Company Name: KIRLOSKAR BROTHERS LIMITED

Plant Name: SMPD-CIF Plant (Kirloskarvadi Site)

1. Company Profile:

Welcome to Total Fluidity Management: Kirloskar Brothers Limited (KBL) is one of the top pump manufacturing company with expertise in the engineering and manufacturing of fluid management systems. Established in 1888 and incorporated in 1920, KBL is the mother company of the Kirloskar Group. KBL provides complete fluid management solutions for large infrastructure projects in the areas of water supply, thermal power plants, irrigation, building & construction, oil & gas industry. KBL manufactures industrial, agriculture and domestic pumps, valves and hydro-turbines.

Where You Can Find Us: The dream has always been to help create a world without boundaries. Over the past 135+ years, we have grown to support the needs of the domestic as well as global economy. Today, our presence stretches across 80 countries and 6 continents.

Web site address: www.kirloskarpumps.com

Company Profile:

KIRLOSKAR BROTHERS LIMITED

Kirloskar Brothers Limited (KBL) is a world-class pump manufacturing company with expertise in the engineering and manufacturing of fluid management systems. Established in 1888 and incorporated in 1920, KBL is the mother company of the Kirloskar Group. KBL provides complete fluid management solutions for large infrastructure projects in the areas of water supply, power plants, irrigation, building & construction, oil & gas industry and marine & defence. KBL manufactures industrial, agriculture and domestic pumps, valves and hydro-turbines.

Over the years, KBL has developed innovative products, which have enabled it to carve a niche globally. It is a global conglomerate and is equipped with the best technologies in the world. It is also India's largest centrifugal pump manufacturer with nine manufacturing facilities in India along with other international subsidiaries and operations in the Netherlands, South Africa, Thailand, the United Kingdom, and the United States of America. KBL has over 16,000 channel partners globally and is supported by best-in-class Pan-India network of authorised service and refurbishment centres.

KBL is the first Indian pump manufacturing company to be certified for Integrated Management System, (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, ISO 50001:2018).

Its factories deploy Total Quality Management tools using the European Foundation for Quality Management (EFQM) model.

Indian subsidiaries and joint ventures

•Kirloskar Ebara Pumps Limited (KEPL) manufactures API, Non-API pumps, and steam turbines.

•Kirloskar Corrocoat Private Limited (KCPL) is the leading solution provider in long-term corrosion protection and energy conversion.

•Karad Projects and Motors Limited (KPML) is a motor manufacturing company with expertise in the manufacture of stampings, stators, rotors, AC rotating machines, aluminium die-cast connecting rods and pump assemblies. The company also houses a notable foundry facility that specialises in the manufacture of a wide range of carbon steel, alloy steel, stainless steel and cast iron castings for industries such as pumps, valves, turbines, shipping, heavy engineering applications and more.

International, subsidiaries and joint ventures

•SPP Pumps Limited, United Kingdom is a 140-year-old leading pumps manufacturer of centrifugal pumps and associated systems, a global principal in the design, supply and servicing of pumps, renowned fire pump packages and high-quality equipment for a wide range of applications and industry sectors. It is the largest pump manufacturer in the United Kingdom.

•SyncroFlo, Inc., United States of America manufactures pre-assembled pumping systems and provides solutions for HVAC systems, fire protection and turf irrigation.

•Rodelta Pumps International is a Dutch pump manufacturing company that offers products for flood control, irrigation, drinking water, wastewater, pulp & paper, power, chemical, oil & gas and general industries.

•Kirloskar Brothers Thailand Limited (KBTL), Bangkok is the Thailand Board of Investment (BOI) promoted headquarters and assembly plant of the KBL Group companies for the ASEAN and East Asia regions.

•Braybar Pumps (Pty) Limited, Republic of South Africa is engaged in the manufacturing and sales of high-head multi-stage pumps, rubber-lined slurry pumps and metal-lined bearings.

Plant Profile:

Kirloskar Brothers Limited, Kirloskarvadi Site, established in 1910, is Kirloskar Brothers Limited's (KBL's) mother plant, which houses manufacturing facilities starting from foundry to machining, assembly and testing of various types of pumps ranging from 5 KW to 4500 KW. The Kirloskarvadi site is located near Sangli, Maharashtra, off the Mumbai-Bangalore (NH4) highway. The Kirloskarvadi site is a green facility committed towards reducing resource consumption and minimising waste while considering the life-cycle costs of products. Over 42% of the total energy consumed within the plant. With over of its premises covered under the green belt, Kirloskarvadi is one of those rare manufacturing facilities where there is enough space for the coexistence of all three – flora, fauna and humans. The facility has been the proud winner of the CII GreenCo Silver Award for Year 2024, which is a reflection of its commitment towards implementation of environment management practices in a sustainable manner.

Technology: State of art manufacturing line, Dolphin package for pump selection, Kirlosmart to know the online overall pump health monitoring, Eco-label green products labeling, QR

Code in pumps, Mold 3D Printing, 3D Scanning, Online portal for supply chain, Electrostatic painting, CNC machines with Latest technology, Dynamic balancing, world class core making technology (Cold box process), Molding technology, Central pattern manufacturing, Spectrometer & PMI for elemental testing, Battery operated vehicles and forklifts, Bio gas plant using food waste of canteen, Augmented reality and Virtual reality for training and exhibitions etc.

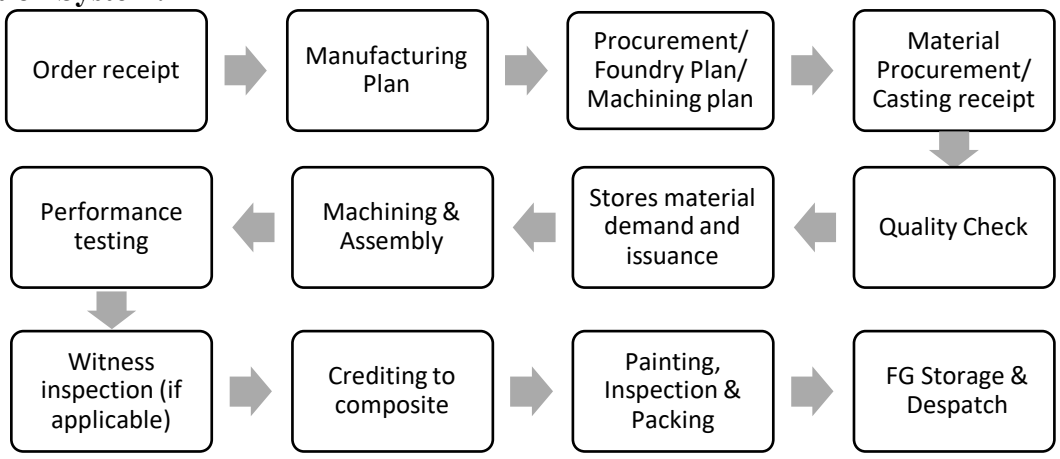
Equipment's: Captive foundry, DISA Green Sand Mixer, Laempe core shooter, CNC machine shop, Dynamic balancing machines for impellers and rotors, Assembly lines, Hardware and software for design, DG set, ETP and STP, Pump testing facility, well equipped NABL Accredited Lab, Standard room for calibration, Electro static painting booths for best in class product painting, Air leak testing for mechanical seal, DNC software for CNC Program storage, Foam packing machine, Renewable energy generation through 1.5MW of Solar power and 4MW from wind mills.

KBL is having wide product range, which covers all application with centrifugal pumping system also KBL is having FM approved and UL listed pump sets for firefighting application. Few of the series are confirming to ISO 5199 standard and few of the series of pumps needs minimum efficiency index. The KBL- plant holds sustainability as a key business strategy. It abides by the Quality, Environment, Health & Safety and Energy Management System certification.

Product (Pumps)	**Applications**
End Suction Pumps	Water Supply, Cooling Water, Irrigation, Water supply, Firefighting, Chilled water, Light chemicals, Treated effluents and Treated sewage
Process Pumps	Acids, Alkalis, Hydrocarbons, Various chemicals, Food Processing, Various Oils, Maize Products, Thermic Fluids and Hazardous fluids
Horizontal Split Case Pumps	Water Circulation, Processing plants, Sprinkler, Fire Fighting, Air conditioning plants, Water supply, Irrigation, RO Plants, Dewatering
Multistage Pumps	Water Circulation, Processing plants, Sprinkler, Fire Fighting, Air conditioning plants, Irrigation, RO Plants, Dewatering applications, Mine Dewatering, Water supply in High-rise buildings, Boiler feed
Submersible Sewage Pumps	Sewage effluent, Contaminated liquids, Food Processing, Syrups, Paper Pulp, Maize Products, Oil Extraction mills, Starch Applications, Screened Sewage, Effluents treatment plants, Drain water, Raw Sewage, Saline water, Storm, Trench and Tunnel water
Non-clog Pumps	Sewage effluent, Contaminated liquids, Food Processing, Syrups, Juice, Paper Pulp, Maize Products, Various Oils, Starch, Dewatering
Sump Pumps	Lime water, Non Abrasive Slurry, Mine water, Sewage, Process and fertilizer industries, Oils
Special Design (Canned Motor Pumps)	Precious liquids, Hazardous liquids like acids, Explosive liquids, Liquefied gas and Sea water

A team of professionals headed by Chairman & Managing Director Mr. Sanjay Kirloskar manages the company. Mr. Vinay Bhatt heads the Kirloskarvadi operations and plant.

Production System:



Manpower Details:

Manpower (CI-SMPD)	Total	Male	Female	Ratio
Staff (A to H Band)	36	36	0	95:1
Associates	187	187	0	
GA/DA/DET/PGT/FTC	6	6	0	
Trade apprentice	27	26	1	
NAPS Trainee	19	18	1	
Total	**275**	**273**	**2**	
Common Manpower to overall plant (Support Functions)				
Staff (A to H Band)	55	55	0	
Associates	43	43	0	
GA/DA/DET/PGT/FTC	4	3	1	
Trade apprentice & NAPS	8	7	1	
Total (Common)	**110**	**108**	**2**	
Net Total	**385**	**381**	**4**	

KBL Kirloskarvadi Site Operates in A Shift (07:00am – 03:30pm), B Shift (03:30pm – 12:00am), C Shift (12:00am – 07:00am) and G Shift (08:30am – 05:30pm)

2. MILESTONES ON THE JOURNEY OF MANUFACTURING EXCELLENCE:

The organization's business performance remained stagnant during the period of 2019-2020 and earlier. Though high-end machines were available, the utilization of the machines was very low. With many machines over 20 years of age, major breakdowns were seriously hampering production.

After realizing the benefits of TPM, in KBL's Dewas Plant, to address the challenges and bring the organization to growth trajectory, KBL Kirloskarvadi site decided to implement TPM with following goals:

- Increase Sales and Profit
- Reduce the conversion cost and improve Value addition

- Improve equipment OEE and Utilization
- Ensure defect free Products
- Improve On-time In Full (OTIF)
- Create a safer, healthier, and environmentally sustainable working environment
- Improve skill level of the organization's manpower

TPM was kick-started in April 2021, with a pilot project of 5 critical machines and establishing 4 TPM Pillars, namely, Autonomous Maintenance (AM), Planned Maintenance (PM), Focused Improvement (FI) and Training & Development (T&D).

A steering team was made consisting of senior management from the Plant under the direction of Plant Head. Cross-functional Project teams were made for each Pillar. All Pillar team members, steering team and all senior managers were trained in TPM concepts and methodologies. We have also developed Key Management Indicators (KMI), Key Performance Indicators (KPI), and Key Activity Indicators (KAI) to effectively monitor and measure the outcomes of our initiatives. With active support of machine operators and supervisors, the pilot machines could achieve step 3 in one year. The breakdowns of the pilot machines reduced significantly, and condition of machines transformed. The success story with pilot machines developed enthusiasm with employees and management decided to roll out the TPM initiative to the entire plant in October 2022. The journey progressed further as below.

- All A class machines were included in the TPM initiative. Stepwise activities like initial deep cleaning, identification & correction of hard to access areas (HAA) and sources of contamination (SOC), formation of tentative standards etc. were carried out in AM pillar for each machine.
- Pillar teams made for pilot phase further expanded and remaining pillars implemented progressively by end 2023, except early management.
- FI team extended improvement activities capturing losses and loss cost of all machines and taken up various improvement projects for set up time reduction and eliminating other losses. Successful improvements were demonstrated to all through QC stories.
- Training on concepts and methodology of Early Equipment Management was conducted in multiple sessions to all team members. The principles were successfully applied in shop layout changes and new machine additions in 2022 and 2023, which helped in vertical start-up of new machines.
- QM Pillar identified areas for improving quality and initiated improvement projects, effectively utilizing QC story boards.
- With increasing requirement of new product designs, Design team was integrated into TPM initiative, implementing Early Product Management (EM) Pillar in 2024, with intention of improving design and development process. With this, all 8 pillars are implemented.
- Systematic training was conducted to impart knowledge and practical skills, though a 10 days' TPM Instructors course and other training. To date, KBL Kirloskarvadi has trained 49 JMAC certified TPM instructors. Through the trained and certified instructors, all employees in the Plant and majority of employees in office were trained in TPM philosophy and techniques.

3. BENEFITS ACHIEVED:

Through TPM implementation we achieved Tangible and intangible benefits. Some of the benefits are as below:

Tangible benefits: The improvements achieved were translated into clear business growth. Significant results could be achieved in the form of productivity improvement, conversion cost reduction, OEE and utilization improvement in machine shop and foundry, Customer complaints reduction, COPQ reduction, Foundry Energy consumption reduction, Machine shop and foundry rejection-rework reduction, Breakdown occurrences reduction, Increase MTBF and reduce MTTR, Employee suggestions improved.

Intangible benefits: With the progress of TPM initiative, the machine operators started taking ownership of the machines and got deeply involved in day-to-day cleaning and maintenance activities (I-Operate, I- Maintain). They actively got involved in analysis of machine breakdowns and implementing corrective actions. Keeping the machines tidy, improving unsafe conditions etc. Increase in confidence and competence of operators, Increasing the thinking capability of operators through small Kaizens and suggestions, better work environment and 5S leading to less chaos and improves engagement. Developing the culture of continuous improvement, we are marching towards achieving manufacturing excellence.

To improve the total employee involvement & promote TPM activities, management recognize & motivate the people who are actively contributing into the TPM implementation**.**

4. KEY OF OUR MANUFACTURING EXCELLENCE:

Aim of manufacturing excellence is to implement the best practices for improving key results in terms of PQCDSME. Kirloskar Brothers Limited, involved all employees to work for manufacturing excellence. Continual improvement activities and periodic review of the results are enablers to meet the key strategies and Business parameters. Following are few highlights noted herewith:

- Develop and maintain “I operate, I maintain” culture to minimize downtime of machines - Implementation of TPM has helped to understand this concept. We will further nurture this concept and integrate in normal working
- Developing manufacturing flexibility to further bring down manufacturing cost.
- Development of proactive approach to address breakdown and enhancing equipment life by working on natural deterioration.
- Improving skills of workers and Staff – Emphasis is given for multi-skilling of operators, training need identification and arranging required training. We have also planned to develop in-house trainers through train-the-trainer program. Competency assessment, gap identification and arranging training is ongoing process.
- Material balancing based on CDD - It is realized that delay in material balancing is a major issue we are facing leading to delays and increase in inventory. Various actions are ongoing to improve monitoring mechanisms to ensure material balancing based on CDD.
- Developing behaviour based safety and other proactive measures to prevent accident, environmental incidences and improve hygiene.

- Strong condition base maintenance approach for enhancing equipment's reliability.
- Emphasis on 5'S principle.
- Developing Suppliers – Delay and quality issues in bought out items are major challenges in our growth. Various actions are ongoing through Office and Quality Pillars.
- Low cost automation to eliminate losses in product realisation process
- Green energy focus through use of renewal energy and improving Green Belt area.