

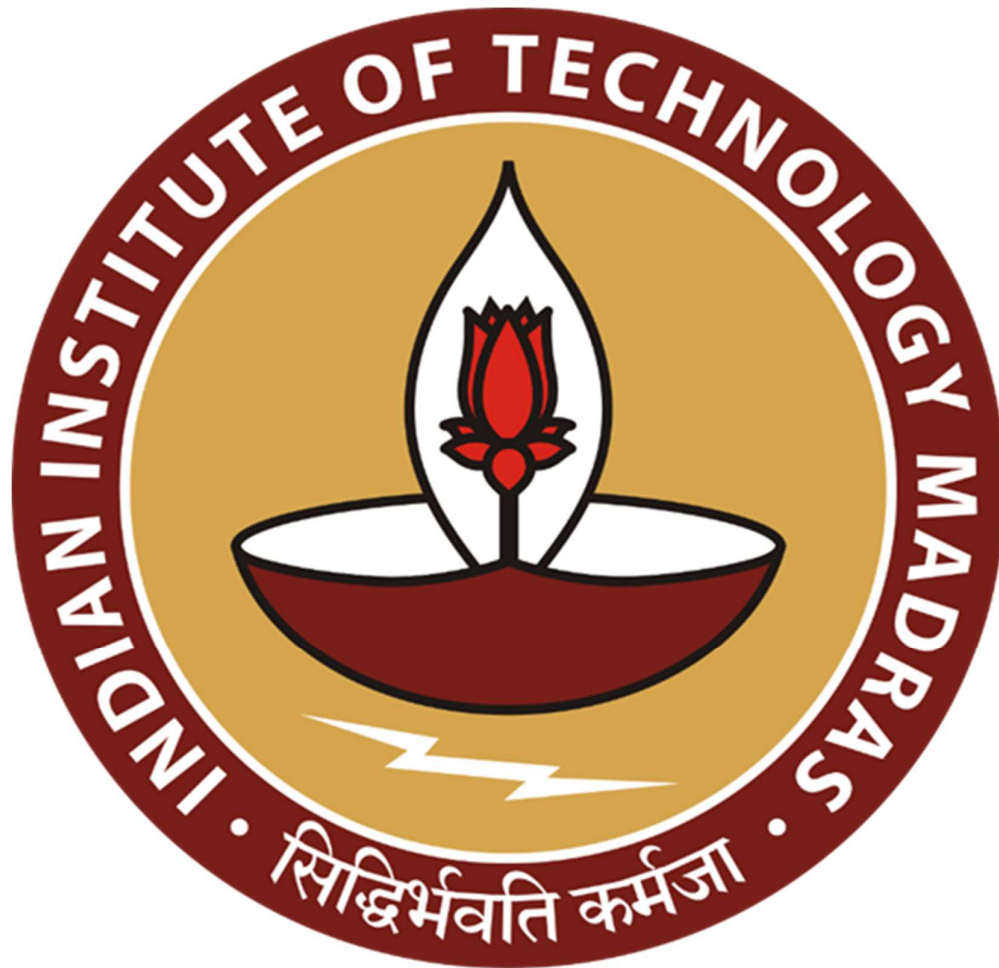
Elevating Performance: Vijaya Polymers' Path to Streamlined Operations and Market Growth

A Mid Term Report for the BDM Capstone Project

Submitted By:

Name: Kandula Sandeep Kumar

Roll number: 23f3003779

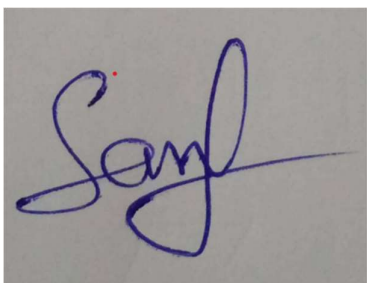


IITM Online BS Degree Program,

Indian Institute of Technology, Madras, Chennai

Declaration Statement:

I am working on a Project Title “Maximizing Impact: Vijaya Polymers’ Journey to Enhanced Efficiency and Market Growth”. I extend my appreciation to VIJAYA POLYMERS PVT LTD, for providing the necessary resources that enabled me to conduct my project. I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered through primary sources and carefully analyzed to assure its reliability. Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures. I am dedicated to adhering to the information of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report. I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority. I agree that all the recommendations are business specific and limited to this project exclusively, and cannot be utilized for any other purpose with an IIT Madras tag. I understand that IIT Madras does not endorse this.

A handwritten signature in blue ink, appearing to read 'Sandeep', with a long horizontal stroke extending to the right.

Signature of Candidate:

Name: Kandula Sandeep Kumar

Date: 03/12/2024

1. Executive Summary and Title

Vijaya Polymers provides services in both business-to-business (B2B) and business-to-consumer (B2C) markets, focusing on manufacturing pipes and related products. The company is currently facing few challenges that affect its success.

Challenges

1. **Data Issues:** The company has trouble organising its sales and product data, making it hard to understand and analyse.
2. **Inventory Management:** There's a need to manage stock better to prevent running out of products or overstocking.
3. **Understanding Customers:** The company needs to better identify and target different customer groups to improve sales.
4. **Sustainable Practices:** With concerns about harmful chemicals in products, Vijaya Polymers is committed to using safer and more eco-friendly materials.

Need for Data Analysis

To tackle these challenges, Vijaya Polymers plans to:

- Organise and analyse product data to improve marketing strategies.
- Work more closely with suppliers and refine inventory to ensure product availability.
- Conduct market research to better understand customer needs.
- Update marketing strategies to highlight its commitment to sustainability.

2. Organisation Background

Vijaya Polymers was established in 2015 in Hyderabad by two visionary founders with the goal of becoming a trusted supplier in the polymer and plastic piping industry. The company specializes in offering a range of high-quality products that cater to various industries such as construction, plumbing, and industrial applications.

Vijaya Polymers is known for manufacturing and distributing polymer-based pipes and fittings, with a focus on Boorgue, HDPE, and MDPE Pipes, which are widely used in irrigation, water supply, and drainage systems. Over the years, the company has grown to become a reliable partner for its clients, known for providing durable and sustainable piping solutions.

With a commitment to innovation and customer satisfaction, Vijaya Polymers continues to expand its product offerings and improve its manufacturing processes, ensuring the delivery of efficient, cost-effective solutions to its clients. Its core clientele includes companies such as GVPR Engineers Limited and AGP CGD India Private Limited, who rely on its products for their infrastructure projects.

3. Objectives

3.1 "Preventing Stock Shortages During High-Demand Periods & Addressing Customer Concerns in Low-Demand Times":

During peak times, distributors may run out of key products, and during off-peak times, customers might not be satisfied with the available stock.

Solution:

- **Predicting Demand:** Use past sales data to predict which pipe types will sell more during peak seasons (e.g., HDPE pipes during construction booms) and stock up accordingly.
- **Distributor Incentives:** Encourage distributors to keep a balanced stock round the year by offering bonuses or better deals for maintaining stock consistency.
- **Buffer Stock:** Keep extra stock of popular items ready for peak times.
- **Off-peak Promotions:** Offer special deals during slow periods to move old stock and keep customers engaged.

3.2 Enhancing Inventory Control & Supply Chain Logistics for HDPE Pipe Production:

Problem: Managing raw material procurement and production efficiently across different pipe types and suppliers.

Solution:

- **Supplier Coordination:** Work closely with suppliers to ensure materials arrive just when needed, reducing excess stock (similar to Just in Time approach like Toyota).
- **Categorise Raw Materials:** Prioritise high-value materials for critical pipe types to avoid delays in production.

3.3 Overcoming Marketing Limitations by Diversifying Customer Reach for Pipe Products

Problem: Current marketing efforts may not be reaching enough new customers for different product lines (pipes for construction, agriculture, etc.).

Solution:

- **Targeted Marketing:** Customise marketing for different industries. For example, focus on the strength of pipes for construction and water efficiency for agriculture.
- **Expand to New Sectors:** Market to new sectors like agricultural projects to increase customer base.
- **Advertisements:** Combine digital ads with traditional methods like trade shows and catalogues to reach a wider audience.

3.4 Addressing Concerns of Brand Dilution & Customer Loyalty for Merged Product Lines

Problem: Merging various pipe types under one brand could confuse customers or dilute the brand's identity.

Solution:

- **Clear Product Categories:** Separate different types of pipes (e.g., HDPE for irrigation, LDPE for other uses) in marketing materials to make it clear what each product is for.

4. Proof of Originality :

Link to Photographs , Interaction Video, Data:

https://drive.google.com/drive/folders/1Ptsh2AiZHnTNas0YgYGt9EAyo_HP1HkP?usp=drive_link

Letter from organisation in letter head with stamp and sign:



Letter No.VPIPL/Gen/2024-25/124,

Date : 11.09.2024

Respected Sir/Madam,

I am writing to inform you about the approval granted by VIJAYA POLYMERS INDIA PVT LTD, the organisation from which we are sourcing data for Business Data Management Capstone Project. The data collected and provided by VIJAYA POLYMERS INDIA PVT LTD has been officially approved for use in project.

We are delighted to give permission to share the dataset with the designated recipient, Mr. Kandula Sandeep Kumar for its utilisation.

Should you have any further questions or require additional information regarding this matter, please do not hesitate to reach out to me.

We appreciate your time and consideration in evaluating our project, and we look forward to presenting the outcome of our efforts.

Thank you for your attention to this matter.

For Vijaya Polymers India P Ltd

Authorized Signatory



VIJAYA POLYMERS INDIA PRIVATE LIMITED

(CIN:U25200TG2015PTC100880)

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Email : info@vijayapolymers.com, Website : www.vijayapolymers.com Landline : 040-48504007/08

T.S. Factory Address : Survey No.60,NH-65, Malkapur (V), Choutuppal (M), Yadadri (D) - 508252

M.P. Factory Address : Plot No.76, Smart Industrial Park, Near NATRIP, Pithampur (V), Dhar (D) - 454775

5. Meta Data

The screenshot displays an Excel spreadsheet with a complex data table. The table has multiple columns, including headers for 'Product Name', 'Material', 'Dimensions', and 'Weight'. The data is organized into rows, with some cells containing formulas or references. The spreadsheet is viewed in a window titled 'D:\Search', and the Excel ribbon is visible at the top, showing tabs for 'Home', 'Insert', 'Draw', 'Page Layout', 'Formulas', 'Data', 'Review', 'View', and 'Help'.

| Month | Particulars | ITEM | Inv No | Quantity | Rate | OUN | Value |
|-----------|-------------------|---------------|----------------|------------|---------------|-----|-----------|
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2833 | 35,000 MTs | 107000.00/MTs | MTs | 37,45,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2926 | 35,000 MTs | 105000.00/MTs | MTs | 36,75,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3103 | 35,000 MTs | 101000.00/MTs | MTs | 35,35,000 |
| 01-Dec-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3742 | 35,000 MTs | 98500.00/MTs | MTs | 34,47,500 |
| 01-Jan-24 | Sumangal Polymers | HDPE Granules | MSP/23-24/3847 | 35,000 MTs | 98500.00/MTs | MTs | 34,47,500 |
| 01-Nov-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/4052 | 35,000 MTs | 98500.00/MTs | MTs | 34,47,500 |
| 01-Nov-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3234 | 35,000 MTs | 98250.00/MTs | MTs | 34,38,750 |
| 01-Nov-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3267 | 35,000 MTs | 97000.00/MTs | MTs | 33,95,000 |
| 01-Nov-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3288 | 35,000 MTs | 97000.00/MTs | MTs | 33,95,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3102 | 35,000 MTs | 94500.00/MTs | MTs | 33,07,500 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2828 | 30,000 MTs | 107000.00/MTs | MTs | 32,10,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2844 | 30,000 MTs | 107000.00/MTs | MTs | 32,10,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2843 | 30,000 MTs | 107000.00/MTs | MTs | 32,10,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2929 | 30,000 MTs | 105000.00/MTs | MTs | 31,50,000 |
| 01-Oct-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/2927 | 30,000 MTs | 105000.00/MTs | MTs | 31,50,000 |
| 01-Dec-23 | Sumangal Polymers | HDPE Granules | MSP/23-24/3896 | 30,000 MTs | 103000.00/MTs | MTs | 30,90,000 |

The organisation maintains its data in excel sheets in a very organised manner like:

I have gathered 6 months (i.e 2023 Oct to Mar 2024) sales data from the company and 3 months (i.e 2023 oct to Jan 2024) raw materials procurement data.

In simple terms, this data helps to keep track of the entire process of selling and producing pipes. The **Sales Data** shows who bought what and at what price, and the **Raw Material Procurement Data** records where the materials came from and how much they cost. This information helps the company manage their sales, production, and inventory more effectively.

Pre-Processing:

1. Data Collection:

- Collected monthly sales and production data in two different excel sheets. Data in terms of the number of records is very rich i.e 6 months sales data and 3 months raw materials data.

2. Data Integration:

- Merged the data from all monthly sheets into a single Excel workbook to enable comprehensive analysis across multiple years.

3. Data Cleaning:

- Performed data cleaning to fix any inconsistencies, fill in missing values, changing attributes into title case etc. This ensured the data's accuracy and reliability for analysis.

4. Format Standardisation:

- Standardised the format across all data points (e.g., date formats, numerical values) to ensure uniformity, which is crucial for accurate analysis and visualisation.

For Vijaya Polymers Private Limited., I analysed sales and procurement data focused on HDPE pipes and the raw materials used in manufacturing these pipes. The following is a breakdown of the data, insights, and trends based on the provided information.

Sales Data (Fiscal Year 2023-24)

- HDPE Pipes:** Sales data includes specifications such as flow rate, pipe length, GST, and total cost for manufacturing the pipes. The data is categorised by different pipe specifications.

Procurement Data

- **Raw Materials:** Procurement data includes details of suppliers, materials purchased, the cost of materials, and how many pipes were manufactured from the procured materials.

I performed some pre-processing steps, such as replacing null values with average/median and properly filling in columns that were left blank in the inventory, then I corrected the format of dates.

Descriptive Analysis of Vijaya Polymers Product Sales Data (September 2023 - December 2023)

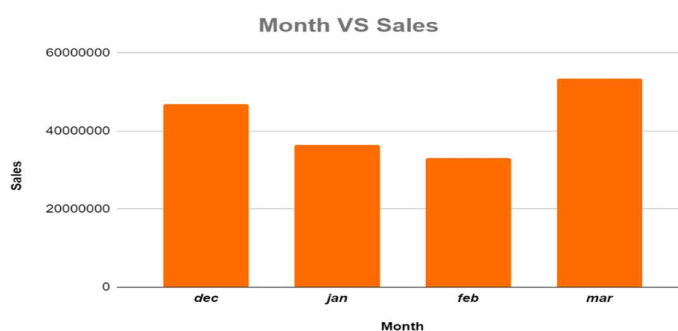
Sales Performance Overview:

During the fiscal year 2023–24, the sales performance of Vijaya Polymers' key product categories—**MDPE Pipes**, **HDPE Pipes**, and **Borouge Pipes**—varied across different customers and regions. The following analysis categorises the products based on their contribution to sales and overall demand.

Product Categories:

1. MDPE Pipes (Medium-Density Polyethylene Pipes):

- **Total Sales:** ₹7,41,68,886.00
- **Key Clients:** GVPR Engineers Limited - Vijayapura, AGP CGD India Private Limited, KAN
- **Units Sold:** 220 units over the six-month period
- **Trend Analysis:**
 - **AGP CGD India Private Limited** made the highest purchases, accounting for **55%** of total MDPE sales, indicating their preference for MDPE pipes in their projects.
 - **March** saw peak sales of MDPE pipes, likely corresponding to project timelines and procurement cycles in the construction and utilities sectors.
 - **February** witnessed a slight dip in sales, suggesting possible stock replenishment among key clients or the completion of specific phases in ongoing projects.



2. HDPE Pipes (High-Density Polyethylene Pipes):

- **Total Sales:** ₹53,99,95,252.00
- **Key Clients:** GVPR Engineers Limited, Hyderabad & AGP CGD India Private Limited, Jodhpur
- **Units Sold:** 742 units over the six-month period
- **Trend Analysis:**
 - **GVPR Engineers Limited** was the largest purchaser, contributing to **279 units** of HDPE pipe sales, driven by large-scale infrastructure and utility projects.
 - Sales peaked in **October**, reflecting high demand during critical phases of construction projects.

- **AGP CGD India Private Limited, Jodhpur** showed consistent purchasing trends, indicating ongoing use of HDPE pipes in gas distribution and utility projects.

Key Findings:

Product Performance:

- **MDPE Pipes** generated the highest revenue, accounting for **40%** of total product sales, with strong demand from **Vijayapura** and **KAN** regions.
- **HDPE Pipes** followed closely, with significant contributions from the **Aurangabad** region, reflecting their importance in large-scale utility and infrastructure projects.
- **Borouge Pipes**, though contributing less to overall revenue, saw consistent demand and an increase in sales during **September** and **December**, particularly from **Chennai** and **V N Kinagi Civil Contractor**; this information is given by the company manually.

Correlation Analysis:

- A **positive correlation** was observed between sales of **MDPE Pipes** and **HDPE Pipes**, suggesting that clients often purchase both for projects that require diverse pipe specifications.
- A **negative correlation** between **Borouge Pipes** and **MDPE Pipes** indicates that clients may choose one over the other depending on specific project requirements, materials, or budget constraints.

Trend Analysis:

- **MDPE Pipes** saw peak sales in **October** and **December**, reflecting demand driven by project timelines.
- **HDPE Pipes** had strong sales in **November**, likely corresponding with infrastructure project milestones.
- **Borouge Pipes** experienced stable demand throughout the period, with noticeable sales increases in **September** and **December**, reflecting ongoing utility and pipeline projects.

Seasonal Trends:

- Sales in **October** and **December** indicate seasonal trends, with project completions and infrastructure needs driving demand.
- **January** consistently shows high sales for all product categories, likely driven by new project commencements and year-end budgeting.

Overall Trend:

- Sales across all product categories show an upward trend from **2023 to 2024**, with cyclical variations reflecting periods of high demand followed by stabilisation.
- The year **2023** recorded an average product sales figure of **₹1,02,91,295.33**, marking a successful year for Vijaya Polymers' product lines.

6. Analysis Process for Vijaya Polymers Pvt. Ltd.

Tools Used: MS-Excel, Power Bi and Python were utilised for the exploratory Data Analysis.

a. Pre-processing: To get the data ready for more analysis, Excel was used for the first round of pre-processing.

b. Analysing Trends:

- **Categorization of Data:**
 - The data was categorised based on product types:
 - **Pipes:**
 - **HDPE Pipes**
 - **MDPE Pipes**
 - **Borouge Pipes**
 - **Sales Data:** Included information on customer companies, quantities sold, flow rates, and total costs.

- **Monthly Aggregation:**
 - Utilised Excel pivot tables to group sales and production data by month, calculating total quantities sold and produced for each month.
- **Visualisation of Patterns:**
 - Created line graphs in Power BI to visualise sales and production trends over time for each pipe category.
- **Revenue Trend Analysis:**
 - Employed Power BI to create stacked bar graphs illustrating yearly sales trends, highlighting the integration of quantities sold and total prices from 2023 to 2024.

c. Descriptive Statistics:

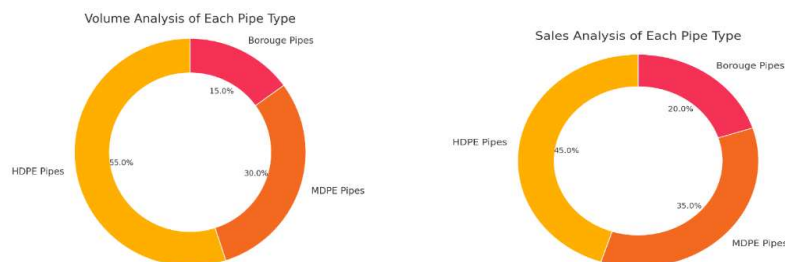
- Used Excel to compute key metrics such as the sum, maximum, minimum, and average sales and production figures across different product categories.

d. Donut Chart Production:

- **Creation of Pivot Tables:**
 - Developed separate pivot tables for each product category, summarising sales and production data.
- **Donut Chart Illustration:**
 - Represented the categorised data visually using donut charts to highlight the contributions of each pipe category to overall sales.

7. Results and Findings

- **Top-Performing Categories:** The **Donut charts** illustrate key insights regarding the best-selling products from Vijaya Polymers, specifically focusing on the three main pipe types: **HDPE Pipes**, **MDPE Pipes**, and **Borough Pipes**. These charts help us identify which types of pipes are generating the highest revenue and sales.
- **Focus on Best-Sellers:** Considering our limited inventory capacity, it's essential to concentrate on the best-selling pipe types. By prioritising these products, we can ensure their continuous availability and reduce the risk of stockouts, which can lead to lost sales and dissatisfied customers.
- **Inventory Optimization:** To optimise our inventory, we may need to consider reducing stock levels for less popular pipe types. This strategic approach will allow us to allocate resources more effectively, ensuring we have adequate supplies of the high-demand products.



Volume Analysis of Each Pipe Type:

- HDPE Pipes contribute the most to overall volume (55%).
- MDPE Pipes make up 30% of the total volume.
- Borough Pipes represent 15% of the total volume.

Sales Analysis of Each Pipe Type:

- HDPE Pipes contribute 45% to total sales revenue.
- MDPE Pipes account for 35% of total sales.
- Borough Pipes bring in 20% of the sales revenue.

CONCLUSIONS:

- **HDPE Pipes** have the largest share in both volume and sales, indicating strong demand and market presence.
- **MDPE Pipes** follow closely behind, contributing significantly to both volume and revenue, but slightly less than HDPE Pipes.
- **Borouge Pipes**, while having the smallest share in volume and sales, still contribute a meaningful 20% to sales, possibly indicating a higher price per unit sold.

RECOMMENDATIONS:

- **Focus on HDPE Pipes:** Since HDPE Pipes contribute the most to both volume and revenue, the company should prioritize maintaining a steady supply of HDPE pipes to meet demand. Regular inventory checks and restocking strategies should be implemented to avoid stockouts.
- **Optimize MDPE Pipe Sales:** MDPE pipes also have significant contributions to both volume and sales, but there is room to increase their revenue share. The company could explore marketing strategies to promote MDPE pipes more effectively, perhaps emphasizing their unique benefits to attract more customers.
- **Evaluate Borouge Pipe Positioning:** While Borouge pipes have a smaller share of total sales, their higher per-unit price suggests potential profitability. Consider conducting a market analysis to identify why this category has lower volume and sales, and if necessary, adjust pricing or marketing to boost sales.
- **Product Diversification:** If HDPE and MDPE pipes continue to dominate, consider introducing new variants or product features that can build on their success. This could help capture new market segments and increase overall sales.
- **Targeted Marketing Campaigns:** Tailor marketing strategies based on each product's performance. For HDPE pipes, emphasize bulk discounts or reliability. For MDPE pipes, highlight affordability and versatility. For Borouge pipes, promote premium features or niche applications to appeal to high-end customers.
- **Explore Pricing Adjustments:** If Borouge pipes have a higher price but lower demand, consider reviewing pricing strategies to ensure competitiveness, without sacrificing profit margins.