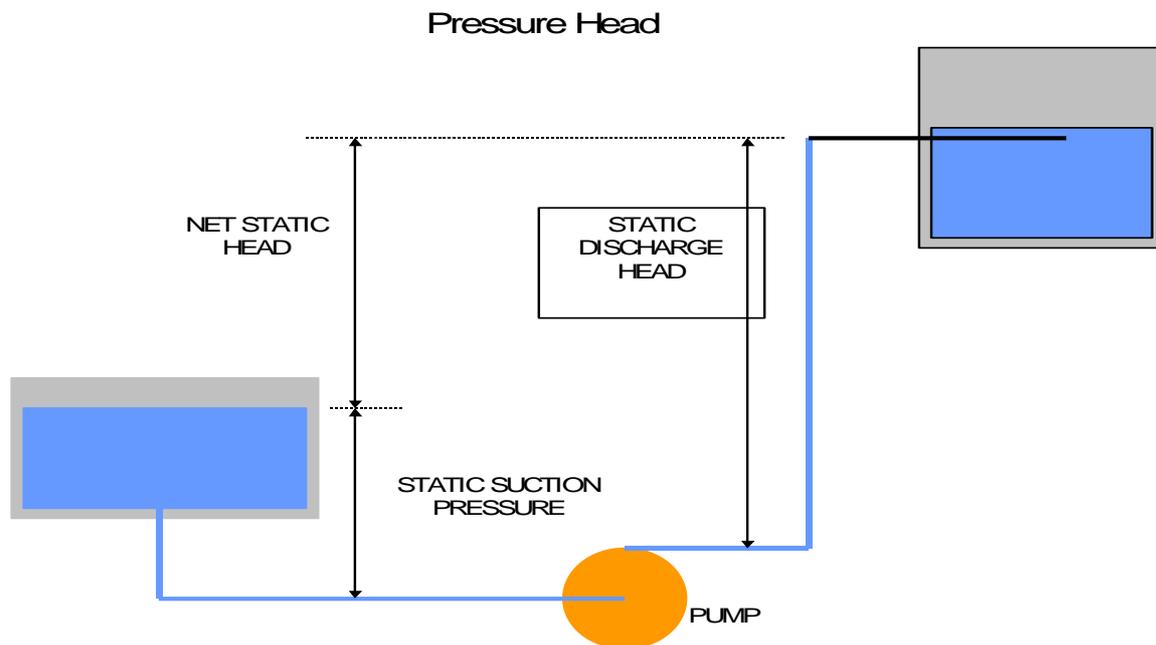
**Total head developed in meters**

**= Velocity Square divided by 2 X acceleration due to gravity.**

**( Velocity is at periphery of impeller in metre/ sec)**

The head can also be calculated from the reading on the pressure gauge attached to the suction and discharge line. One fact that must always be remembered: a pump does not create pressure, it only provides flow. Pressure is a just an indication of the amount of resistance to flow. The pump curves provide information relating to flow rate and pressure head developed by the pump at a different impeller sizes and rotational speeds. Centrifugal pump

operation should confirm to the pump curves supplied by the manufacturers.



### Pressure Heads:

#### Head:

- The vertical distance between two horizontal levels of liquid. A measure of the pressure exerted by a column or body of liquid because of the weight of the liquid. Since a pump may be installed above, at, or below the surface of the source of supply, the pump must be able to overcome the net static head in order to pump from one elevation to another.

#### Velocity head:

Head required to impart velocity to a liquid equivalent to the vertical distance through which the liquid would have to fall to acquire the same velocity.

#### Friction head:

- The force or pressure required to overcome friction is obtained at the expense of the static pressure head
- Unlike velocity head, friction head cannot be “recovered” or reconverted to static pressure head
- Thermal energy is usually wasted, therefore resulting in a head loss from the system

The flow pattern inside a centrifugal pump is very complex, three dimensional and often associated recirculation flow at inlet and exit, flow separation, cavitations, and so on. The

curvature of the blades and the rotational system has great influenced on the flow field.

**Manufacturing process:**

It can be categorized into four major activities.

1. Preparation of castings for pump body and other parts.
2. Machining of the static and rotational parts.
3. Assembling of pump.
4. Testing of the assembled pump.

The main components for assembling of the single stage centrifugal pump are listed below:

Sr. No.	Part name	Material
1	Impeller	Cast Iron
2	Shaft	CS/SS
3	Packing Gland	Cast Iron
4	Oil Seal	Al. seal with SS spring
5	Packing rope	Braided rope
6	Gland plate	Cast Iron
7	Impeller key	Alloy steel
8	Impeller lock nut	Brass
9	Pump casing	Cast iron
10	Packing gland/ gland plate stud with nut	Mild steel

Sr. No.	Part name	Material
11	Suction flange washer	Rubber
12	Suction flange	Cast iron
13	Delivery flange washer	Rubber
14	Delivery flange	Cast iron
15	Terminal box	Cast iron
16	Terminal box cover	Cast iron
17	Suction flange stud with nut	Mild steel
18	Delivery flange bolt with nut	Mild steel
19	Pump casing/ gland plate stud with nut	Mild steel
20	Gland plate / front cover plate stud with nut	Mild steel

**Volute Casing** : made of Gray Cast Iron, Ductile Cast Iron, Cast Steel etc. Castings are brought from the foundries and are machined in machine shop.

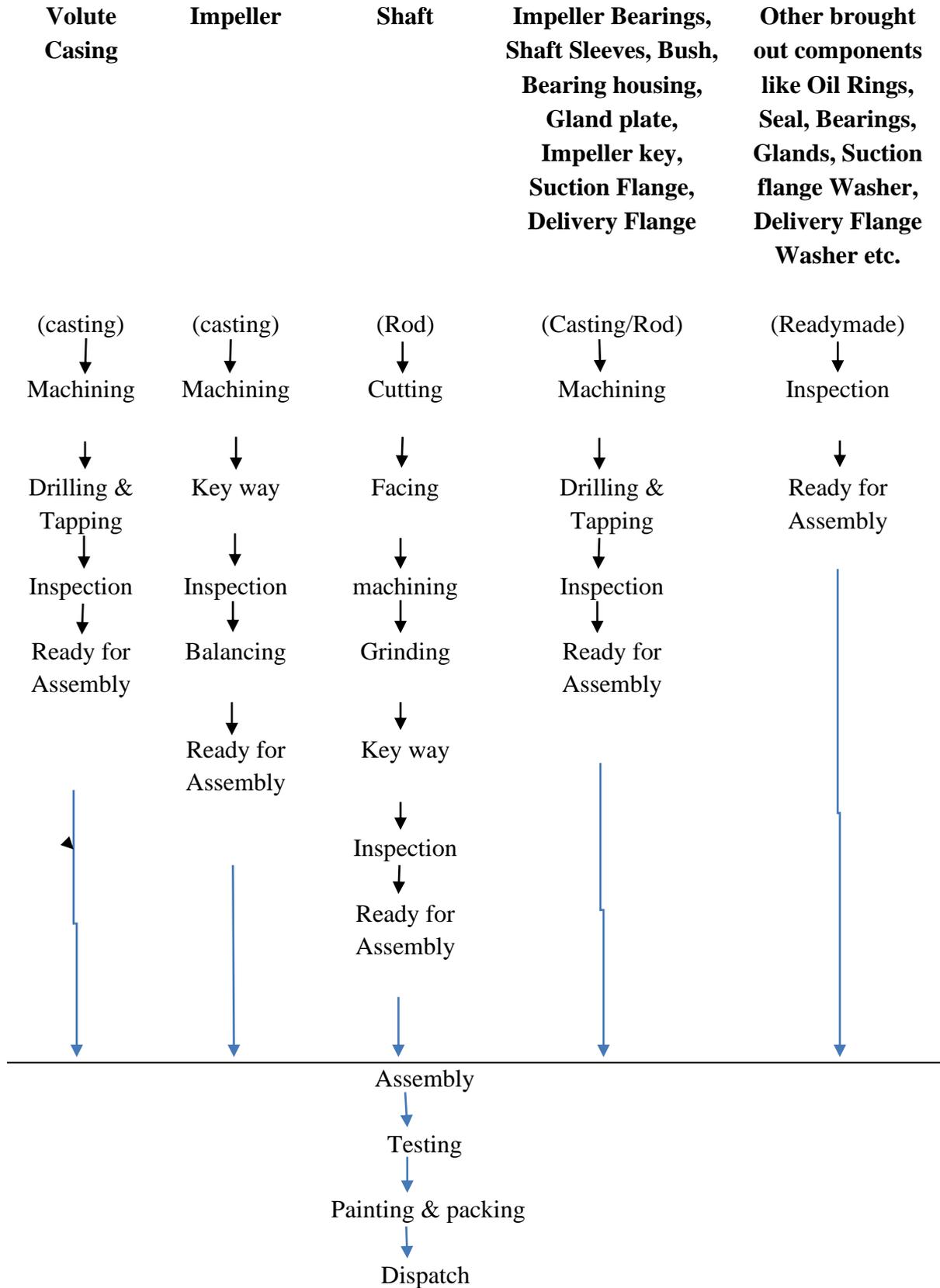
**Impeller**: made of Bronze, Gary Cast Iron, Silicon Brass, Stainless Steel etc.

**Shaft**: made of Stainless Steel, Carbon Steel etc.

**Other Components**: Impeller Bearings, Shaft Sleeves, Bush, Gland plate, Impeller key, Suction Flange, Delivery Flange etc. made of Cast Iron/ Bronze/ Stainless Steel etc.

**Brought out Items**: Oil Rings, Seal, Bearings, Glands, Suction flange Washer, Delivery Flange Washer etc.

## FLOW PROCESS CHART



- **QUALITATIVE PARAMETERS OF THE PRODUCT** : The qualitative parameters are:

1. Rated Total Head (TH) in Meters
2. Rated Discharge (Q) in Liters per Second (lps)/ Liters per Minute (lpm)/ Liters per Hours (lph)
3. Head Range in Meters
4. Pump Power Input (P) in kW
5. Pump efficiency in %

- **DETAILS OF THE PRODUCT LICENSES TO BE OBTAINED:**

1. IS 6595 : Part 1 : 2018 and 2. IS 6595 : Part 2 : 1993

- **EQUIPMENTS REQUIRED FOR MANUFACTURING OF THE PRODUCT:**

1. Hacksaw machine
2. CNC Lathe machine
3. Milling machine
4. Slotting machine
5. Lathe Machine
6. Drilling Machine
7. Tools and gauges
8. Storage racks and trolleys

- **TEST FACILITIES REQUIRED FOR THE PRODUCT:**

S.N.	Name of Equipment	Test/Cl. for reference	Qty.(Nos.)
1.	Hydraulic Testing machine	Hydrostatic test of casing	1
2.	Impeller Balancing Machine	For balancing impeller	1
3.	Micrometer , Vernier caliper, Dial Bore Gauge, Snap gauge	For various Dimensional measurements	1 set
4.	Electric magnetic flow meter & Piping & valves	Discharge measurement	1 set

5.	Pressure gauge (0-600 meter)	Discharge pressure	3
6.	Vacuum gauge ( 0-760 mm)	Suction lift measurement	2
7.	Tachometer 0-10000 RPM	Measurement of RPM	1
8.	KW meter 180 AMP – 54KW	Wattage measurement	1set
9.	Volt meter	Voltage measurement	
10.	Frequency meter	Frequency measurement	
11.	Ampere meter	Current measurement	
12.	Power factor meter	Power factor measurement	
13.	Powerstat	To vary the voltage	

**THE TECHNOLOGY BEING USED FOR THE MANUFACTURING OF THE PRODUCT :**

Early days, low technology was used in different stages of manufacturing. Now industry is taking help of modern technology and materials for manufacture of more efficient and durable pumps. Medium scale and few small scale enterprises are equipped with Automatic PLC controlled furnaces, CNC Turning centers, CNC Vertical machining centers, CNC EDM wire cut machines, CNC special purpose machines, Test Rigs with sophisticated controls and instruments.

The essential requirements for a successful pump installation are performance and life. Performance is the rating of the pump-Total Head, Discharge and Efficiency. Life is the total number of hours of operation before one or more pump components must be replaced to maintain an acceptable performance. Initial performance is the responsibility of the pump manufacturer and is inherent in the hydraulic design. Life is primarily a measure of the resistance of the material of construction to corrosion, erosion, or a combination of both under actual operating conditions.

The selection of the most economic material for any particular service, however, requires a knowledge of not only the pump design and manufacture, but also of the erosion-corrosion properties of the materials under consideration when subject to the velocities actually encountered in the pump. Very little corrosion data exists on the effects of the velocities

encountered in centrifugal pumps for liquids other than seawater. Despite this limitation, experience has provided the designer of pumping systems with a specialized branch of metallurgical and corrosion engineering adequate for most pumping problems. Factors that lead to a long pump life are:

1. Neutral liquid at low temperature
2. Absence of abrasive particles
3. Continuous operation at or near the maximum efficiency and capacity of the pump.
4. An adequate margin of available NPSH over the NPSH required as stated on the pump manufacturer's rating curve.

Any pumping installation that satisfies all these criteria will have a long performance life. A typical example would be a waterworks pump. Some waterworks pumps with bronze impellers and cast iron casings have performance life of 50 years or more. At the other extreme would be a chemical pump handling a hot corrosive liquid with abrasive particle carried in suspension. Here the performance life might be measured in months rather than in years despite the fact that the construction has been selected based upon the most resistant materials available.

Most pumping applications lie somewhere between these two extremes. Aside from straight corrosion or erosion from abrasive particles in the fluid, the greatest single factor that reduces the performance life is operation at flows other than the maximum efficiency or rated capacity of the pump. The vane angle of the impeller is designed to match the fluid angles at the maximum efficiency. At flows other than the rated capacity the fluid angles no longer match the vane angles and separation occurs with increasing intensity as the operating point moves away from the maximum efficiency capacity. The destruction of the impeller vanes is particularly severe at the inlet to the impeller, as this is the point of lowest pressure in the pump. In addition to surface damage to the inlet vanes from separation, localized cavitation damage may occur during sustained operation at capacities less than 50 percent of maximum efficiency capacity. This means not to say that these pumps can not operate under these adverse operating conditions, but their performance life is considerably less than the same pump operating at or near its maximum efficiency capacity.

Cavitation erosion is major problem in the pumps. To overcome cavitation erosion problem, special materials & design will be used for manufacture of impellor, casing and other main parts. Depends of the application and intensity of erosion, material like Cast Iron, Cast

Steel, all Bronze, Manganese Bronze, Nickel Aluminium Bronze, Monel, Stainless Steels grades 304/316, Titanium (TT), PP – Polypropylene, PVDF - Polyvinylidene Fluoride are used for manufacturing of the pumps.

### **SUGGESTED MODERN TECHNOLOGIES AVAILABLE IN THE MARKET FOR ADOPTION :**

Large section of Micro and Small Scale Enterprises have not adopted latest manufacturing methods like automatic welding, Special purpose machines for assembling, presses, Process controlled test rigs, Computer Numerical Controlled machines for Machining of components, etc. Indian Industry is not yet utilizing modern Software tools / software / rapid prototyping tools for designing and analysing the design in all respects before releasing for manufacturing / assembling. Adequate Skilled manpower like Designers / fitters / machinists / experts is not readily available.

### **Present status of quality standards adopted by small-scale units for the products, raw materials and testing methods:**

To produce the reliable Centrifugal pumps, stringent process control measures are required to be adapted. Pump manufacturing unit shall have adequately equipped and continuously upgraded facilities include research and development, physical and chemical laboratories, pump performance-testing laboratories, to ensure high quality standards. Unit shall also employ qualified operators / Inspectors/ staff/quality team, who will ensure quality at all stages of manufacture and also at place of installation (i.e after sales services). The unit shall follow / provide facilities for ISO Procedures, BIS codes, etc.

Specifications are formulated for all types of the pumps. National and international bodies are also doing regular reviews of the specifications. List of the national and international standards / specifications are already listed in this report. Manufacturers should ensure that their products are being manufactured as per the specification laid down in the respective standards of the product. Pump testing ensures that the tested pump would meet the intended application or intended use. The test parameters that require for identifying the performance or quality of the pump are: speed of rotation, pressure, outlet volume and velocity of the flow, total head, loss of total head at inlet/outlet, Net positive Suction Head (NPSH), pump power output/input, pump efficiency, cavitation test etc.

The quality tests are intended to ascertain the performance of the pump and to compare this with the manufacture's guarantee. The following one or more parameter are generally guarantees the product:

1. Discharge of pump.

2. Total Head of pump
3. Power Input or efficiency of pump or combined motor pump unit (for example submersible pump or mono-set pumps, or separate pump or motor with overall efficiency guaranteed)

**Needs of Industry regarding technology and testing facilities:** Most of the centrifugal pump manufacturers are having obsolete process technology / machinery. They are not able to compete with global players and also demand of domestic market. To improve productivity and to reduce the manufacturing cost, industry should adopt modern machinery / process /testing system etc.

Industry needs Common Facility Centers (CFC) at various parts of the country, which can be based on the concentration of the pump manufacturing units. This CFC can be established with private and public partnership (PPP model). Centers shall have the facilities like latest software tools (ex; Computer Aided Design, Computer Aided Machining, FE analysis software, flow analysis, material analysis), Rapid prototyping Machine, Computer Aided Machines, Casting / forging Facilities, NDT testing / certification and other R&D facilities. ISI marks for products will create goodwill of the unit in the market and will ensure energy efficient product to the customer. Industries should go for ISI marking on their product. Industry is not meeting demand of Special application pumps (ex: highly abrasive pumping application, atomic power generation application). Industry should adopt special materials like ceramic coated impeller and casings.

Research and developing activities –Designing, design analyzing, testing of the product is being carried out manually by most of the MSEs adopting traditional methods / manual calculations. Industry is using conventional machining methods for manufacturing of the components and manual/traditional assembling methods which consume more time in execution of the order. Hence Micro and Small Enterprises are loosing the orders to Medium / Large Enterprises.

**Domestic and International competition:** Specifically Micro and Small Enterprises are facing cutthroat competition in the market. Raw material price is highly sensitive. Medium and Large scale industries are producing products with sophisticated machines and methods with high productivity as a result they are releasing more models of pumps with high quality, and competitive price.

The main challenges in front of the Micro and Small enterprises are lower volume, fragmentation, inadequate R&D technology support, lower productivity levels, limited resources for international marketing and establishment of an inefficient supply chain.

Compared to rest of the world, most of the Indian pump manufacturers have not adapted modern manufacturing management tools (i.e Six Sigma, Total Productive Management, 5 S, Total quality management, Quality Control / statistical tools, Material Resource Planning Software.

**Training Needs:** Presently industry is facing 15 % to 20 % of employee turn out rate. It is expected that this percentage may increase in coming years. More turnout rate is experienced by ancillaries like foundries / casting industries, where more manpower is required. Hence ancillaries are not able to deliver sufficient quantity of the products / raw material required by the industry with good quality.

Industry requires semi skilled and skilled manpower. It is necessary to impart product/process oriented training to unemployed youth (even school dropouts). Local technical education institutes (Like it is, Polytechnics, Engineering collages) and Government Industrial developments / Intitutions should jointly organize training programmes for the urban / semi urban unemployed youth on pump manufacturing related activities (like winding, foundry, machining, assembling, packing etc)

- **RAW MATERIAL REQUIRED AND AVAILABILITY** : Raw material used for manufacturing of centrifugal pumps are Steel castings, Cast Iron castings, Mild Steel, Bronze, Brass, Iron castings, Stainless steel, Special type of plastics, Titanium, Bearings, and other hardware are available in local market where pump industry is situated. After the Pandemic Corona the pump industry is also trying to limping back to normalcy, but there is a acute price rise of nearly 10 % on all short of raw materials and cost of the raw materials is shooting up day by day. The increase in the price of Diesel has increased the transportation cost of raw materials as well as finished goods. Hence this industry is compelled to increase its Sale Price. Hence industry is not able to face cut thought competition in the market.

- **INDIAN /INTERNATIONAL STANDARDS COVERING RAW MATERIALS:**

IS 210 : 2009	Specifications for Grey Iron Castings (Third Revision)
IS 318 : 1981	Specifications for Leaded Tin Bronze Ingots and Castings (Second Revision)
IS 1570 (Part 2, Section 1): 1979	Schedule for Wrought Steels: Part 2 Carbon Steels (unalloyed steels), Section 1 Wrought products (other than wires) with specified chemical composition and related properties (third revision)

IS 1570 (Part 5) : 1985	Schedule for wrought steels: Part 5 Stainless and heat resisting Steels (second revision)
IS 5120 : 1977	Technical requirements for rotodynamic special purpose pumps (first revision)
IS 1875 : 1992	Carbon steel billets, blooms, slabs and bars for forgings – specification
IS 6911 : 2017	Stainless steel plate, strip and sheet-specification
IS 6603 : 2001	Stainless steel bars and flats-specification

**PROJECT REPORT ON MANUFACTURING OF CENTRIFUGAL PUMP**  
**SUCTION 150 MM X DELIVERY 150 MM**

1. **Activity** : manufacturing of Centrifugal Pump
2. **NIC code of the product** : 28132
3. **Quality Standards:** 1. IS 6595 : Part 1 : 2018 and 2. IS 6595 : Part 2 : 1993
4. **Production Capacity:** Per Annum

Name	Quantity (Nos)	Rate (Rs.)	Total (Rs.)
Centrifugal Pump Suction and Delivery 150 mm X 150mm	6000	20,000/-	12,00,00,000/-

5. **Month and Year of preparation** : April, 2021
6. **Prepared by:** MSME Development Institute, Ahmedabad

**(A) INTRODUCTION:**

Centrifugal pumps are widely used devices to lift and supply water or other liquids to distant locations. There are various type of centrifugal pumps used for different purposes like industrial, domestic, agricultural etc. Prime mover can be either diesel engine or electric motor. The running cost of electrical driving is less than the diesel engine.

**(B) MARKET :**

The industrial sector includes industries such as oil & gas, water & wastewater, mining & metal, power generation, chemicals, pharmaceuticals, pulp & paper, agriculture, automotive, food & beverage, textiles industries. Centrifugal pumps are used for dewatering activities in construction sites, production activities in oilfields (artificial lift), and water and sewage

treatment plants, as well as in the manufacturing plants and sand, sludge & slurry removal in mines.

**(C) BASIS AND PRESUMPTIONS :**

- (i) The basis for calculation of production capacity is normally on single shift basis on 75 % capacity utilisation
- (ii) On the basis of single shift working for 300 days in the year, the expected capacity utilisation is 60 % in the 1<sup>st</sup> year, 65 % in the second year, 70 % in the third year and 75 % in the fourth year of production, 100 % in the fifth year of production. So, unit will achieve full capacity utilisation in the 5<sup>th</sup> year of production and onwards.
- (iii) The provision for salaries and wages are kept on the basis of prevailing standard paid in the similar industries.
- (iv) Interest on the total capital investment is taken @ 12 % at an average as prevailing at the time of preparation of this project. However this figure is likely to vary accordingly depending upon the financial outlay of the project, financing agency and the location of the unit.
- (v) The cost of the machinery and equipment are indicative and the prices are approximately those at the time of preparation of this project.
- (vi) Margin money is recommended 25 % of the total capital investment required at an average. However % of margin money is likely to vary with bank at discretion.
- (vii) The break even point in the project has been calculated on the basis of full capacity utilisation.
- (viii) The provision made on other aspects viz. raw material, personnel, utilities, rents, overheads etc. are drawn on the basis of standard operation and average output and the cost indicated against each are approximate and based on local market conditions and vary according to product design, production, programme, organisational set up and the location of the unit.
- (ix) Non-refundable deposits, project implementation costs etc. whenever needed may be considered under the pre-operative expenses.
- (x) The sale price indicated is exclusive of the applicable taxes.

**(D) IMPLEMENTATION SCHEDULE:**

The major activities in the implementation schedule of the project is detailed as below. The unit can be implemented within 6 months from the serious initiation of project work.

S.N.	Activities	Time required in months
1.	Preparation of Project and site selection	Two Months
2.	Arrangement of finance	One Month
3.	Acquisition of premises and construction, Registration and other formalities	One month
4.	Procurement, installation, commissioning and trial run of the machinery, recruitment of manpower	Two Months
<b>Total</b>		<b>Six Months</b>

**(E) TECHNICAL ASPECTS:**

**(I) Process Outline: Manufacturing process:** It can be categorized into four major activities.

1. Preparation of castings for pump body and other parts.
2. Machining of the static and rotational parts.
3. Assembling of pump.
4. Testing of the assembled pump.

**(II) Quality Standards:** 1. IS 6595 : Part 1 : 2018 and 2. IS 6595 : Part 2 : 1993

**(III) Production capacity per annum:**

Name	Quantity	Rate (Rs.)	Total (Rs.)
Centrifugal Pump Suction and Delivery 150 mm X 150mm	6000 nos	20000/-	120000000/-

**(iv) Approximate Motive Power required :** 40 H.P. (30 kW)

**(v) Pollution Control Needs:** Not required.

**(vi) Energy Conservation Needs :** not required.

**(F) FINANCIAL ASPECTS:**

**1. Fixed Cost:**

**(I). Land & building**

(i) Company proposes to acquire 120 Sq. Meter of land @Rs. 3000 per Sq. Meter so the value of the land is = Rs. 360000

(ii)The total built up area = 100 Sq. Meter @ Rs. 11400 per Sq. Meter so the total cost of

construction is = Rs. 1140000

So the total cost of land and building is= Rs. 360000+ Rs. 1140000 = Rs.1500000

**(II).MACHINERY AND EQUIPMENTS:**

S.N.	Particulars	UOM	Qty.	Rate (Rs.)	Total value (Rs.)
	<b>Main Machines/ Equipment</b>				
1	Hacksaw machine 600 mm stroke	Nos	2	40000	80000
2	Lathe machine (300mm center height X 800mm bed length)	Nos	2	350000	700000
3	Universal Milling machine	Nos	1	250000	250000
4	Slotting machine	Nos	2	35000	70000
5	Lathe Machine (150mmcenter height X 1000mm bed length)	Nos	3	75000	225000
6	Pillar type Drilling Machine (25mm capacity)	Nos	2	40000	80000
7	Motor Testing Apparatus	LS	2	15000	30000
8	Pump Test system as per BIS (As listed below),	Nos	1	1723000	1723000
<b>Sub Total:</b>					<b>3158000</b>
	<b>Tools and Ancillaries</b>				
1	Tools, Jigs, Fixtures and Gauges	LS	1	70000	70000
2	Misc. Tools etc.	LS	1	30000	30000
<b>Subtotal:</b>					<b>100000</b>
	<b>Fixtures and Elect Installation</b>				
1	Storage racks and trolleys	LS	1	25000	25000
2	Other Furniture	LS	1	20000	20000
3	Telephones/ Computer	LS	1	30000	30000
4	Electrical Installation	LS	1	140000	140000
<b>Sub Total:</b>					<b>215000</b>
	<b>Other Assets/ Preliminary and Preoperative Expenses</b>	LS	1	120000	120000
<b>Total Plant &amp; Machinery Cost</b>					<b>3593000</b>

**List of Test Equipments:** (Details of above item no. 11 for Pump test as per IS)

Sl. No.	Name of Equipment	Test/Cl. for reference Remarks	Qty.(Nos.)	Cost (Rs.)
1.	Hydraulic Testing machine	Hydrostatic test of casing	1	50000
2.	Impeller Balancing Machine	For balancing impeller	1	100000
3.	Micrometer , Vernier caliper, Dial Bore Gauge, Snap gauge	For various Dimensional measurements	1 set	55000
4.	Electric magnetic flow meter & Piping & valves	Discharge measurement	1 set	300000
5.	Pressure gauge (0-600 meter)	Discharge pressure	3	25000
6.	Vacuum gauge (0-760 mm)	Suction lift measurement	2	30000
7.	Tachometer 0-10000 RPM	Measurement of RPM	1	8000
8.	KW meter 180 AMP – 54KW	Wattage measurement	1 set	1155000
9.	Volt meter	Voltage measurement		
10.	Frequency meter	Frequency measurement		
11.	Ampere meter	Current measurement		
12.	Power factor meter	Power factor measurement		
13.	Powerstat	To vary the voltage		
			<b>Total:</b>	<b>1723000</b>

**(2) WORKING CAPITAL:**

**(A) Total Recurring Expenditure per Month:**

**I. Personnel (per month) :**

S.N.	Personnel	Nos.	Rate (Rs.)	Total (Rs.)
1.	Manager	1	50000	50000
2.	Supervisors	2	25000	50000
3.	Skilled Workers	4	18000	72000
4	Semi-skilled /Unskilled Workers/Helpers/peon	4	8000	32000

5	Accountant-cum-Clerck	1	12000	12000
			Sub Total	216000
			Add other perquisites @ 15%	32400
			<b>Total</b>	<b>248400</b>

**II. Raw material (per month) :**

S.N.	Name of Raw Material	Qty.	Rate (Rs.)	Total (Rs.)
1.	C.I. Castings	40 T	70000/T	2800000
2.	Steel Rod	6 T	100000/T	600000
3.	Bronze	4T	600000/T	2400000
4.	Other Brought out items	Lump sum		2500000
			<b>Total</b>	<b>8300000</b>

**III. Utility (per month) :**

1.	Electricity : 6000 units @ Rs. 8.00 per unit:	48000
2.	Water	1000
		<b>Total</b>
		<b>49000</b>

**IV. Other contingent Expenses (Rs. per Month):**

1.	postage stationary & telephone	5000
2.	Repair & maintenance	50000
3.	Selling & marketing	10000
4.	Traveling & transport	50000
5.	Insurance	8000
6.	Maintenance and Calibration charges	28700
7.	miscellaneous	10000
		<b>Total</b>
		<b>161700</b>

**So, Total recurring expenses per month :**

1.	cost of personnel per month	248400
2.	cost of raw material per month	8300000
3.	cost of utility per month	49000
4.	cost of other contingent expenses per month	161700
		<b>Total</b>
		<b>8759100</b>

**Total working capital requirement** = 3 months total recurring expenditure X 8759100  
= **26277300**

**(3) Total Capital Investment** = (1) Fixed cost + (2) working capital  
= 3593000 + 26277300  
= **29870300**

**V. Cost of production per year in (Rs.):**

<b>1</b>	Recurring cost per year	105109200
<b>2</b>	Depreciation on building @5 %	57000
<b>3</b>	Depreciation on machinery and equipments @ 10%	359300
<b>4</b>	Interest on capital investment @ 12%	3584436
<b>Total cost of Production</b>		<b>109109936</b>

**VI. Turn Over per year** = Sale price Rs. 20000 per pump X 6000 pump per year  
= **12000000**

**VII. Net Profit per year** = Turn over per year- Cost of production per year  
= 120000000-109109936  
= **10890064**

**VIII. Rate of Return** = Net profit per year\*100/Total Capital investment  
= 10890064\*100/29870300 = **36.45 %**

**IX. Net Profit Ratio** =Net Profit per year\*100/Turnover per year  
= 10890064\*100/120000000=**9.07 %**

**X. Break Even Point:**

**(i) Fixed Cost:**

(a) Depreciation=416300

(b) Interest on total investment=3584436

(c ) 40 % of salaries and wages: 0.4\* 2980000 =1192320

(d) 40 % of other contingent expenses= 0.4\*12\*161700=776160

**Total fixed cost=5969216**

**XI. Break Even Point** = Fixed cost\*100/(Fixed cost+ profit)  
= 5969216\*100/(5969216+10890064)  
= **35.40 %**

## **XII. LIST OF MACHINERY SUPPLIERS:**

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. Some of the machinery and dies and tooling suppliers are listed here below:

1. Techno Machine  
Chikkanahalli Road, Opp. Shahi Exports (Unit No 6), Near Annapoorneshwari Temple,  
Bommanahalli, BENGALURU-560 068, INDIA
2. S. S. Engineering Works  
Plot No. 100, Sector 6 IMT Manesar, Gurgaon - 122050, Haryana, India
3. Taurus Private Ltd Co  
No. 24, D 2 / E 3, Kiab Industrial, Area At Pivele  
Kiab Industrial Area, Bengaluru – 560100 Karnataka, India
4. S. G. Profile  
Plot No. 201/1, Gala No. 56, Morya Industrial Estate, MIDC, Bhosari, Bhosari Midc,  
Pune-411026, Maharashtra, India

The above list of machine supplier is illustrative. There are many machinery, dies and tools suppliers and consultants at several industrial clusters all over India where you may find suppliers of services and machinery for a chosen product mix. Other well known machine manufacturers can be searched from directories/ internet.

### **• NAME OF THE RAW MATERIAL SUPPLIERS**

1. Baba Ferrocast  
Plot No. 416 Road No10 Kathvada G.Idc Ahmedabad Gujarat
2. Bhavesh Enterprises  
Narela Road, Piao Maniyari, Kundli, Dist. Sonapat-131028, Haryana
3. Biswakarma Patterns & Engineering Works  
Light area 123 industrial area, Bhilai
4. Brakes India Private Limited  
Shoilinghur -India-631102
5. Drashti Casting And Forging  
Plot No 1706/9-10-11 G I D C Estate Halol. Halol-389350  
Panchmahal-Gujarat

6. Drashti Casting And Forging  
Plot No 1706/9-10-11 G I D C Estate Halol. Halol-389350, Panchmahals, Gujarat.

**DETAILS OF TEST FACILITIES AVAILABLE IN INDIA:**

**1. IS 6595 Part: 1 2018 - HORIZONTAL CENTRIFUGAL PUMPS FOR CLEAR, COLD, FRESH WATER FOR AGRI CULTURAL PURPOSES**

Sl No.	Name of the Recognized Laboratory	Lab Code
1	<b>Darshan Electrical Testing &amp; Research Laboratory</b> At. Haldala, Near Water Pump Rajkot-363650 Gujarat Contact : Manish V. Sanghani Tel : 9824451162 Email: <a href="mailto:detr1@darshan.ac.in">detr1@darshan.ac.in</a>	7165436
2	<b>Electrical Research &amp; Development Association</b> P.B. No. 760, ERDA Road, GIDC, Makarpura Industrial Estate Vadodara-390010 Gujarat Contact : Hitesh R Karandikar, Director-Mob:09978940911 Tel : 0265-2642942,964,377 Fax : 0265-2648382 Email: erda@erda.org, vinod.gupta@erda.org, <a href="mailto:mitesh.prajapati@erda.org">mitesh.prajapati@erda.org</a>	7101125
3	<b>MSME Development Institute</b> 386, Patel Road Ramnagar Coimbatore-641009 Tamilnadu Contact : M. Sateesh Kumar, CEO Tel : 9443829389 Fax : 0422-2230426 Email: brdcdi- <a href="mailto:coim@dcmsme.gov.in">coim@dcmsme.gov.in</a>	6105534
4	<b>NSIC Technical Services Centre</b> 80 Ft. Road, Near Bhavnagar Road Crossing, Aji Industrial Area	7104734

	Rajkot-360003 Gujarat Contact : Shri Ram Kumar Yadav, DGM Tel : 0281-2387613,2387396 Fax : 0281-2387729 Email: <a href="mailto:ntscraj@nsic.co.in">ntscraj@nsic.co.in</a>	
5	<b>Scientific &amp; Industrial Testing &amp; Research Centre</b> 83 & 84, Avarampalayam Road, K.R. Puram P.O. Coimbatore-641006 Tamilnadu Contact : Sh.A.M. Selvaraj, Joint Director Tel : 0422-2562612,2560473 Fax : 0422-2562612 Email: <a href="mailto:sitarcinfo@sitarc.com">sitarcinfo@sitarc.com</a>	6104904
6	<b>The National Small Industries Corporation Ltd</b> Technical Service Centre, Sector B-24, Gindy Industrial Estate, Ekkaduthangal Chennai-600032 Tamilnadu Contact : Shri N.K. Subramani, DGM Tel : 044-22251254 Fax : 044-22254500 Email: <a href="mailto:nsic_energy@nsic.co.in">nsic_energy@nsic.co.in</a>	6135404

**IS 6595 Part: 2 1993 - HORIZONTAL CENTRIFUGAL PUMPS FOR CLEAR, COLD WATER-GENERAL PURPOSES OTHER THAN AGRICULTURAL & RURAL**

S. N.	Name of the Recognized Laboratory	Lab Code
1	<b>Electrical Research &amp; Development Association</b> P.B. No. 760, ERDA Road, GIDC, Makarpura Industrial Estate Vadodara-390010 Gujarat Contact : Hitesh R Karandikar, Director-Mob:09978940911 Tel : 0265-2642942,964,377 Fax : 0265-2648382 Email: erda@erda.org, vinod.gupta@erda.org, <a href="mailto:mitesh.prajapati@erda.org">mitesh.prajapati@erda.org</a>	7101125
2	<b>The National Small Industries Corporation Ltd</b> Technical Service Centre, Sector B-24, Gindy Industrial Estate, Ekkaduthangal	6135404

Chennai-600032 Tamilnadu Contact : Shri N.K. Subramani, DGM Tel : 044-22251254 Fax : 044-22254500 Email: <a href="mailto:nsic_energy@nsic.co.in">nsic_energy@nsic.co.in</a>	
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## **SCHEMES AND CONSULTANCY SERVICES:**

- **EXISTING SCHEMES AVAILABLE AND THEIR DETAILS:**

### **1. CREDIT LINKED CAPITAL SUBSIDY SCHEME**

**Objectives:** To facilitate technology to MSEs through institutional finance for induction of well established and proven technologies in the specific sub-sector/products.

**Eligibility/ Applicability :**

1. Any Micro and Small Enterprise (MSE) availing institutional credit to buy new Plant & Machinery approved under the scheme.
2. Special Benefits- In case of SC/ST, Women, NER / Hill States / Aspirational Districts / LEW Districts, the subsidy shall be admissible for investment in acquisition /replacement of Plant & Machinery /equipments & Technolog up-gradation of any kind (Core plant & Machinery). Second hand & fabricated will not be eligible

**Nature of Assistance :**

Upfront subsidy of 15% on institutional Credit upto Rs. 1.0 Crore (i.e. subsidy cap of Rs. 15.00 lakh) for identified sectors/ subsectors/ technologies

**How to Apply :**

Applicant meeting the eligibility criteria may approach to loan lending bank branch / PLI, on behalf of applicant the lending bank branch will examine & apply for subsidy claim through a dedicated online application & tracking management System (MIS), the application will reach to the Ministry through 11 nodal Banks / Agencies. These are SIDBI, NABARD, SBI, BoB, PNB, BOI, TIICL, Andhra Bank, Corporation Bank, Canara Bank and Indian Bank.

**Contact :**

Loan lending bank branch or Nodal Banks /Agency under the scheme and MSME-Development Institutes under Office of Development Commissioner.

## 2. CREDIT GUARANTEE FUND TRUST SCHEME FOR MSES AND NEW ENTREPRENEURS

**Objective:** Credit Support

**Eligible Condition:** Existing Micro, small & service entrepreneur all are eligible.

**Nature of Scheme:** The scheme is implemented by Credit Guarantee Trust for MSE (CGTMSE);

**Detailed Information:**

- Credit guarantee for loans upto 200 lakh for loan up to R. 2.00 Crore without collateral and third party guarantee:
- Guarantee coverage ranges from 85% (Micro Enterprise up to Rs. 5 lakh) to 75% (others);
- Recently, guarantee coverage made eligible to select NBFCs and small Finance banks;
- The extent of guarantee cover is 50% of the sanctioned amount of the credit facility for credit from Rs. 10 lakh to Rs. 100 Lakh per MSE borrower for retail trade activity.
- The extent of guarantee cover is 50% of the sanctioned amount of the credit facility for credit from Rs. 10 Lakh to Rs. 100 Lakh per MSE borrower for retail trade activity.
- The extent of guarantee cover is 80% for (i) micro and small enterprises operated and / or owned by women; and (ii) all credit /loans in North East Region for credit facilities up to Rs. 50 Lakh.
- In case default, CGTMSE settles the claim with the leading institute.
- Apply through Member lending Institute (MLIs- Banks and NBFCs).

List of MLIs are available at [www.cgtmse.in](http://www.cgtmse.in)

## 3. LEAN MANUFACTURING COMPETITIVENESS SCHEME:

**Key Benefits:** Financial assistance is provided for implementation of lean manufacturing techniques, primarily the cost of lean manufacturing consultant (80% by GoI and 20% by beneficiaries)

**Scheme applicable for:** Existing Entrepreneurs

**How to apply:**

<http://www.dcsmse.gov.in/schemes/clcs-tus/LEAN-Operational-Guidlelines.pdf>

**Objectives:** The objectives of the Scheme is to enhance the manufacturing competitiveness of MSMEs through the application of various Lean Manufacturing (LM) techniques by;

- a. Reducing waste;
- b. Increasing productivity
- c. Introducing innovative practices for improving overall competitiveness;
- d. Inculcating good management systems; and Imbibing a culture of continuous improvement.

#### **4. ZERO EFFECT ZERO DEFECT (ZED) SCHEME**

##### **Key benefits:**

- Promote adaptation of Quality tools/systems and Energy Efficient manufacturing.
- Enable MSMEs for manufacturing of quality products.
- Encourage MSMEs to constantly upgrade their quality standards in products and processes.
- Financial assistance will be provided to the MSMEs in obtaining a ZED certification.
- Reimbursement of Certification fees/Consultancy charges on successful certification, subject to an upper ceiling as per the scheme guideline. This can be claimed as per scheme guidelines.
- For MSMEs supplying for Defence, reimbursement shall be admissible additionally on Defence related certificates/Standards as per the scheme guidelines.

##### **Scheme applicable for:**

All the Udyog Aadhar Memorandum (UAM) registered manufacturing MSMEs are eligible to apply for ZED registration.

##### **How to apply:**

[http://dcmsme.gov.in/schemes/clcs-tus/Operational\\_Guidelines\\_ZED.pdf](http://dcmsme.gov.in/schemes/clcs-tus/Operational_Guidelines_ZED.pdf)

##### **Objectives:**

The scheme envisages promotion of Zero Defect and Zero Effect (ZED) manufacturing amongst MSMEs and ZED Assessment for their certification so as to:

- a. Encourage and Enable MSMEs for manufacturing of quality products using latest technology tools & to constantly upgrade their processes for achievement of high productivity and high quality with the least effect on the environment.
- b. Develop an Ecosystem for Zero Defect Zero Effect Manufacturing in MSMEs, for enhancing competitiveness and enabling exports
- c. Promote adoption of Quality and recognizing the efforts of successful MSMEs.
- d. Increase public awareness on demanding Zero Defect and Zero Effect Products through the ZED Rating and Grievance Redressal Portal

#### **5. MICRO AND SMALL ENTERPRISES CLUSTER DEVELOPMENT PROGRAM (MSE-CDP)**

##### **Key Benefits:**

The Ministry of Micro, Small and Medium Enterprises (MSME), Government of India (GoI) has adopted the Cluster Development approach as a key strategy for enhancing the productivity and competitiveness as well as capacity building of Micro and Small Enterprises

(MSEs) and their collectives in the country. A cluster is a group of enterprises located within an identifiable and as far as practicable, contiguous area or a value chain that goes beyond a geographical area and producing same/similar products/complementary products/services, which can be linked together by common physical infrastructure facilities that help address their common challenges. The essential characteristics of enterprises in a cluster are (a) Similarity or complementarity in the methods of production, quality control & testing, energy consumption, pollution control, etc., (b) Similar level of technology & marketing strategies/practices, (c) Similar channels for communication among the members of the cluster, (d) Common market & skill needs and/or (e) Common challenges & opportunities that the cluster faces. GoI Financial assistance upto 70 % to 90 % for the CFC Project Cost upto Rs. 20 crore is provided.

**Scheme applicable for:**

Micro and Small Enterprises (MSEs)

**How to apply:**

Online Applications are only considered with effect from 01-04-2012. Hard copy of Applications needs to be sent through State Govts or their autonomous bodies or field institutes of Ministry of MSME ie. MSME-DIs. The proposals are approved by the Steering Committee of the MSE-CDP. <http://cluster.dcmsme.gov.in>

**Objectives:**

- (i) To support the sustainability and growth of MSEs by addressing common issues such as improvement of technology, skills & quality, market access, etc.
- (ii) To build capacity of MSEs for common supportive action through formation of self help groups, consortia, upgradation of associations, etc.
- (iii) To create/upgrade infrastructural facilities in the new/existing Industrial Areas/Clusters of MSEs.
- (iv) To set up Common Facility Centres (for testing, training, raw material depot, effluent treatment, complementing production processes, etc).
- (v) Promotion of green & sustainable manufacturing technology for the clusters so as to enable units switch to sustainable and green production processes and products.

**6. PROCUREMENT AND MARKETING SUPPORT (PMS) SCHEME**

**Eligibility:**

Manufacturing / Service sector MSEs registered at Udyog Aadhaar Memorandum (UAM) Portal.

**IMPLEMENTING AGENCY:**

DC MSME through its field organizations namely MSME Development institutes and Technology centers (2) Other field organizations of M/o MSME namely NSIC, KVIC, Coir board (3) State governments through its departments/organizations/corporations/autonomous bodies and agencies (4) Other Central Govt. ministries through its departments/organizations/corporations/autonomous bodies and agencies

**Nature of Assistance/Benefits under the scheme:**

(A) Participation of individual MSEs in domestic trade fairs/ exhibitions across the country:

(B) Organizing Domestic Trade Fairs/ Exhibition and participation in trade fairs/exhibitions by the Ministry/Office of DC (MSME)/Government organizations:

(C) Capacity building of MSMEs in modern packaging technique:

(D) Development of Marketing Haats:

(E) Vendor Development Programs:

(F) International/National Workshops/Seminars.:

(G) Awareness Programs:

**How to apply:**

Eligible MSEs may submit their application online at

link: [https://my.msme.gov.in/MyMsme/Reg/COM\\_MatuDomAppForm.aspx](https://my.msme.gov.in/MyMsme/Reg/COM_MatuDomAppForm.aspx)

any system in place with implementing agencies.

**Objectives:**

The Scheme aims at the following:

- 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/methods/process of packaging in marketing, latest developments in international/national trade and other subjects/topics relevant for market access developments.
- To create more awareness about trade fairs, digital advertising, e-marketing, GST, GEM portal, Public Procurement policy and other related topics etc.

**7. DESIGN SCHEME****Key Benefits:**

- To facilitate MSMEs to develop new Design strategies and or design related products through design interventions and consultancy. Financial assistance to the MSMEs for engagement of design consultants for design intervention (GoI contribution @ 75% for micro, 60% for SMEs for the project range up to Rs. 40 lakh).

- The Design Scheme shall support design work by reimbursing 75% of expenses incurred up to Rs. 1.5 lakh for final year student project done for MSMEs .

**Scheme applicable for:**

Manufacturing MSMEs

**How to apply:**

MSMEs can submit their proposal to Implementing Agency (IA) as per scheme guideline.

The scheme guideline is available at <http://www.dcmsme.gov.in/schemes/Design-Guidelines-CLCS-TUS-2019-2020.pdf>

**Objectives:**

To bring Indian manufacturing sector and Design expertise/ Design fraternity on to a common platform and to provide expert advice and cost effective solution on real time design problems, resulting in new product development, continuous improvement and value addition for existing products including new products.

## **8. BUILDING AWARENESS ON INTELLECTUAL PROPERTY RIGHTS**

**Key Benefits:**

Reimbursement of Patent/Trademark/GI:

1. Patent:
  - A. Indian Patent up to Rs.1.00 Lakh
  - B. Foreign Patent up to Rs. 5.00 Lakh
2. Trademark up to Rs. 0.10 Lakh
3. GI Registration Rs. 2.00 Lakh
4. Assistance for setting up IP Facilitation Centre up to Rs. 1.00 cr. for period of 5 years

**Scheme applicable for:**

Existing MSMEs

**Objectives:**

To enhance the awareness of Intellectual Property Rights (IPRs) amongst the MSMEs to encourage creative intellectual endeavour in Indian economy;

- To take suitable measures for the protection of ideas, technological innovation and knowledge-driven business strategies developed by the MSMEs for;
- To provide appropriate facilities and support for protection and commercialization of Intellectual Property (IP) for the benefit of MSME sector;
- To assist SMEs in effective Utilization of IPR Tools for technology up-gradation, market and business promotion and competitiveness. enhancement.

**How to apply:**

[https://my.msme.gov.in/MyMsme/Reg/COM\\_IprReim.aspx](https://my.msme.gov.in/MyMsme/Reg/COM_IprReim.aspx)

## 9. INTERNATIONAL COOPERATION SCHEME

**Description:** The scheme covers the following activities:

- a) Visit of MSME delegations to other countries in international exhibitions/ trade fairs, conferences/ summits/workshops etc. for exploring new areas of technology infusion/upgradation, joint ventures, improving market of MSMEs products, etc.
- b) Participation of MSME delegations in international exhibitions, trade fairs and buyer-seller meets in foreign countries.
- c) Holding international conferences/summits/workshops/seminars relating to MSME sector to be organized in India by the Industry Associations/ Government organizations.
- d) Holding/organising mega international exhibition or fair and international conferences/seminars/workshops, Joint Committee Meetings/Joint Working Group Meetings/Government to Government bilateral meetings with outer countries in India by Ministry of MSME or organizations under it.
- e) Sending a delegation of the Ministry of MSME to an International Exhibition/Fairs/Conference in foreign count

**Nature of Assistance:**

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.

**Who can apply?:**

Government Institutions and Registered Industry Associations associated with promotion and development of MSME sector.

**How to apply?:**

Applications for financial assistance can be sent in the prescribed form to the Director (International Cooperation), Ministry of MSME, Udyog Bhawan, New Delhi -110011.

## 10. MARKETING ASSISTANCE SCHEME

**Description:**

The marketing assistance scheme provides assistance for the following activities:

- a) Organisation of exhibitions abroad and participation in international exhibitions/ trade fairs

- b) Co-sponsoring of exhibitions organised by other organisations/industry associations/agencies;
- c) Organising buyer-seller meets, intensive campaigns and marketing promotion activities.

**Nature of Assistance:**

(a).The maximum net budgetary support for participating in an international exhibition/trade fair would normally be restricted to an overall ceiling of Rs. 30 lakh per event (Rs. 40 lakh for Latin American countries).

(b). The budget for organizing the Domestic Exhibitions/Trade Fair would depend upon the various components of the expenditure, i.e. space rental including construction and fabricating charges, theme pavilion, advertisement, printing material, transportation etc. However, the budgetary support towards net expenditure for organizing such exhibition/trade fair would normally be restricted to a maximum amount of Rs. 45 lakh. The corresponding budgetary limit for participation in an exhibition/trade fair shall be Rs. 15 lakh. Financial assistance will be provided ranging from 25% to 95% of the Air-Fare and space rent to entrepreneurs on the basis of size and type of the enterprise. Financial assistance for co-sponsoring an event would be limited to 40% of the net expenditure, subject to a maximum amount of 5 lakh.

**Who can Apply?:** MSMEs, Industry Associations and other organisations related to MSME sector are eligible to apply.

**How to apply:**

Applications/proposals seeking assistance under the scheme should be submitted to the Branch Manager of the nearest office of the National Small Industries Corporation, with full details and justification in support of the application.

The Guideline of Marketing Assistance Scheme is available on the Ministry's Website i.e. <http://msme.gov.in>

## **11. STAND UP INDIA FOR FINANCING SC/ST AND/OR WOMEN ENTREPRENEURS**

Stand Up India Scheme facilitate bank loans between 10 lakh and 1 crore to atleast one scheduled caste (SC) or Scedhuled Tribe, borrower and atleast one women per bank branch for setting up a greenfield enterprise. This enterprise may be in manufacturing, services or the trading sector. In case of non-individual enterprises at least 51% of the shareholding and controlling stake should be held by either an SC/ST or Woman entrepreneur.

**Eligibility:**

1. SC/ST and/or women entrepreneurs; above 18 years of age.
2. Loans under the scheme is available for only greenfield project. GreenField signifies, in this context, the first time venture of the beneficiary in the manufacturing or services or trading sector
3. In case of non-individual enterprises, 51% of the shareholding and controlling stakes should be held by either SC/ST and/or Women Entrepreneur
4. Borrower should not be in default to any bank or financial institution

#### **Procedure to Apply Online:**

The scheme which covers all branches of Scheduled Commercial Banks, will be accessed in three potential ways:

1. Directly at a Bank Branch
2. Through SIDBI Stand-Up India Portal ([www.standupmitra.in](http://www.standupmitra.in))
3. Through the Lead District Manager

#### **How to Avail Stand Up India Scheme:**

- Through stand up India Portal provides information to a potential borrower on various kinds of handholding support from different agencies and also provides a window to get in touch with banks to avail loans
- The applicant first click to "Register" and answer to few short questions on the Registration page of the portal
- Based on the response, the Applicant would be classified as the "Trainee Borrower" or "Ready Borrower". Applicant would also be given feedback on his/her eligibility for stand-up India loan
- A trainee borrower/ready borrower may then choose to register and login through the portal
- Upon logging through the portal, the borrower is taken to a dashboard
- Contact Details:

Support@standupmitra.in

[help@standupmitra.in](mailto:help@standupmitra.in)

<https://www.standupmitra.in/>

## **12. PUBLIC PROCUREMENT POLICY FOR MICRO AND SMALL ENTERPRISES (MSES) , 2012**

### **The Policy:**

- Public Procurement Policy for MSEs Order, 2012 has been notified under section 11 of MSMED Act, 2006.
- The Policy is effective from 1st April 2012 (Gazette notification on 26th March 2012).
- The objective of Policy is promotion and development of Micro and Small Enterprises by supporting them in marketing of products produced and services rendered by them. However, the policy rests upon core principle of competitiveness, adhering to sound procurement practices and execution of supplies in accordance with a system which is fair, equitable, transparent, competitive and cost effective.
- **Salient features of the Policy:**
- Every Central Ministry /Department / PSUs shall set an annual target for 25% procurement from MSE Sector. Special provision for Micro and Small Enterprise owned by women. Out of the total annual procurement from Micro and Small Enterprises, 3 per cent from within the 25 per cent target shall be earmarked for procurement from Micro and Small Enterprises owned by women.
- A sub-target of 25% out of above 25% target of annual procurement earmarked for procurement from MSEs owned by SC/ST entrepreneurs.
- Overall procurement goal of minimum 20% has become mandatory from 1st April 2015.
- Tender sets free of cost and exemption from payment of earnest money to registered MSEs.
- MSEs quoting price within price band L-1 + 15%, when L1 is from someone other than MSE, shall be allowed to supply at least 20% of tendered value at L-1 subject to lowering of price by MSEs to L-1.
- 358 items are reserved for exclusive procurement from MSEs.
- Ministry /Department/CPSUs shall prepare their annual procurement plan to be uploaded on their official website.
- For enhancing participation of MSEs in government procurement, Ministry /Department/CPSUs shall conduct Vendor Development Programmes or Buyer Seller Meets for MSEs especially for SC/ST entrepreneurs.
- **Universe of the Policy:**
- A. Buyers:**
- Central Departments (46)
- Central Ministries (51)
- CPSUs (277) ( out of 277 CPSUs, 44 are Sick/Closed)

## **B. Suppliers:**

- All MSEs having registration as per provisions of the Policy i.e. registration with District Industries Centre (DIC) or Khadi and Village Industries Commission (KVIC) or Khadi and Industries Board (KVIB) or Coir Board or National Small Industries Commission (NSIC) or directorate of Handicrafts and Handlooms or Udyog Aadhaar Memorandum or any other body specified by Ministry of MSME.

## **PROPOSED SCHEME:**

In India, the item: centrifugal pumps suction & delivery 150mm X 150mm is reserved for the exclusive purchase from micro & small enterprises. The reasons for not increase in the demand for Centrifugal Pump at the expected level in domestic as well as export market are :

The market of the Centrifugal Pump is being replaced by Monoset Pump and Openwell Submersible Pump due to following reasons:

1. The Centrifugal Pumps are being used either for specific industrial applications or where electricity supply is not available. So, in the agricultural sector where electricity supply is not available these pumps are coupled with the diesel pump. But since the Rural Electrification has considerably increased in the world, the demand of this centrifugal pumps is not increasing upto expected level.
2. The Centrifugal Pumps are coupled with prime mover by means of flanged coupling, Love-joy coupling etc. types of coupling. In this type of the coupling the perfect alignment is required as the Prime Mover and Centrifugal Pumps are mounted on separate shafts. Any short of little misalignment will affect the performance of the pump i.e. it will reduce the flow rate (Q) or it will reduce the Total Head (TH) and it will increase the Pump Power consumption (P) which will reduce the overall efficiency of the Pump. This happens also in the case when pump is driven by pulley through belt. While in Monoset/Monoblock Pump, since the motor and the pump are mounted on the same shaft, this problem is eliminated. So, in certain circumstances, the market of the centrifugal Pumps is being replaced by Monoset/Monoblock Pumps which are governed by **IS:9079**.
3. The use of Vertical and Horizontal Openwell Submersible Pumps has also affected the demand of the Centrifugal Pump. The Openwell Submersible Pumps are mounted on the bottom surface of the fluid tank source from which the fluid has to be lifted. Hence these type of the pumps are more efficient due to the submergence and also the fluid surrounding the pump acts as a coolant which will result in less power consumption of the

motor. The Open Well Submersible Pumps are governed by **IS: 14220**. Hence the purchase of mono set pumps as well as vertical/horizontal open well submersible pumps also exclusively should be made from micro and small enterprises i.e. the item: mono set pump upto 10 HP as well as vertical/horizontal open well submersible pumps upto 10 HP should be added in the list of the items exclusively reserved for micro and small enterprises under PPP 2012. Also, government should encourage the use of solar pump.

• **DETAILS OF AGENCIES WHICH CAN PROVIDE GUIDANCE:**

**1. Bureau of Energy Efficiency**

Ministry of Power, Govt. of India

4th Floor, Sewa Bhawan, R. K. Puram, New Delhi - 110066 (INDIA)

**2. Petroleum Conservation Research Association**

Sanrakshan Bhavan, 10 - Bhikaji Cama Place, New Delhi- 110 066.

**3. Indian Pump Manufacturing Association**

Plot no. 407, Sarkhej-Bavla Highway, Changidar, Moraiya,

Near Sarvodaya hotel, Ahmedabad-382 213.

E-mail: [ipmaorg.1951@gmail.com](mailto:ipmaorg.1951@gmail.com)

**4. Bureau of Indian standards**

9 ,Bahadur Shah Zafar Marg, New Delhi-110002,India

Tel : +91 11 23230131, 23233375, 23239402 (10 lines)

Fax : +91 11 23234062, 23239399, 23239382

After office hours : +91 11 23215936

Email : [info@bis.gov.in](mailto:info@bis.gov.in)

Website: [www.bis.gov.in](http://www.bis.gov.in)

**5. Ministry of Commerce and Industry, Govt Of India ([www.commerce.nic.in](http://www.commerce.nic.in))**

**6. Planning Commission of India (<http://planningcommission.nic.in>)**

**7. Confederation of Indian Industry ([www.ciionline.org](http://www.ciionline.org))**

**8. The Director General of Foreign Trade <http://dgft.delhi.nic.in/>**

**9. Indian Institute of Metals <http://www.iim-india.net/>**

**10. ISO [www.iso.org](http://www.iso.org)**

**11. Project Monitor <http://www.projectsmonitor.com>**

**12. Pumps India <http://www.pumpsindia.com/pumpsindia/artical.asp>**

**13. Total Quality Management Consultants [www.tqmc.org](http://www.tqmc.org)**

**14. Indian Pump Manufacturers' Association (IPMA), Mumbai.**