Industry Research Report on Hydraulic Fittings Industry

September 2025

Disclaimer

This report is prepared by Care Analytics and Advisory Private Limited (CareEdge Research). CareEdge Research has taken utmost care to ensure accuracy and objectivity while developing this report based on information available in CareEdge Research's proprietary database, and other sources considered by CareEdge Research as accurate and reliable including the information in public domain. The views and opinions expressed herein do not constitute the opinion of CareEdge Research to buy or invest in this industry, sector or companies operating in this sector or industry and is also not a recommendation to enter into any transaction in this industry or sector in any manner whatsoever.

This report has to be seen in its entirety; the selective review of portions of the report may lead to inaccurate assessments. All forecasts in this report are based on assumptions considered to be reasonable by CareEdge Research; however, the actual outcome may be materially affected by changes in the industry and economic circumstances, which could be different from the projections.

Nothing contained in this report is capable or intended to create any legally binding obligations on the sender or CareEdge Research which accepts no responsibility, whatsoever, for loss or damage from the use of the said information. CareEdge Research is also not responsible for any errors in transmission and specifically states that it, or its Directors, employees, parent company – CARE Ratings Ltd., or its Directors, employees do not have any financial liabilities whatsoever to the subscribers/users of this report. The subscriber/user assumes the entire risk of any use made of this report or data herein. This report is for the information of the authorised recipient in India only and any reproduction of the report or part of it would require explicit written prior approval of CareEdge Research.

CareEdge Research shall reveal the report to the extent necessary and called for by appropriate regulatory agencies, viz., SEBI, RBI, Government authorities, etc., if it is required to do so. By accepting a copy of this Report, the recipient accepts the terms of this Disclaimer, which forms an integral part of this Report.

Table of Contents

List of Charts

List of Tables

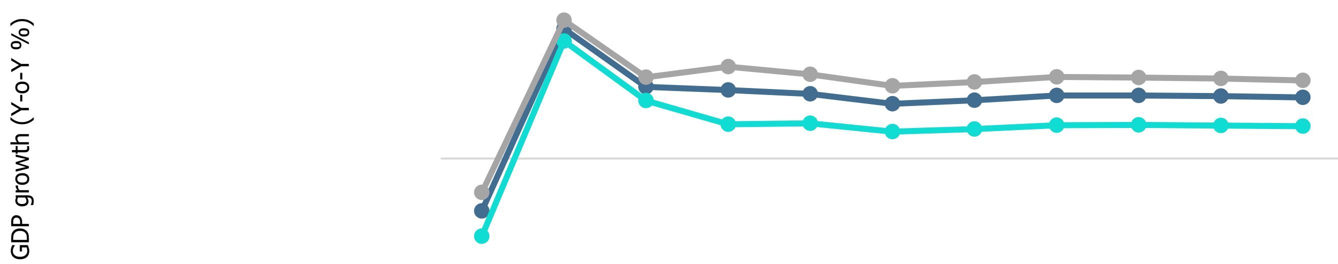
1. Global and Indian Macroeconomic Overview and Outlook

1.1 Global Macroeconomic Outlook

1.1.1 Review of global GDP growth

Global growth, which reached 3.5% in CY23, stabilized at 3.3% for CY24 and projected to decrease at 2.8% for CY25. Global trade is expected to be disrupted by new US tariffs and countermeasures from trading partners, leading to historically high tariff rates, and negatively impacting economic growth projections. The global landscape is expected to change as countries rethink their priorities and policies in response to these new developments. Central banks priority will be to adjust policies, while smart fiscal planning and reforms are key to handling debt and reducing global inequalities.

Chart 1: Global Growth Outlook Projections (Real GDP, Y-o-Y change in %)



	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
World	-2.7%	6.6%	3.6%	3.5%	3.3%	2.8%	3.0%	3.2%	3.2%	3.2%	3.1%
Advanced Economies	-4.0%	6.0%	2.9%	1.7%	1.8%	1.4%	1.5%	1.7%	1.7%	1.7%	1.7%
Emerging Market and Developing Economies	-1.7%	7.0%	4.1%	4.7%	4.3%	3.7%	3.9%	4.2%	4.1%	4.1%	4.0%

Source: IMF – World Economic Outlook, April 2025; Notes: P-Projection

1.1.2 Global GDP outlook as per IMF

Table 1: GDP growth trend comparison - India v/s Other Economies (Real GDP, Y-o-Y change in %)

	Real GDP (Y-o-Y change in %)										
	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
India	-5.8	9.7	7.6	9.2	6.5	6.2	6.3	6.5	6.5	6.5	6.5
China	2.3	8.6	3.1	5.4	5.0	4.0	4.0	4.2	4.1	3.7	3.4
Indonesia	-2.1	3.7	5.3	5.0	5.0	4.7	4.7	4.9	5.0	5.1	5.1
Saudi Arabia	-3.6	5.1	7.5	-0.8	1.3	3.0	3.7	3.6	3.2	3.2	3.3

Brazil	-3.3	4.8	3.0	3.2	3.4	2.0	2.0	2.2	2.3	2.4	2.5
Euro Area	-6.0	6.3	3.5	0.4	0.9	0.8	1.2	1.3	1.3	1.2	1.1
United States	-2.2	6.1	2.5	2.9	2.8	1.8	1.7	2.0	2.1	2.1	2.1

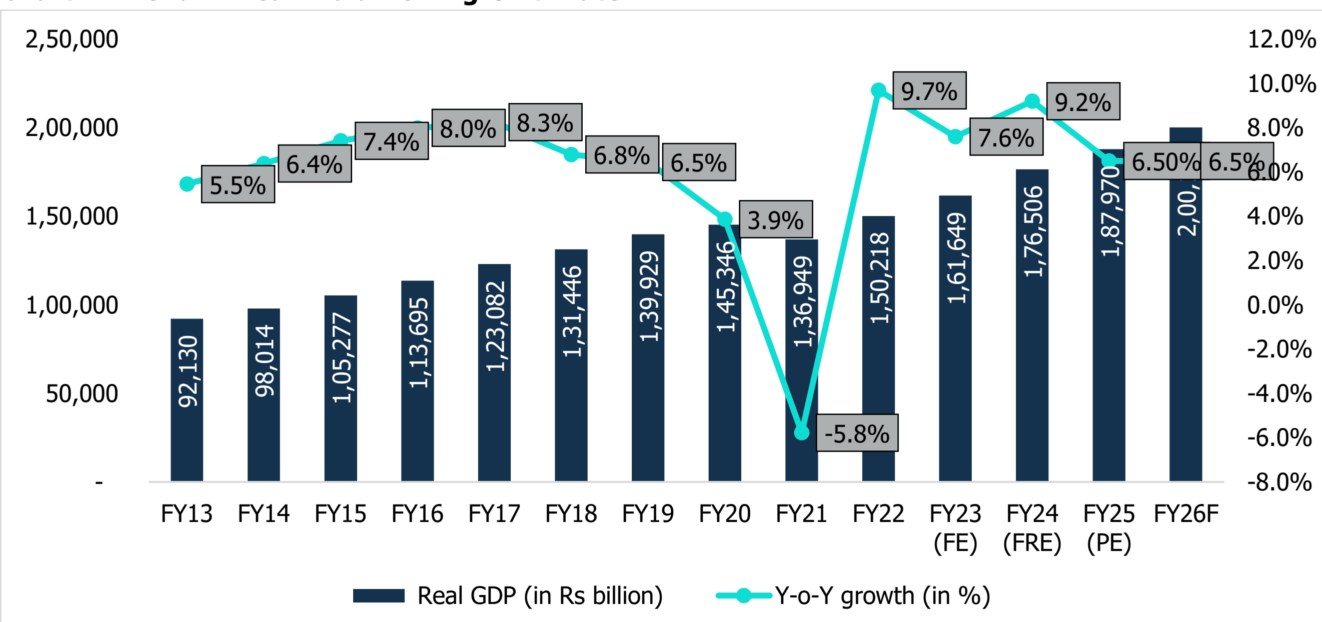
Source: IMF- World Economic Outlook Database (April 2025)
Note: P- Projections, E-Estimate; India's fiscal year (FY) aligns with the IMF's calendar year (CY). For instance, FY24 corresponds to CY23

2. Indian Macroeconomic Outlook

2.1 GDP Growth and Outlook

Resilience to External Shocks remains Critical for Near-Term Outlook

Chart 2: Trend in Real Indian GDP growth rate



Source: MOSPI, Reserve Bank of India
Note: FE – Final Estimates, FRE- First Revised Estimates, PE – Provisional Estimates, F – Forecasted

India's real GDP grew by 9.2% in FY24 (Rs. 176,506 billion) which is the highest in the previous 12 years (excluding FY22, on account of end of pandemic) and as per provisional estimates, it grew at 6.5% in FY25 (Rs. 187,970 billion), driven by double digit growth particularly in the Manufacturing sector, Construction sector and Financial, Real Estate & Professional Services. This growth is also led by private consumption increasing by 7.6% and government spending increasing by 3.8% Y-o-Y. Real GDP growth is projected at 6.5% in FY26 as well, driven by strong rural demand, improving employment, and robust business activity.

GDP Growth Outlook (April 2025)

FY26 GDP Outlook: The RBI projects real GDP growth at 6.5% for 2025–26, driven by strong private consumption, steady investment, and resilient rural and urban demand. A favourable monsoon, robust services sector and improving corporate balance sheets support this outlook.

However, risks from prolonged geopolitical tensions, global trade disruptions, and weather-related uncertainties remain. Taking these into account, the RBI has reaffirmed its growth projections.

Table 2: RBI's GDP Growth Outlook (Y-o-Y %)

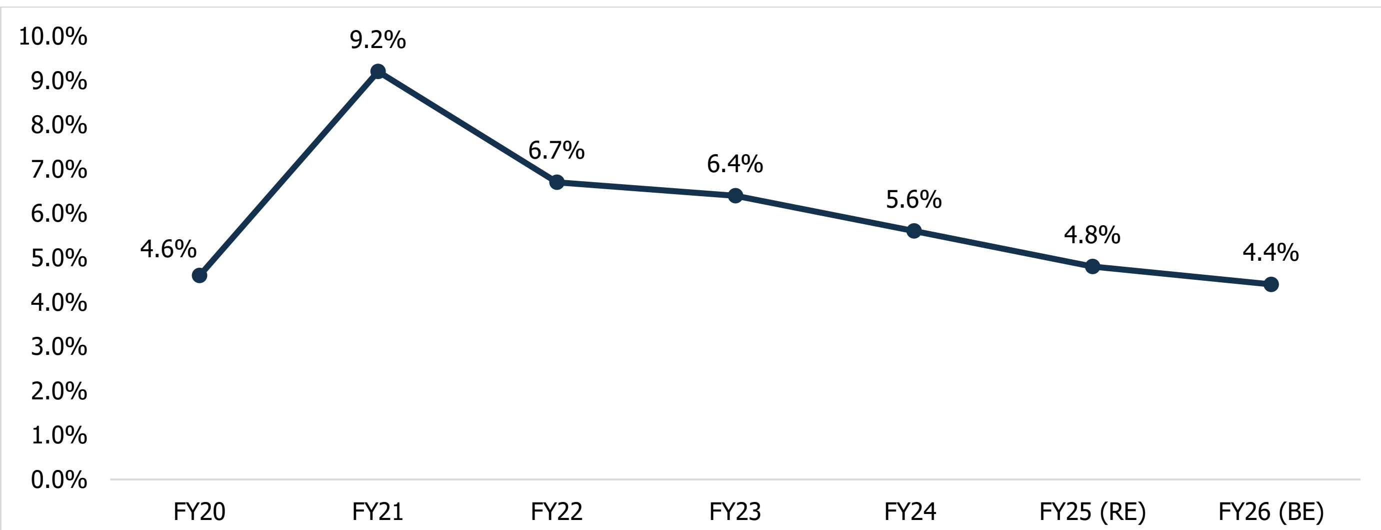
FY26P (complete year)	Q1FY26P	Q2FY26P	Q3FY26P	Q4FY26P
6.5%	6.5%	6.7%	6.6%	6.3%

Source: Reserve Bank of India; Note: P-Projected

2.2 Fiscal Deficit (as a % of GDP)

In FY21, India's fiscal deficit was 9.2% due to the impact of COVID-19, since then it has seen a steady improvement is expected to reduce to 4.8% of GDP FY25 (RE), driven by strong economic growth and higher tax and non-tax revenues. The government aims for further fiscal consolidation, setting a target of 4.4% of GDP for FY26 to maintain fiscal prudence.

Chart 3: Gross Fiscal Deficit (% of GDP)

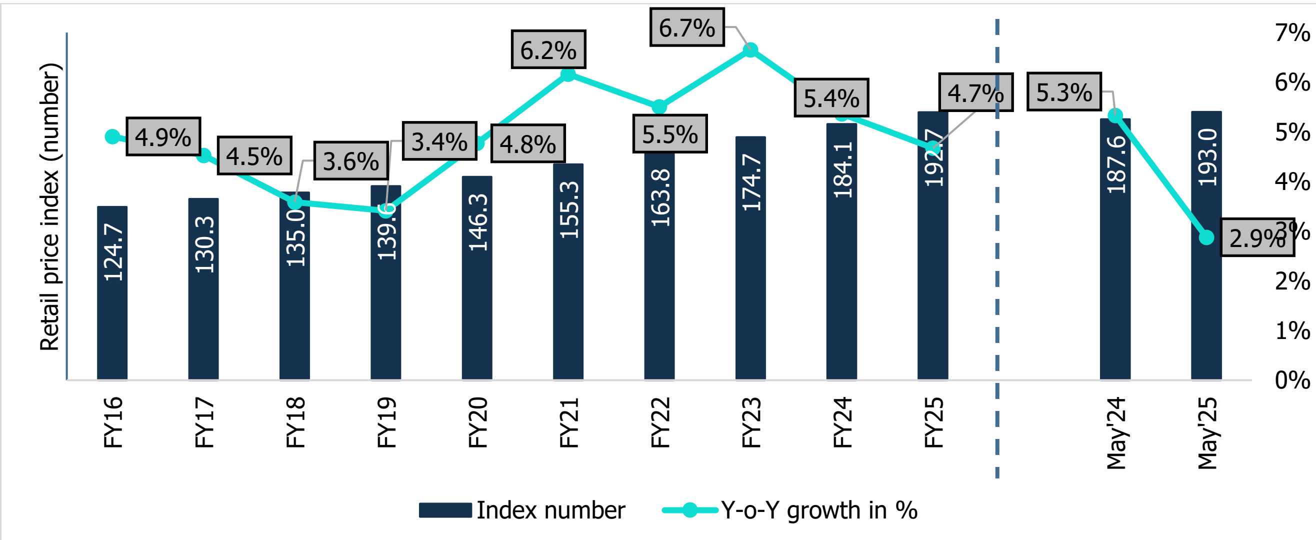


Source: RBI; Note: RE-Revised Estimates, BE-Budget Estimates

2.3 Consumer Price Index

The CPI (general) and food inflation in May 2025 over May 2024 (2.9%, provisional) witnessed lowest Y-o-Y inflation since February 2019. The moderation was driven by decline of inflation in pulses, vegetables, fruits, cereals, households' goods & services, sugar & confectionary, and eggs.

Chart 4: Retail Price Inflation in terms of index and Y-o-Y Growth in % (Base: 2011-12=100)

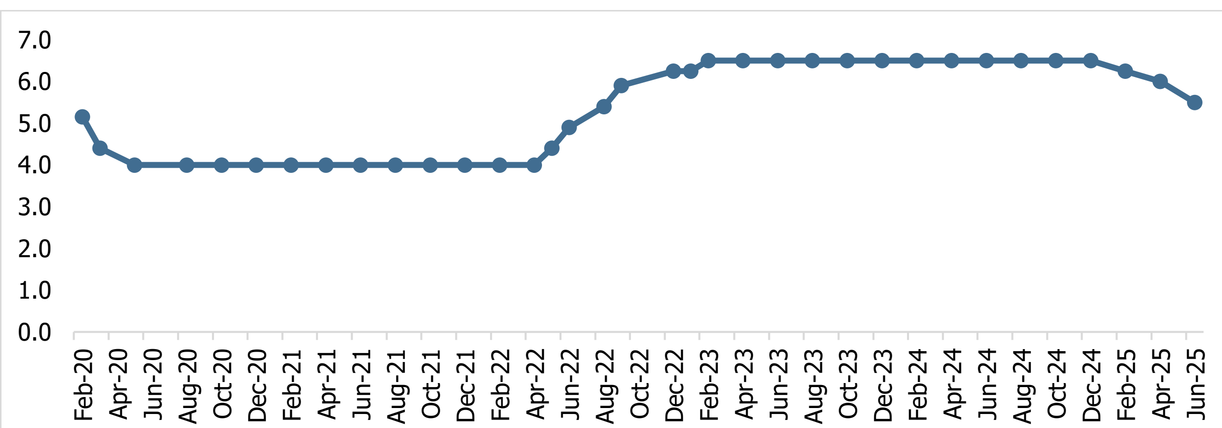


Source: MOSPI

The CPI is primarily factored in by RBI while preparing their bi-monthly monetary policy. At the bi-monthly meeting held in June 2025, RBI projected inflation at 3.7% for FY26 with inflation during Q1FY26 at 2.9%, Q2FY26 at 3.4% and Q3FY26 at 3.9% and Q4FY26 4.4%.

Considering the current inflation situation, RBI cut the repo rate to 5.5% in the June 2025 meeting of the Monetary Policy Committee.

Chart 5: RBI historical Repo Rate



Source: RBI

Further, the central bank shifted its policy stance from 'accommodative' to 'neutral.' With a decline in food inflation, the headline inflation moderated to a six-year low to 3.2% in April 2025.

The economic growth outlook for India is expected to maintain momentum, supported by private consumption and continued growth in fixed capital formation. The uncertainty regarding the global outlook has reduced given the temporary tariff stay and optimism with trade negotiations. However, global growth and trade has been revised downward due to weakened sentiments and lower growth prospects.

The RBI has adopted for a non-inflationary growth with the foundations of strong demand and supply with a good macroeconomic balance. The domestic growth and inflation curve requires the policies to be supportive of the volatile trade conditions.

2.4 Key Growth Drivers for Economic Growth

Urbanization: Urbanization contributes to economic growth by concentrating on people and resources in cities, which enhances productivity and innovation. Cities provide better access to infrastructure, education, and healthcare, as well as closer interactions among workers and firms that foster knowledge sharing and business opportunities. This overall effect helps economies grow more efficiently and adapt quickly to new economic trends.

Young population in India: The age structure of a population significantly affects economic growth through the "demographic dividend." A rising proportion of the working-age population compared to dependents means there are more people actively contributing to economic activities and fewer relying on support. This demographic shift can boost savings, investment, and productivity, presenting a valuable opportunity for faster economic growth.

Population Growth: India's growing population will expand the labour force and increase demand for goods and services, creating a larger domestic market that attracts investment. This will support economies of scale and boost economic activity across various sectors. With more workers available, productivity and output are likely to rise, driving overall growth. Additionally, a bigger market encourages businesses to innovate and expand, further strengthening the economy. Efficient integration of this population into productive roles will accelerate India's economic development.

Openness to Trade and Foreign Investment: India's openness to trade and foreign investment has expanded its access to global markets and diverse goods. By focusing on sectors like IT and pharmaceuticals, India has improved efficiency and competitiveness. Foreign investment brings capital, technology, and expertise, boosting productivity and fuelling economic growth.

2.5 GVA in the Industrial Sector

India's industrial sector is expected to grow by 10.8% in FY24, reaching Rs. 31.56 trillion, supported by positive business sentiment, falling commodity prices, and government initiatives like production-linked incentives. In FY25, growth is expected to slow down to 5.9% y-o-y, down from 10.8% in FY24. The growth is driven primarily by manufacturing, construction, and utility services. The slowdown can be attributed to the manufacturing segment likely to grow at 4.5%, lower than the previous year's 12.3%.

Table 3: Industrial sector growth (Y-o-Y growth) -at Constant Prices

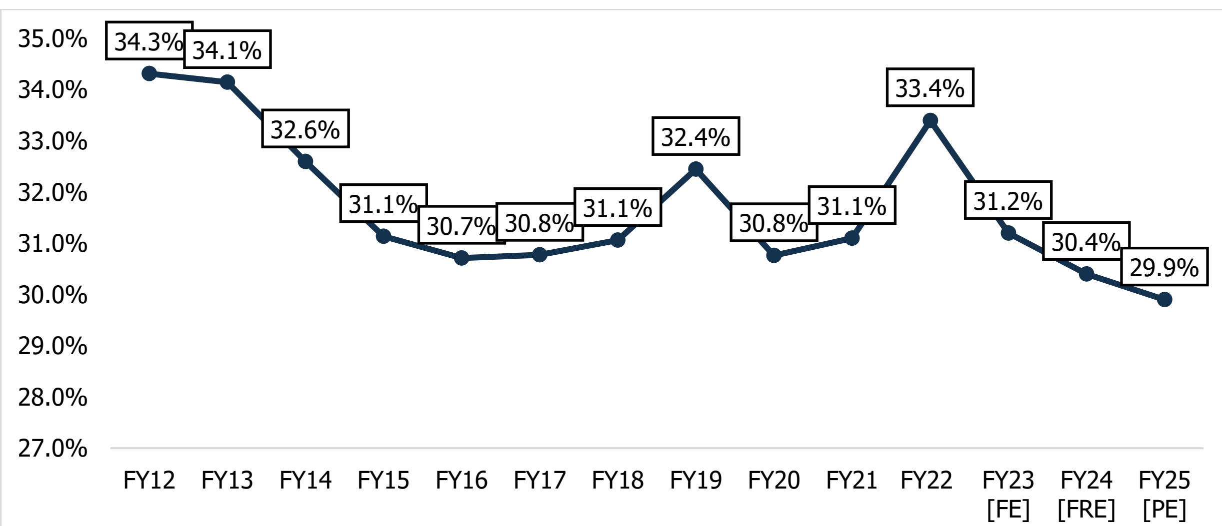
At constant Prices	FY19	FY20	FY21	FY22	FY23 (FE)	FY24 (FRE)	FY25 (PE)
Industry	**5.3**	**-1.4**	**-0.9**	**11.6**	**2.0**	**10.8**	**5.9**
Mining & Quarrying	-0.9	-3.0	-8.6	7.1	2.8	3.2	2.7
Manufacturing	5.4	-3.0	2.9	11.1	-3.0	12.3	4.5
Electricity, Gas, Water Supply & Other Utility Services	7.9	2.3	-4.3	9.9	11.5	8.6	5.9
Construction	6.5	1.6	-5.7	14.8	10.0	10.4	9.4
GVA at Basic Price	**5.8**	**3.9**	**-4.2**	**8.8**	**7.4**	**8.6**	**6.4**

Source: MOSPI; Note: FRE – First Revised Estimates, FE – Final Estimates, PE- Provisional Estimates

2.6 Investment Trend in Infrastructure

Gross Fixed Capital Formation (GFCF) is a measure of net increase in physical assets. In FY23, the ratio of investment (GFCF) to GDP remained flat, as compared to FY22 which was at 33.4%. The growth stabilized at 30.4% in FY24 before falling to 29.9% in FY25. The moderation reflects cautious capital spending by both government and private corporations, which has persistently lagged overall GDP growth.

Chart 6: Gross Fixed Capital Formation (GFCF) as % of GDP (At constant prices)



Source: MOSPI; Note: FRE- First Revised Estimates, FE – Final Estimates, PE- Provisional Estimates

Overall, the support of public investment in infrastructure is likely to gain traction due to initiatives such as Atmanirbhar Bharat, Make in India, and Production-linked Incentive (PLI) scheme announced across various sectors.

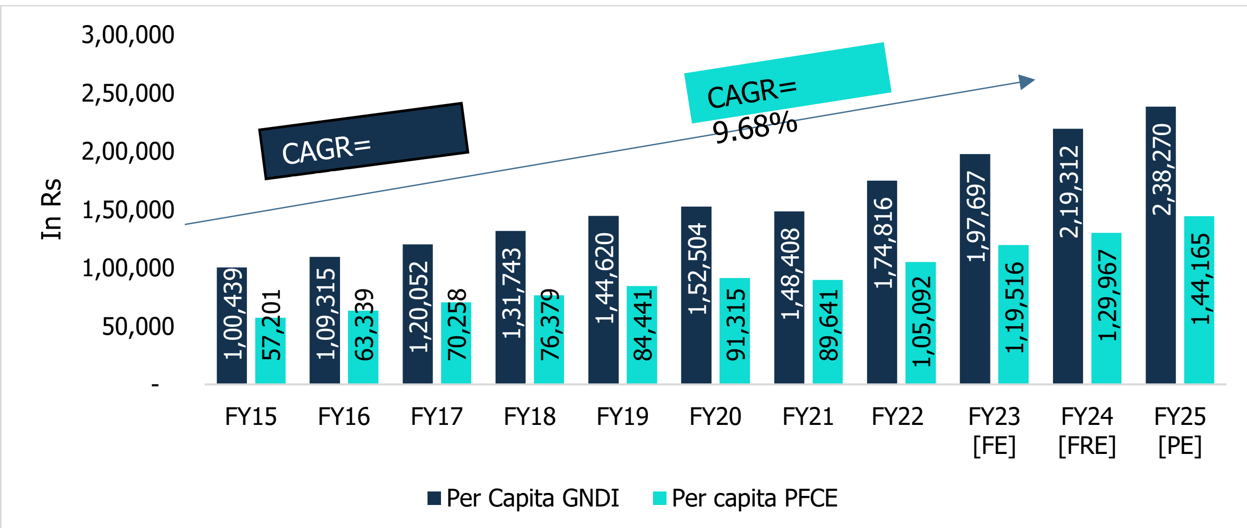
2.7 Per capita PFCE and GNDI

- **Increasing Disposable Income and Consumer Spending**

Gross National Disposable Income (GNDI) is a measure of the income available to the nation for final consumption and gross savings. Between the period FY15 to FY25, per capita GNDI at current prices registered a CAGR of 9.02%. More disposable income drives more consumption, thereby driving economic growth.

With the increase in disposable income, there has been a gradual change in consumer spending behaviour as well. Per capita Private Final Consumption Expenditure (PFCE), which is a measure of consumer spending has also shown significant growth from FY15 to FY25 at a CAGR of 9.68%.

Chart 7: Trend of Per Capita GNDI and Per Capita PFCE (Current Price)



Source: MOSPI; Note: FRE – First Revised Estimates, FE – Final Estimates, PE- Provisional Estimates

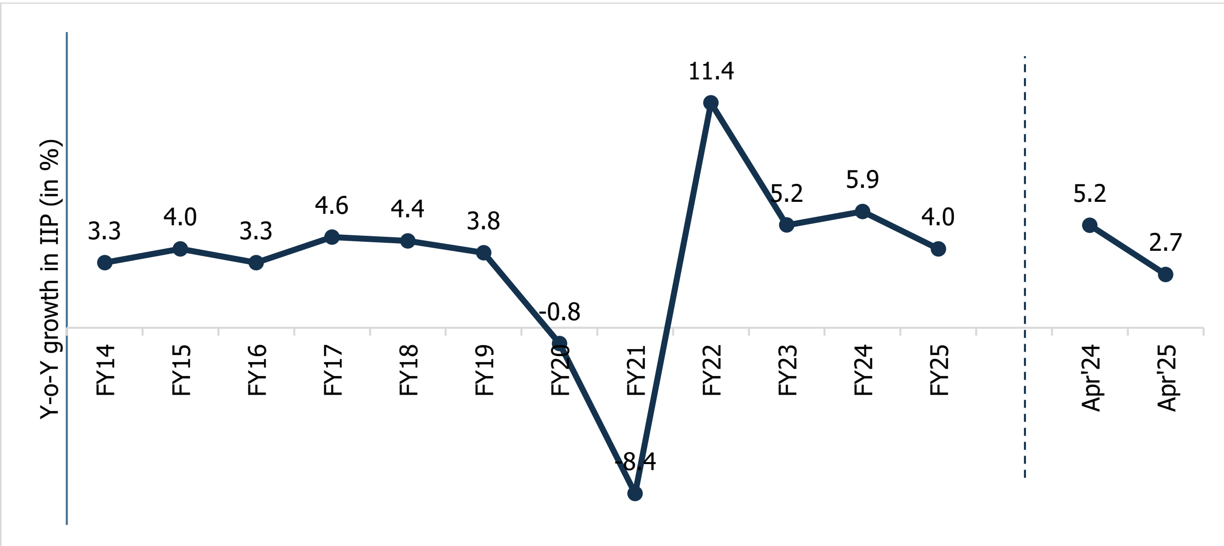
2.8 Industrial Growth

The Quick Estimates of the Index of Industrial Production (IIP) for April 2025 show a growth of 2.7%, compared to 5.2% in April 2024. The year-on-year growth moderation reflects subdued performance across key segments, largely due to a contraction in consumer non-durables, infrastructure industries, intermediate goods, capital goods, and primary goods.

In April 2025, industrial growth was supported by Manufacturing (3.4%) and Electricity (1.1%), while the Mining sector contracted by 0.2%. Within the manufacturing sector, industry groups such as pharmaceuticals, motor vehicles, and beverages recorded notable growth. Specifically, the electrical equipment and fabricated metal products segments contributed positively Use-based indices highlighted slower growth across Primary Goods, Capital Goods, and Intermediate Goods. Capital Goods, however, stood out with a strong 20.3% rise, suggesting continued investment momentum.

Manufacturing output grew by 3.4%, contributing significantly to overall industrial growth. This was primarily driven by strong performance in segments such as pharmaceuticals, motor vehicles, beverages, and electrical equipment.

Chart 7: Y-o-Y growth in IIP (in %)



Source: MOSPI

2.9 Concluding Remarks

Global economic growth faces headwinds from geopolitical tensions, volatile commodity prices, high interest rates, inflation, financial market volatility, climate change, and rising public debt. However, India's economy remains relatively strong, with an IMF forecast of 6.2% GDP growth in CY25 (FY26 according to the fiscal year), compared to the global projection of 2.8%. Key drivers include strong domestic demand, government capital expenditure and moderate inflation.

Public investment is expected to exhibit healthy growth as the government has allocated a strong capital expenditure of about Rs. 11.21 lakh crores for FY26. The private sector's intent to invest is also showing improvement as per the data announced on new project investments and resilience shown by the import of capital goods. Additionally, improvement in rural demand owing to healthy sowing, improving reservoir levels, and progress in south-west monsoon along with government's thrust on capex and other policy support will aid the investment cycle in gaining further traction.

The impact of U.S. tariffs on India's export trade is expected to remain limited. Engineering goods may face increased tariff exposure, while the steel industry though subject to 25% tariffs sees minimal effects given lower export volumes. The U.S. raised its reciprocal tariffs on Indian exports, including engineering goods from 25% to 50%. However, hydraulic hose fittings and related parts (classified under HTS codes 8412.90.9080 and similar) are currently duty-free. Consequently, hydraulic fittings exported from India to the U.S. remain exempt from tariffs despite broader increases affecting other sectors.

On February 13, Prime Minister Narendra Modi and President Donald Trump discussed enhancing the U.S.-India trade relationship, with a target to increase bilateral trade from USD 200 billion to USD 500 billion by 2030. Negotiations for a multi-sector bilateral trade agreement (BTA) are expected to commence later this year, focusing on trade fairness, national security, and job creation.

Thus, while U.S. tariffs may have a limited impact on India's exports, ongoing trade negotiations and India's competitive manufacturing advantage position it well for continued growth in global trade.

3. Overview of Hydraulic Fittings

3.1 Overview of Hydraulic systems

Hydraulic systems operate via pressurized fluids. Within a hydraulic system, pressure is applied on contained fluid and this pressurized fluid creates force or power and acts upon every part of the section of the containing vessel. Depending on how this force is applied, operator can lift heavy loads. Hydraulic systems are usually used when load requirements change very frequently or where high-power density is required.

Some of the basic components that form part of hydraulic systems are detailed below:

- **Hydraulic pump**
  - A hydraulic pump is one of the most important components of the hydraulic system as it converts mechanical energy of fluids into hydraulic energy. Usually, power-driven pumps are used in the hydraulics system however hand pumps can be used in case of emergency if power pump isn't able to function. Hydraulic pumps can be classified into:
  - **Piston pump:** Hydraulic piston pumps can handle high hydraulic system pressures and hence can operate with various control types.
  - **Gear pump:** Gear pumps have a simpler structure with very few moving parts.
  - **Vane pump:** These pumps operate with lower pulsation and are light weight. It produces less noise due to its structure.
- **Actuators**
  - Actuators help convert hydraulic energy back to mechanical energy. Actuators include hydraulic cylinders and hydraulic motors. Hydraulic cylinders aid in conversion of hydraulic energy into linear motion while a hydraulic motor supports in conversion of hydraulic energy into mechanical rotating motion. Different types of hydraulic cylinders and motors are available in the market depending on the usage.
- **Valves**
  - Hydraulic valves support the hydraulic systems by starting, stopping, and directing the flow of hydraulic fluids and are made of spools or poppets. Some of the common varieties of valves are:
- **Pressure control valves:** Such valves control pressure in the hydraulic systems and different types of pressure control valves are available depending on the control to be achieved such as relief valves, sequence valves, brake valves etc.

- **Directional control valves:** Such valves can control start/stop, directions, and acceleration/deceleration of hydraulic motors and cylinders. They can be classified into three types:

spool, poppet, and ball.

- **Flow control valves:** Such valves control flow rate in hydraulic systems and are classified further basis the type of control that needs to be achieved.
- **Accumulators**
    - Accumulators help in achieving a large flow rate and absorb pulsations and shocks.
- **Hydraulic Fittings**

  Hydraulic fittings aid in transmission of energy generated by the hydraulic fluid and help to maintain high pressure conditions. It is detailed in the next section.

Cylinders, motors, filters, hydraulic fluids, tubes, pipes and hoses, seals, sensors are some of the other components that form part of hydraulic systems.

3.2 Hydraulic Fittings market size

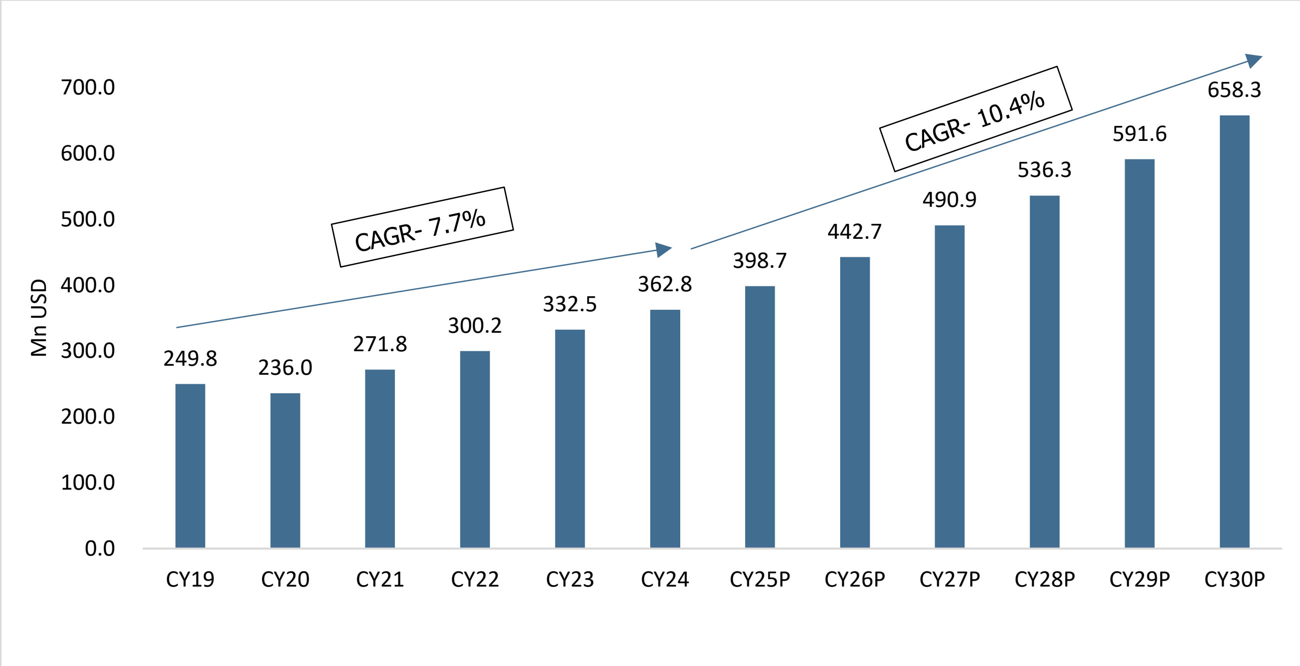
Hydraulic fittings are primarily used in hydraulic systems to connect pipes, tubes, and hoses. Hydraulic fittings support the transmission of energy produced by the hydraulic fluid and help maintain high pressure conditions. The varied type of hydraulic fittings allows the fluid to flow, change direction or mix. The fittings should be capable of creating a tight seal and preventing leakage in the application in which it is being used. As the hydraulic system operates under high pressure conditions and therefore is not a fixed system, hydraulic fittings need to be reliable, strong, and versatile to operate effectively in the respective hydraulic systems it is being used.

Hydraulic fittings can be classified based on application, size, shape, connection type and so on which leads to some fittings better suited for specific applications. The fittings can be made of steel, brass, aluminium, plastic etc.

The hydraulic fittings market in India is experiencing significant growth, driven by the expansion of various industries such as manufacturing, construction, automotive, and agriculture. As infrastructure development and industrialization continue to rise, there is an increasing demand for hydraulic systems, which in turn boosts the need for high-quality hydraulic fittings. Key trends in this market include the growing adoption of automation, increasing investments in renewable energy projects, and a shift towards more durable, corrosion-resistant, and efficient hydraulic components. Furthermore, the rise of local manufacturing and the availability of cost-effective solutions are making hydraulic fittings more accessible to small and medium-sized enterprises. Additionally, advancements in technology, such as the integration of IoT and smart sensors in hydraulic systems, are shaping the market's future.

The increasing adoption of technologically advanced machines across various industries such as agriculture, construction, material handling, and aerospace is expected to drive growth in the hydraulic fittings market. In India, the hydraulic fittings market has grown at a CAGR of 7.7% between CY19 and CY24 and is projected to expand at a higher CAGR of 10.4% from CY24 to CY30.

Chart 8: Indian Market Size of Hydraulic Fittings



Source: Maia Research, Care Edge Research

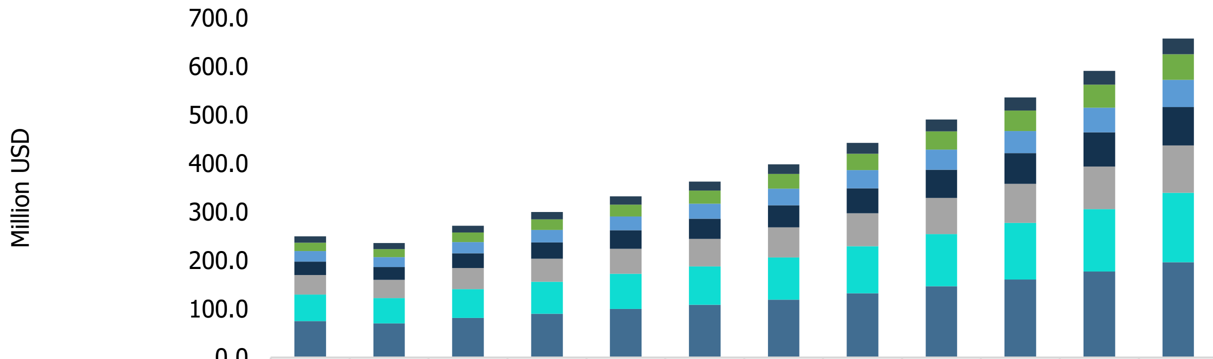
3.3 Types of Hydraulic fittings

Hydraulic fittings can be differentiated on the basis of type of connection and the function it performs.

3.3.1 On the basis of Type of connection

Hydraulic fittings can be connected in various ways depending on the requirement and usage. The hydraulic fittings market is evolving with a growing demand for more specialized and efficient connection solutions across various industries.

Chart 9: Indian Market Size of Hydraulic Fittings – based on connections



	CY19	CY20	CY21	CY22	CY23	CY24	CY25 P	CY26 P	CY27 P	CY28 P	CY29 P	CY30 P
Others	12.8	12.2	13.9	15.1	16.9	18.2	20.1	22.2	24.0	26.7	29.0	32.4
End Fittings	17.4	16.6	19.3	21.8	24.4	27.0	30.0	33.7	38.1	42.1	47.1	53.1
Push-to-Connect	21.7	20.4	23.3	25.5	28.5	31.3	34.2	37.7	41.5	45.7	50.8	56.1
Flange Fittings	27.7	26.2	30.5	34.0	38.0	41.8	46.1	51.6	57.7	63.6	70.8	79.0
Crimp Fittings	40.4	38.0	43.4	47.6	52.0	56.3	61.6	67.9	74.6	80.4	88.0	97.5
Threaded Fittings	54.5	51.7	59.9	65.9	72.6	79.1	87.2	97.4	107.6	116.9	128.7	143.7
Compression Fittings	75.3	70.9	81.5	90.5	100.1	109.2	119.5	132.4	147.5	160.9	177.2	196.4

Compression Fittings, Threaded Fittings, Crimp Fittings, Flange Fittings, Push-to-Connect, End Fittings, Others

Source: Maia Research, CareEdge Research

- **Compression Fittings**

Compression fittings are those fittings that make use of compressive force to connect vessel to the fitting. These fittings are gaining popularity due to their ability to form leak-proof seals in high-pressure systems, offering excellent reliability and ease of installation.

The Compression hydraulic fittings market has grown at CAGR of 7.7% from CY19 to CY24 and is expected to grow at a CAGR of 10.3% from CY24 to CY30.

Some of the types of compression fittings are stated below:

- **Flare fittings'** structure includes a body with a flared/coned end. Flare fittings usually can handle higher pressures and a broader range of operating parameters than standard compression fittings.
- **Standard fittings** make use of rings, ferrules or metal gaskets which ultimately form a seal on vessel via compression. Such types of fittings are useful in quick field installations as they usually do not require tools to assemble.
- **Mechanical grip fittings** are primarily two-ferrule assemblies and can be reassembled multiple times without damaging other components. They are known to have good resistance to mechanical vibration.
- **Bite type fittings** have a sharpened ferrule that "bites" the vessel when compressed and provides the seal.

- **Crimp Fittings**

Crimp fittings are designed in a way that a hose is placed over a tubular end and crimped/compressed against it with a ring, sleeve or a crimp socket. Such fittings usually need crimping tools/machines to make connections. Skiving means that part of the hydraulic hose placed over the tubular end/inner tube is removed before attaching hose ends.

These fittings are also on the rise, especially in industries requiring secure, high-performance connections for hydraulic hoses. The crimping process ensures a tight, durable connection that can handle high pressures, making these fittings ideal for demanding applications in sectors like automotive and manufacturing. The Crimp hydraulic fittings market has grown at CAGR of 6.9% from CY19 to CY24 and is expected to grow at a CAGR of 9.6% from CY24 to CY30.

Figure 1: No Skive crimp fitting

Figure 2: Skive crimp fitting

Source: Parker Hannifin website

- **Flange Fittings**

Hydraulic flange fittings facilitate easy connection between tube or pipe and hose where flexibility is required between rigid lines (pipe to pipe or tube to tube). Such fittings can be either rims, edges, collars or ribs. Such fittings are used in the most demanding applications, as they are well suited for high pressure, shock and vibration, especially in larger sizes. Flange fittings are used in the most demanding applications, as they are well suited for high pressure, shock, and vibration, especially in larger sizes.

These fittings are increasingly being used in large-scale industrial systems, particularly where the need for strong, reliable connections at higher pressures is critical. They provide robust, leak-resistant solutions for heavy-duty applications. The flange hydraulic fittings market has grown at CAGR of 8.6% from CY19 to CY24 and is expected to grow at a CAGR of 11.2% from CY24 to CY30.

- **Push-to-Connect**

Push to Connect fittings are suitable in scenarios where systems need to be frequently connected and disconnected. The ends of such fittings are designed in a way that it connects to tubes by pushing it into the end.

These fittings are becoming a trend in applications requiring fast and easy installation, minimizing downtime, and improving system flexibility. These fittings are especially popular in automation and fluid power systems due to their simple, tool-free connection process. The push to connect hydraulic fittings market has grown at CAGR of 7.6% from CY19 to CY24and is expected to grow at a CAGR of 10.2% from CY24 to CY30.

- **End Fittings**

End fittings are designed in a way so as to provide specific surfaces in order to connect vessels in hydraulic systems and some of the common type of end fittings are clamp end fittings and plain end fittings.

These fittings, used to attach hoses to equipment, are evolving with advancements that focus on durability, corrosion resistance, and easier assembly. The End hydraulic fittings market has grown at CAGR of 9.2% from CY19 to CY24 and is expected to grow at a CAGR of 11.9% from CY24 to CY30.

- **Threaded Fittings**

Such type of fittings has screw threads on their outer (male) and inner (female) surfaces and can accept connections with matching threads. The threads can be bifurcated into straight threads and tapered threads. Thread sizes are based on standards and some of the common standards include British Standard Pipe (BSP) and National Pipe Thread (NPT) among other standards.

These fittings continue to be widely used for their versatile and cost-effective connection solutions, offering both strength and adaptability for varied system configurations. The threaded hydraulic fittings market has grown at CAGR of 7.7% from CY19 to CY24 and is expected to grow at a CAGR of 10.5% from CY24 to CY30.

3.3.2 On the basis of function

Hydraulic fittings can also be segregated on the basis of the functions they perform.

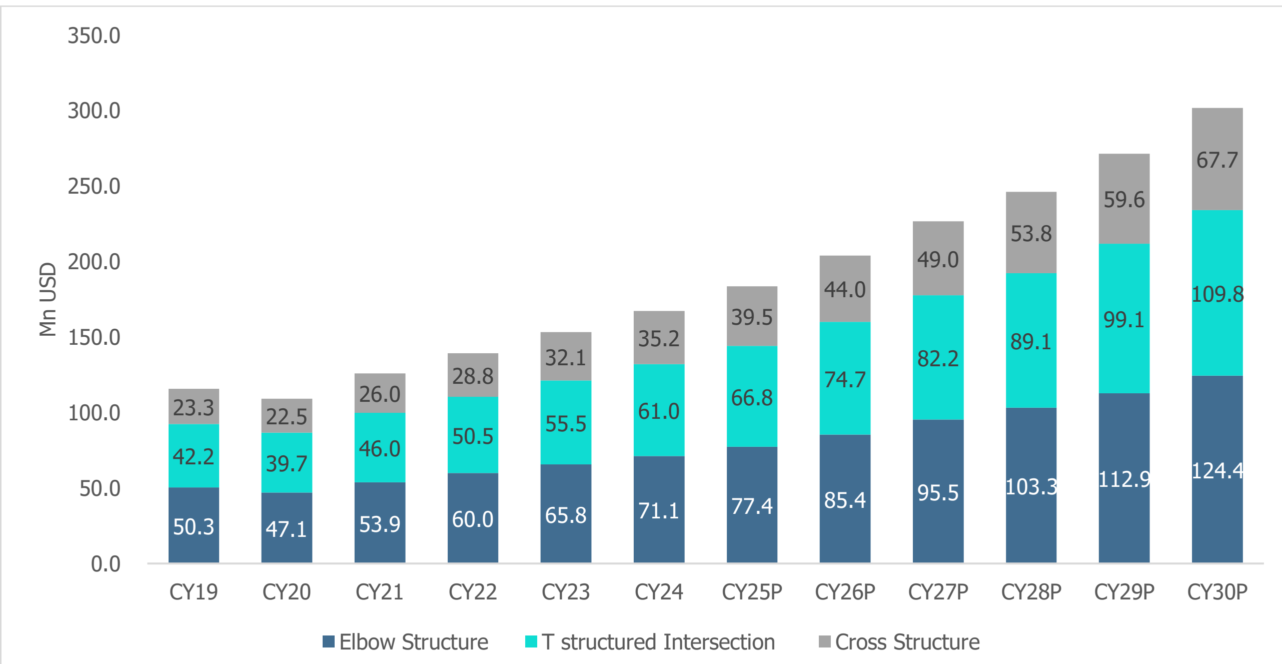
1. Fittings which add or change direction

The market for hydraulic fittings, including T-structures, cross fittings, and elbow fittings, has been experiencing steady growth due to the increasing demand for hydraulic systems across various industries such as manufacturing, automotive, aerospace, and agriculture.

Tee	Cross	Elbow
•T-structured intersection to connect three flow sections	•Such fittings provide 4 way connection to change direction of flow	•Such fittings can change direction of the flow at various angles

Source: Industry Sources, CareEdge Research

Chart 10: Market Size of change in direction Hydraulic Fittings – based on functions



Source: Maia Research, CareEdge Research

T-structures and cross fittings are essential for creating branching connections in hydraulic circuits, allowing for better fluid control and distribution, while elbow fittings are critical for redirecting fluid flow in different directions without compromising system integrity. The trend shows a shift towards more durable materials like stainless steel and corrosion-resistant alloys to ensure longevity and reliability in harsh environments. Additionally, there is a growing focus on the customization of these fittings to meet specific operational requirements, driving innovations in design and manufacturing processes. As industries increasingly adopt automation and advanced machinery, the demand for high-performance hydraulic fittings continues to rise, with manufacturers focusing on optimizing efficiency, reducing downtime, and enhancing the overall reliability of hydraulic systems.

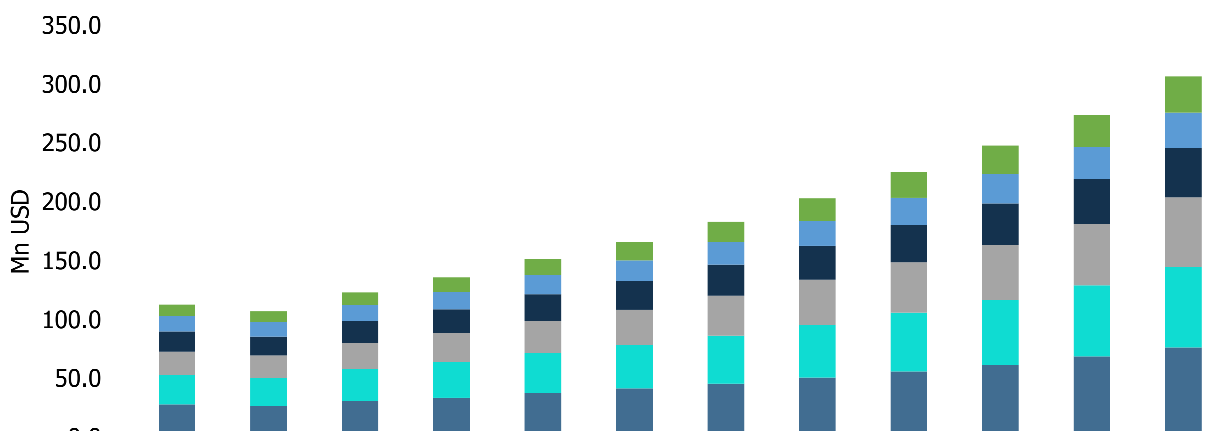
The Elbow Fittings, T-Structure and Cross Fittings hydraulic fittings market has grown at CAGR of 7.2%, 7.7% and 8.6% respectively from CY19 to CY24 and is expected to grow at a CAGR of from 9.8%, 10.3% and 11.5% respectively from CY24 to CY30.

2. Fittings which extend or terminate pipe length

Sleeve	Cap	Adapter	Coupling	Plug	Union
• Connects two sections using mechanical fasteners such as anchors or screws	• It helps close the male thread port	• It helps to connect dissimilar pipes	• It helps connect similar pipes	• It helps to close the female thread port	• It helps to disconnect couplings without cutting them

Source: Industry Sources, CareEdge Research

Chart 11: Indian Market Size of Hydraulic Fittings – based on connections



	CY19	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
Cap	9.7	9.3	10.9	12.2	13.8	15.3	17.0	19.2	21.7	24.1	27.1	30.5
Sleeve	13.0	12.1	13.8	15.1	16.5	17.8	19.3	21.2	23.2	25.1	27.4	30.1
Plung	17.2	16.0	18.3	20.1	22.3	24.2	26.2	28.9	31.8	34.9	38.2	42.0
Union	19.8	19.2	22.3	24.7	27.5	30.3	34.2	38.2	42.6	46.8	52.0	59.5
Adapter	25.0	23.8	27.2	30.3	33.9	36.7	40.7	44.8	50.1	55.3	60.5	68.0
Coupling	28.1	26.5	30.8	33.7	37.5	41.4	45.6	50.9	55.9	61.5	68.6	76.5

Coupling Adapter Union Plung Sleeve Cap

Source: Maia Research, CareEdge Research

The market for hydraulic fittings is experiencing steady growth, driven by the increasing demand for efficient and reliable fluid power systems across various industries. Sleeve fittings, which offer easy installation and secure connections, are gaining popularity for their versatility in connecting tubes or pipes in hydraulic systems.

Cap fittings, used to seal the ends of pipes or tubes, are also seeing heightened demand due to their critical role in preventing leaks and maintaining system integrity.

Adapter fittings, which allow for the connection of different thread sizes or types, are essential in meeting the requirements of diverse hydraulic systems, further boosting their market presence.

Coupling fittings, known for their ability to join two pipes or hoses together securely, are becoming indispensable in both industrial and mobile hydraulic applications.

Plug fittings, used to block off unused ports or outlets, are witnessing a rise in demand as they provide solutions for system maintenance and reconfiguration.

Finally, union fittings, which allow for easy disconnection and reconnection of hydraulic components without the need for cutting or welding, are becoming a preferred choice in industries where frequent disassembly is required.

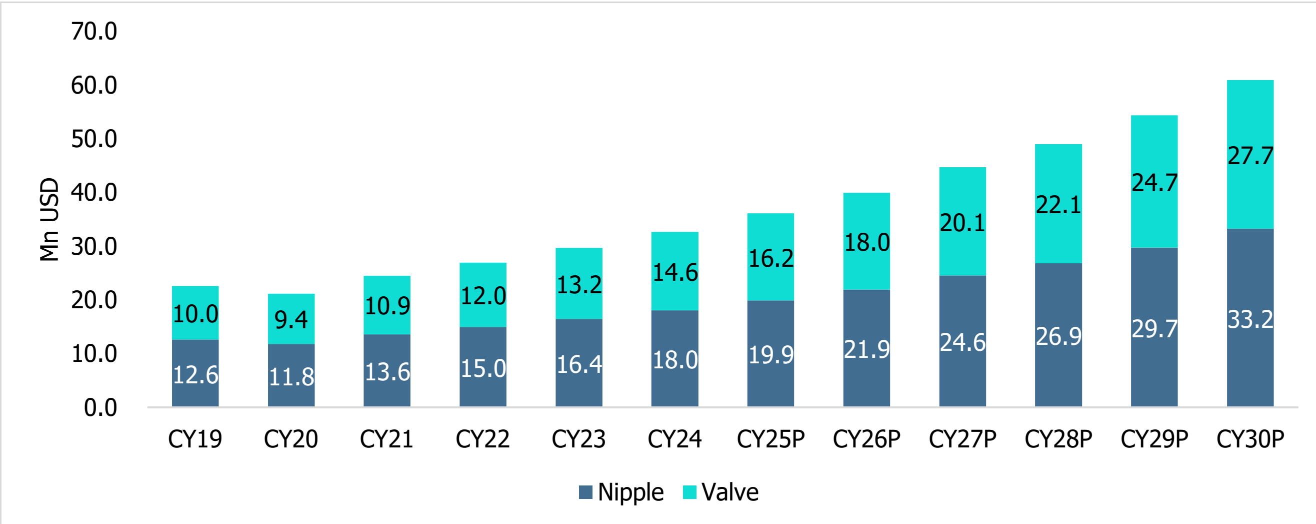
As industries like construction, automotive, agriculture, and oil & gas continue to expand, the market for these hydraulic fittings is expected to grow, with a focus on innovation and the development of high-performance materials to meet increasing pressure and temperature demands.

The Sleeve Fittings, Cap Fittings, Adapter Fittings, Coupling Fittings, Plug Fittings and Union Fittings hydraulic fittings market has grown at CAGR of 6.5%, 9.5%, 8.0%, 8.1%, 7.1% and 8.9% respectively from CY19 to CY24 and is expected to grow at a CAGR of 9.1%, 10.8%, 10.8%, 10.9%, 9.6% and 11.9% respectively from CY24 to CY30.

3. Fittings which provide special connections or functions

- **Nipple:** Two separate fittings can be connected at each end through such type of fitting and has male threads at both ends.
- **Valve:** Such type of fitting helps to connect vessels and has a valve too for flow control.

Chart 12: Indian Market Size of Hydraulic Fittings – based on connections



Source: Maia Research, CareEdge Research

Nipple fittings, which serve as connectors between two female-threaded parts, are increasingly popular due to their role in extending or connecting hydraulic pipes and hoses in tight or challenging spaces. Their robust performance in high-pressure applications makes them essential across various sectors, including manufacturing, automotive, and oil & gas.

As industries demand greater flexibility and customization, nipple fittings are evolving to cater to specific system requirements, contributing to their growing market presence. Meanwhile, valve fittings are experiencing significant demand driven by their critical role in controlling fluid flow, pressure, and direction within hydraulic systems. With advancements in automation and process control, the need for high-quality, precision-engineered valve fittings is on the rise, particularly in industries like energy, aerospace, and chemical processing. These fittings help prevent system malfunctions and ensure smooth operation by offering safety and efficiency. As hydraulic systems become more sophisticated, the demand for advanced valve and nipple fittings continues to expand, with manufacturers focusing on durable materials, leak-proof designs, and compatibility with a wide range of fluid media and environmental conditions.

The Nipple Fittings and Valve Fittings hydraulic fittings market has grown at CAGR of 7.4% and 7.9%, respectively from CY19 to CY24 and is expected to grow at a CAGR of 10.7% and 11.2% respectively from CY24 to CY30.

3.4 Global Scenario

The demand for hydraulic fittings is primarily driven by usage in equipment/machinery in end use industries such as agricultural equipment, construction equipment and so on. Developments in agricultural sectors particularly in developing regions such as India, China augur well for hydraulic fittings industry. In addition, investments in infrastructure development are growing across the globe is expected to lead to growth in demand for hydraulic based construction equipment. Similarly, growing demand for automotive will positively impact the hydraulic fittings industry.

3.4.1 Trade scenario on fittings

Fittings include tube or pipe fittings such as coupling, elbow sleeves made of iron or steel. The top 5 countries accounted for a share of 67% in exports of fittings from India in FY25 with USA contributing as the largest share at 40%. With respect to imports to India, the top 5 countries accounted for a share of 68% in imports of fittings in FY25 with China contributing for the largest share at 25%.

Chart 13: Country-wise export mix in FY25

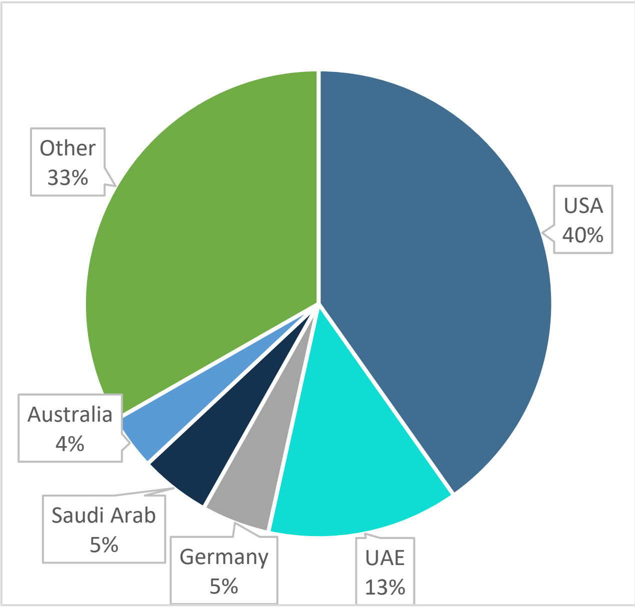
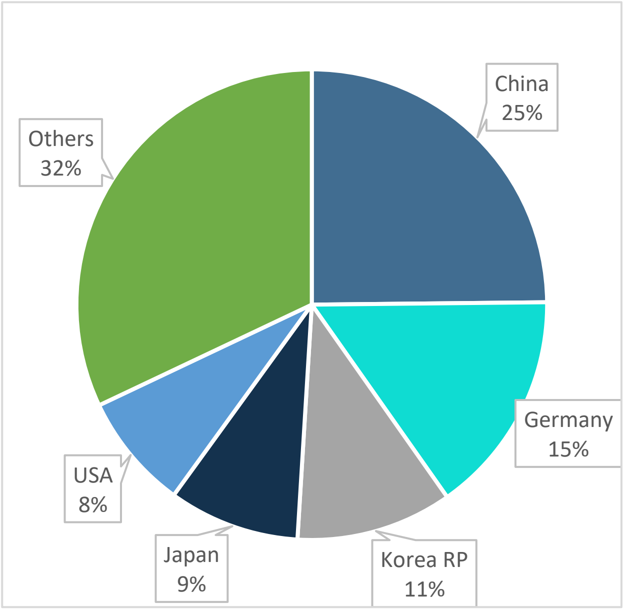


Chart 14: Country-wise import mix in FY25



Note: Above data is based on HSN Code 73079990 – NON-GALVANISED Products Include: Hydraulic Hose, Ms Flange, Fuel Injector, Shackle, Adapter/Adaptor, Ferrule, Rcc Pipe, Connection Pipe, Hose Box, Hex Nipple, Hydraulic Fittings, Quick Release Coupling, Ss Tube, etc.
Source: Ministry of Commerce and Industry

3.4.2 Key global players in hydraulics industry

Some of the key global organized players operating in hydraulics industry are stated below:

Stauff Group

It was founded more than 50 years ago and is headquartered in Werdohl, Germany and is a manufacturer and supplier of pipework equipment and accessories to the hydraulic industry. They crater to mobile, industrial hydraulic machinery and have application in commercial and special purpose vehicles, rail transportation and energy technology. Their products are also used in oil, gas food, chemical and marine industries. The company has presence in over 45 sites in 18 countries and has a consolidated external sale of around 283 million EUR.

Parker Hannifin Corporation

It was founded in 1917 in Ohio, USA and initially the company built pneumatic brake systems for trucks, trains, buses, and industrial machinery, as well as leak-free fittings for the pioneers of aviation. Now, the company comprises of 6 product groups spanning the core motion technologies - electromechanical, hydraulic, and pneumatic - with a full complement of fluid handling, filtration, sealing and shielding, climate control, process control and aerospace technologies. The company has presence in 50 countries across the globe and supports 100 divisions with 336 manufacturing locations. It registered total net sales of USD 14 billion in 2021, a 5% growth as compared with USD 13 billion in the corresponding period a year ago.

Voss Fluid GmbH

Voss was founded in 1931 in Wipperfurth, Germany and is a supplier of hydraulic connections internationally. It is a manufacturer of coupling/fitting systems for mobile and stationary hydraulics. They have subsidiaries in France, Poland, Italy, Spain, and China. The product by Voss has applications in natural gas service stations, gas transport, agriculture and forestry, rail technology, marine & offshore, surface mining, automotive, machine tools and hydraulic presses.

Manuli Hydraulics

It was established in 1975 in Germany and manufactures connector solutions, components and associated assembly equipment for high pressure hydraulics, industrial material conveyance and refrigeration and cooling. The products manufactured by Manuli Hydraulics are used in applications such as constructions, agriculture, industrial machines, refrigeration, water blasting and cleaning etc.

3.4.3 Trade barriers, freight cost trends

Trade barriers in the global hydraulic parts market have become more complex in recent years. Technical trade barriers have become one of the main obstacles, and the certification requirements for hydraulic products in different countries and regions vary significantly. The European and American markets generally require CE, SAE, or UL certification, and attach strict environmental protection and energy efficiency standards, such as the EU's REACH regulations on hazardous substances and the United States' mandatory requirements for energy efficiency ratings. These standards increase the compliance costs of export companies, especially for manufacturers in developing countries. In terms of tariff barriers, some countries restrict imports through anti-dumping duties and safeguard measures. For example, India imposes high anti-dumping duties on certain hydraulic components, and the United States has not completely lifted the tariffs imposed on Chinese hydraulic products. In addition, intellectual property protection has also become a point of trade friction, and companies in developed countries frequently use patent litigation to restrict competitors from entering the market. The differentiated rules of regional trade agreements further increase trade complexity, and companies need to deal with multiple compliance issues such as rules of origin and localization requirements.

The trade barriers in the Indian hydraulic parts market have their own particularities. The country protects its local manufacturing industry through high tariff policies, and import tariffs on hydraulic components are generally high, especially for finished parts. India also frequently uses quality control measures to restrict imports, such as mandatory BIS certification and specific customs inspection procedures, which objectively prolong customs clearance time and increase uncertainty. In terms of technical standards, India adopts some international standards while retaining unique local specifications, resulting in additional adaptation costs for foreign suppliers. In addition, the "Make in India" policy promoted by the Indian government has prompted some industries to gradually increase the proportion of local procurement, which puts pressure on hydraulic system suppliers that rely entirely on imports. In terms of non-tariff barriers, complex customs procedures, opaque valuation procedures, and local protectionist tendencies have increased the difficulty of market entry.

The global transportation cost of hydraulic parts has experienced significant fluctuations in recent years. As the main mode of transportation, sea transportation is affected by the cyclical changes in container capacity. Freight rates on key routes have soared during periods of tight supply chains. Although they have fallen back recently, they are still higher than pre-epidemic levels. Changes in route layout also have an impact. Some traditional shipping routes have been forced to adjust due to regional conflicts or canal traffic problems, resulting in increased transportation time and costs. Air freight remains high, mainly used for the transportation of high-value or emergency hydraulic parts, but the slow recovery of air freight capacity has restricted the room for cost reduction. There are obvious differences between regions. The freight rate fluctuations on the Asia-North America route are greater than those within Europe, and the insufficient port infrastructure in emerging markets often leads to additional demurrage charges.

The freight rate problem in the Indian market is more complicated. The country's port efficiency is relatively low, and container detention and customs clearance delays are common, which invisibly pushes up the overall logistics costs. The inland transportation link is weak, and there are bottlenecks in road and rail transshipment from ports to industrial areas, especially for the transportation of heavy hydraulic equipment. In addition, India's uncertainty in the classification of some hydraulic parts may lead to customs disputes, resulting in warehousing and demurrage charges. Insurance costs are also on the rise. Due to the high risk of transportation delays and cargo damage, underwriters are more cautious in pricing premiums for Indian routes. Seasonal factors cannot be ignored. Monsoon weather often interferes with port operations and inland transportation, forming cyclical freight rate fluctuations.

In terms of future trends, global trade barriers may continue to develop in the direction of technology and compliance, and carbon footprint tracking and sustainable development requirements may become new entry conditions. The Indian market is expected to maintain a protectionist tendency, but restrictions may be relaxed in certain key parts to meet the needs of industrial development. In terms of freight rates, with the delivery of new ships and the replenishment of shipping capacity, sea freight prices are expected to stabilize, but regional conflicts and energy price fluctuations remain potential risk factors. If India continues to improve its port and inland logistics facilities, it may reduce overall transportation costs in the long run, but it is difficult to see a fundamental change in logistics efficiency in the short term. Under the trend of global supply chain reconstruction, near-shore procurement and regionalized production may partially alleviate freight pressure, but for specialized products such as hydraulic accessories, global trade flows will still dominate.

3.4.4 India's Export Competitiveness

Presence in Global Market
India has been steadily expanding its role in the global hydraulic fittings market, especially for products adhering to JIC (Joint Industrial Council), DIN (Deautsche Industrial Norme), and BSP (British Standard Pipe) standards. These international standards are widely used across industries such as agriculture, construction, and manufacturing. Meeting these specifications allows Indian exporters to cater to diverse global demands effectively.

Cost Competitiveness and Diverse Manufacturing Base
A major strength of India's hydraulic fittings industry is its cost advantage. Lower labour and manufacturing costs compared to Western countries and China enable Indian producers to offer fittings at more affordable prices without compromising quality. This makes Indian hydraulic fittings attractive to buyers seeking cost-effective yet reliable components. India's hydraulic fittings sector benefits from a robust and growing manufacturing ecosystem, comprising many small and medium enterprises (SMEs). This diverse base allows India to produce a wide variety of fittings in multiple sizes and specifications, meeting the complex and varied requirements of international clients.

Quality and Standards Compliance
Indian manufacturers have invested significantly in upgrading their production processes to comply with international quality standards, including ISO certifications and specific adherence to JIC, DIN, and BSP norms. This commitment to quality has enhanced India's reputation as a dependable supplier in the global hydraulic fittings market.

Export Destinations
Hydraulic fittings produced in India, compliant with JIC, DIN, and BSP standards, are exported to regions including the Middle East, Africa, Southeast Asia, and increasingly to Europe and North America. This broad geographic reach reduces dependence on any single market and strengthens India's export stability.

Competitive Challenges
Despite progress, Indian exporters face intense competition from established players like China, Germany, and the US. Challenges include the need to adopt advanced manufacturing technologies, reduce lead times, improve product innovation, and enhance logistics. Addressing these areas is important for India to grow its market share and respond effectively to evolving customer demands.

Way forward
India's export competitiveness in hydraulic fittings is built on cost advantages, improved quality standards, and a strong manufacturing base. Continued investments in technology, innovation, and supply chain efficiency will be essential for India to expand its presence and capture a larger share of the global hydraulic fittings market.

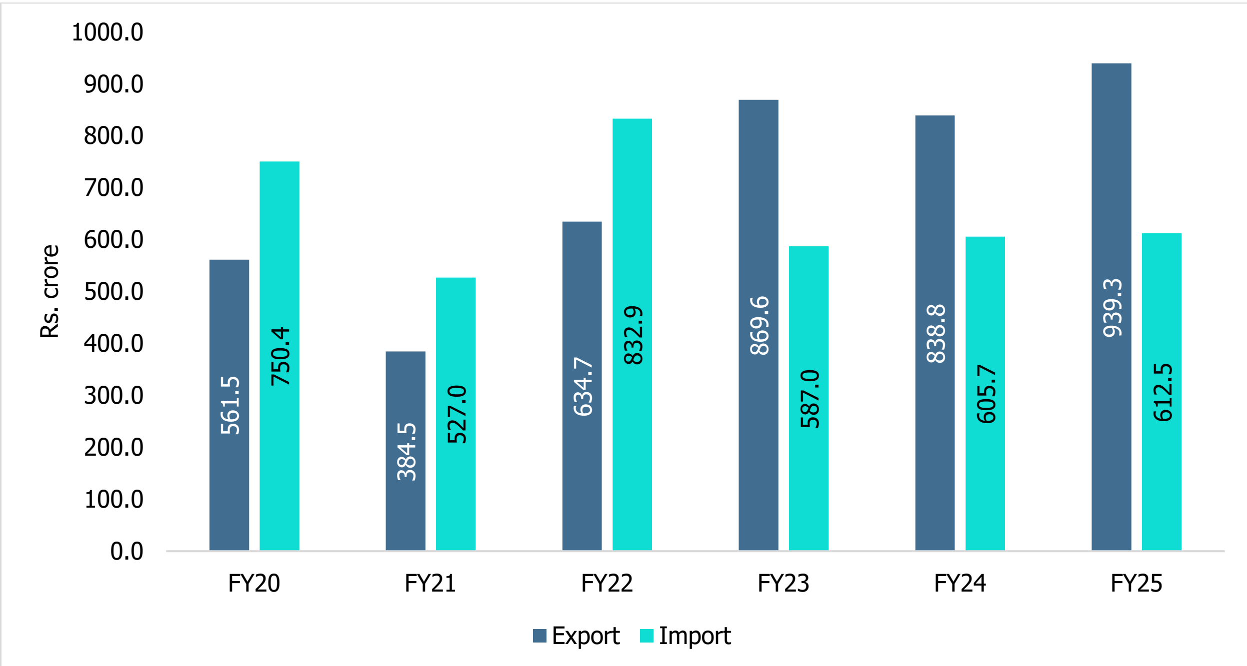
3.5 Domestic Trade Scenario

The domestic industry for hydraulic fittings is largely unorganized and competitive intensity is high with presence of several players. Hydraulic fittings are used in industries such as automobiles, machinery/equipment used in oil & gas industry, construction & mining equipment, agriculture equipment and intermediaries such as Injection Moulding Machines.

Fittings include tube or pipe fittings such as coupling, elbow sleeves made of iron or steel. With respect to trade, India has been a net exporter of fittings as depicted in the chart below.

Exports grew at a CAGR of 12.0% from FY20 to FY25, while imports declined by approximately 4% during the same period. This trend highlights the growth of domestic production in India and a reduced dependence on foreign suppliers, moving the country closer to self-sufficiency.

Chart 15: Domestic trade scenario of hydraulic fittings



Note: Above data is based on HSN Code 73079990 – NON-GALVANISED Products Include: Hydraulic Hose, Ms Flange, Fuel Injector, Shackle, Adapter/Adaptor, Ferrule, Rcc Pipe, Connection Pipe, Hose Box, Hex Nipple, Hydraulic Fittings, Quick Release Coupling, Ss Tube, etc.
Source: Ministry of Commerce & Industry

India's hydraulic fittings market is experiencing significant growth in both exports and imports, driven by the increasing demand for high-quality hydraulic components in various industries such as manufacturing, construction, agriculture, and oil & gas. On the export front, India has emerged as a prominent supplier of hydraulic fittings, particularly to markets in North America, Europe, the Middle East, and Southeast Asia.

The country's competitive advantage lies in its well-established manufacturing base, cost-effective production, and an ability to provide customized solutions that meet international standards. Indian manufacturers are capitalizing on the growing demand for hydraulic fittings by expanding their export networks, offering a wide range of products such as nipple fittings, valve fittings, adapters, and couplings. On the import side, India relies on advanced hydraulic components from countries with sophisticated technologies, such as Germany, the United States, and Japan. These imports include high-precision fittings, specialized valves, and advanced materials that may not be locally produced at the required standards. The growing domestic need for high-performance hydraulic systems is driving the influx of these imported products, which complement the local supply and cater to niche applications that require cutting-edge technology. As India's industrial landscape continues to modernize, the trade in hydraulic fittings is expected to see an upward trajectory, with a balanced increase in both exports and imports.

3.6 Overview of Direct OEM Supply vs Channel Distribution

Direct OEM Supply

Direct OEM Supply is the process where hydraulic fitting manufacturers sell their products directly to Original Equipment Manufacturers (OEMs). OEMs are companies that assemble machinery, vehicles, or industrial equipment. In this model, fittings are often customized to meet the exact design, performance, and quality requirements specified by the OEM, ensuring a precise fit and high reliability.

This direct relationship allows manufacturers to maintain strict control over product specifications, quality testing, and delivery schedules. By eliminating intermediaries, OEMs benefit from cost savings, competitive pricing, and faster turnaround times. Manufacturers also typically provide ongoing support, including technical documentation, warranty services, and assistance with product integration and installation.

Long-term contracts often characterize these relationships, providing OEMs with a consistent supply of parts and enabling manufacturers to optimize their production planning and resource allocation. This steady partnership fosters innovation, as manufacturers work closely with OEMs to develop new or improved hydraulic fittings tailored to evolving industry needs.

The Direct OEM Supply model is widely used in industries such as automotive and ancillary manufacturing, construction equipment, and industrial machinery, where precision, durability, and reliability are critical. Additionally, this model helps OEMs reduce inventory costs and streamline their supply chains by ensuring timely and accurate deliveries aligned with production schedules.

Channel Distribution

Channel Distribution is a model where hydraulic fittings are sold through intermediaries such as distributors, dealers, and retailers. These channel partners purchase products from manufacturers and then supply them to end-users, smaller manufacturers, or sectors involved in repair and maintenance. This system enables manufacturers to broaden their market reach across various geographic regions and industry segments without directly managing complex sales networks.

Distributors and dealers play a crucial role by maintaining inventory and managing logistics, ensuring that hydraulic fittings are readily available for customers who need them urgently or in smaller quantities. This availability is especially important for repair shops, contractors, and small manufacturers who often require quick access to standard parts to minimize downtime and maintain operational efficiency. Many channel partners also provide valuable technical support to customers. This includes advising on product selection, offering installation guidance, and sometimes providing training to ensure proper use and maintenance of hydraulic fittings. Such support enhances customer satisfaction and helps reduce errors during installation or operation.

The channel distribution model offers flexibility in purchasing options, allowing customers to order fittings in varied quantities and from multiple brands within the same network. This variety supports a wide range of needs, from large-scale industrial projects to small maintenance jobs. Additionally, channel partners often handle marketing and customer service efforts on behalf of manufacturers, helping to build brand awareness and maintain customer relationships at the local level. By leveraging the established presence and expertise of distributors and dealers, manufacturers can focus on product development and large-scale production.

This distribution approach is particularly effective in markets with diverse and dispersed customer bases, where direct sales could be costly or inefficient. Overall, channel distribution is important for ensuring the availability, accessibility, and technical support of hydraulic fittings, making it indispensable for sectors like construction, agriculture, industrial maintenance, and repair services where timely access to reliable parts is essential.

3.7 Prevalence of Customized vs Catalogue Products

Catalogue Hydraulic Fittings – Dominance in Volume and Reach
In India, catalogue hydraulic fittings constitute the majority of the market by volume. These are standardized, off-the-shelf components manufactured according to global norms such as JIC, DIN, BSP, SAE, and NPT. Their widespread availability, lower cost, and compatibility across various machines make them the go-to choice for aftermarket sales, repair and maintenance services, and small-scale manufacturers. These fittings are distributed through a well-established dealer and distributor network that services both urban and rural markets, especially in sectors like agriculture, construction, material handling, and general industrial machinery. Due to India's cost-sensitive customer base, catalogue fittings are favoured for their affordability and immediate availability.

Demand Drivers for Catalogue Fittings
The strong demand for catalogue fittings in India is primarily driven by the aftermarket and maintenance sectors, where speed of delivery, ease of installation, and standardization are key requirements. Distributors and retailers stock a wide range of catalogue fittings, allowing quick replacements and minimal downtime for users. The extensive use of standardized hydraulic equipment in agriculture and construction, especially in Tier 2 and Tier 3 cities, further boosts the preference for catalogue products. Additionally, Indian SMEs in manufacturing often use standard fittings to keep procurement simple and reduce design and inventory complexity.

Customized Hydraulic Fittings – Growing Share in OEM and Export Segments
While catalogue fittings dominate in volume, the share of customized hydraulic fittings is growing steadily in India, especially within the OEM (Original Equipment Manufacturer) segment. These fittings are tailored to meet specific design, performance, and space requirements of large machinery and equipment manufacturers. As India becomes a global manufacturing hub in sectors like automotive, earthmoving machinery, construction equipment, and defence, OEMs are increasingly seeking bespoke solutions for better integration, fluid control, and performance optimization. Customized fittings are also essential in equipment where pressure ratings, angles, space constraints, or corrosion resistance demand unique designs and materials.

India’s Transition Towards Engineering-Centric Manufacturing
India’s push toward ‘Make in India,’ combined with increased foreign direct investment (FDI) in industrial and infrastructure projects, is fuelling the demand for high-precision, application-specific fittings. OEMs in India are collaborating with domestic manufacturers for co-designing fittings, focusing on product performance, durability, and space-saving integration. Unlike catalogue parts, customized hydraulic fittings require advanced design capabilities, precision machining, and more involved production planning. As a result, many Indian manufacturers are upgrading their capabilities, investing in CNC machines, CAD design teams, and rapid prototyping to serve OEM clients both domestically and globally.

Supply Chain and Economic Considerations
Catalogue fittings continue to offer better economies of scale, shorter lead times, and lower procurement costs. They are ideal for high-turnover, mass-market applications, and situations where part standardization simplifies inventory and servicing. Customized fittings, while higher in unit cost and requiring longer lead times, offer higher margins and deeper integration into the OEM's production cycle. In India, the supply chain for catalogue products is largely distributor-led, while custom products typically involve direct OEM engagement. Customized fittings also allow manufacturers to form long-term partnerships with OEMs, offering more predictable demand and higher brand stickiness.

In the Indian hydraulic fittings market, catalogue products dominate in terms of volume, driven by their cost-effectiveness, broad availability, and applicability across common machinery. However, customized fittings are gaining traction, especially as India strengthens its position as a manufacturing and export base for complex equipment. The growth of OEM-led production in construction, automotive, and industrial machinery is creating new opportunities for Indian manufacturers to shift from standard offerings toward value-added, engineering-driven solutions. The future will likely see a hybrid approach, where catalogue fittings continue to serve the mass market while customized solutions cater to precision-driven OEM demand and export requirements.

3.8 Trends in product customization and low volume, high variety production

The hydraulic fittings market is undergoing a transformation, driven by rising demand for application-specific solutions and more agile manufacturing capabilities. Key trends are emerging around product customization and low-volume, high-variety production, both of which are critical for serving specialized and fast-evolving industrial requirements.

Product Customization in Hydraulic Fittings

Tailored Connection & Modular Designs
Manufacturers are expanding their offerings to include a wide range of thread types, sealing mechanisms, and coupling formats to meet the requirements of diverse sectors such as aerospace, agriculture, construction, automotive and marine. Modular and configurable designs allow fittings to be easily adapted for varying system pressures, spatial constraints, and fluid compatibility.

Integration of Smart Technologies and Sustainable Materials in Hydraulic Fittings
Modern hydraulic fittings are increasingly being designed with both intelligence and sustainability in mind to meet the evolving demands of end-user industries and regulatory frameworks. On the technological front, manufacturers are embedding sensors and Industrial IoT (IIoT) capabilities into fittings to enable real-time performance monitoring. These smart fittings support predictive maintenance by continuously tracking parameters such as pressure, temperature, and vibration, allowing early detection of potential failures, and minimizing unexpected equipment downtime. Simultaneously, there is a strong industry shift toward the use of environmentally sustainable and application-specific materials. Recyclable alloys, corrosion-resistant metals, and bio-compatible materials are gaining prominence, particularly in sectors that use biodegradable hydraulic fluids or operate in sensitive ecological zones. This dual focus on smart functionality and eco-friendly materials reflects a broader trend of aligning product design with both operational efficiency and environmental responsibility.

Growth in Digital Customization Tools
Leading players are investing in online configurators and digital catalogues that allow customers to design and order tailored fittings directly. These platforms enable efficient order processing and better support low-volume, high-precision requirements.

Low-Volume, High-Variety Production Trends

Agile and Flexible Manufacturing
Manufacturers are adopting reconfigurable production lines and flexible tooling systems that support quick changeovers between product variants. This flexibility minimizes downtime and accommodates fluctuating demand across end-user segments.

Digitalization and Agile Production for LVHV Environments
To meet the challenges of low-volume, high-variety production, manufacturers are increasingly leveraging digitalization and agile manufacturing practices. Real-time simulation tools and digital twin technologies are being integrated into production systems to optimize scheduling, resource utilization, and workflow efficiency. These tools enable predictive insights, allowing manufacturers to respond quickly to changing production needs and reduce downtime. Additionally, the shift toward cloud-based platforms and regionally distributed manufacturing networks supports on-demand production closer to end users, significantly cutting lead times while enabling high levels of customization. Complementing these advancements, lean manufacturing principles are being adapted for settings, focusing on rapid changeovers, reduced setup times, and minimal work-in-progress (WIP) inventory. This integrated approach enhances operational flexibility, responsiveness, and cost-effectiveness in increasingly complex and demand-driven manufacturing environments.

Data-Driven Production Management
Integration of ERP systems and business intelligence tools with manufacturing lines allows real-time adjustment of batch sizes and product configurations based on customer demand and market forecasts. The convergence of advanced manufacturing technologies, digital tools, and market-specific customization is reshaping the hydraulic fittings industry. As customer expectations shift toward more personalized solutions and rapid delivery, manufacturers are increasingly investing in Low-Volume High-Variety capabilities and digital transformation to stay competitive in a dynamic global landscape.

3.9 Key demand drivers

High-Pressure Infrastructure Demands
A growing share of new hydraulic installations in India requires fittings designed for very high-pressure applications. This trend is largely driven by the rapid expansion of sectors such as mining, construction, and port infrastructure under initiatives like the National Infrastructure Pipeline and PM Gati Shakti. As a result, demand is increasing for high-tensile alloy fittings with advanced sealing technologies.

Agriculture and Mechanization
According to the Ministry of Agriculture and Farmers Welfare indicates that mechanized farming is accelerating, with tractor density surpassing 80 units per 1,000 hectares in states like Punjab and Haryana. This shift has increased the need for hydraulic fittings compatible with mobile agricultural implements. Flexible and quick-disconnect variants have become critical, especially for field repairs and precision farming, supported by ICAR's findings on rotary application growth.

Industrial Automation Integration
Hydraulic fittings are playing a critical role in the shift toward automated manufacturing systems. Industries are integrating these fittings into robotic arms, automated assembly lines, and material handling equipment to improve operational efficiency. The demand is moving toward modular designs that are easier to install and remove, often without specialized tools. Quick-connect features are becoming essential to reduce

downtime during maintenance. These fittings also offer flexibility to adapt to frequent layout changes and upgrades in smart factories, making them important for modern industrial setups.

Energy Sector Requirements

The energy sector places high demands on hydraulic systems, particularly in pipeline infrastructure, refineries, and renewable energy installations. These applications require fittings that are not only high-pressure and leak-resistant but also resistant to corrosion from chemicals and harsh environmental conditions. Smart designs that allow real-time monitoring and diagnostics are gaining traction to ensure uninterrupted operations. The emphasis is on durability, safety, and minimal fluid loss, which are crucial for maintaining system efficiency and meeting regulatory standards.

SKU Breadth and Customer Retention

In the highly customized field of hydraulic systems, offering a broad range of SKUs (Stock Keeping Units) has become a strategic lever for customer retention. Distributors and manufacturers that maintain a wide product catalogue can meet varied customer needs more efficiently, whether it's a niche fitting for a specific machine or a large-volume order for OEMs. This flexibility often leads to higher client satisfaction, faster order fulfilment, and stronger loyalty. Customers in sectors like automation, heavy equipment, and industrial utilities prefer vendors who can respond quickly to custom or urgent requests, making SKU diversity a strong value proposition.

Aftermarket

A significant portion of demand also comes from the aftermarket segment, where hydraulic systems require frequent maintenance due to pressure-induced wear and fluid leakage. Hydraulic fittings are among the most commonly replaced components in such systems. Maintenance teams typically seek suppliers with a wide variety of fittings readily available, as delays in sourcing can lead to prolonged equipment downtime. Distributors that stock a comprehensive range of fittings including various thread types, configurations, and materials gain an advantage in this segment by enabling faster service and minimizing unplanned operational halts.

3.10 Key Challenges

Fragmented and unorganized supply chain

The Indian hydraulic fittings industry is largely dominated by small and medium enterprises (SMEs), with only a few large players. This fragmented structure creates challenges in maintaining standardization and quality consistency across the supply chain. Different suppliers may follow different production practices, leading to variation in performance and reliability of fittings. Also, unorganized distribution channels lead to inefficiencies in inventory management, delayed deliveries, and weak after-sales support.

Skilled workforce shortage

The industry requires highly skilled technicians, engineers, and machinists with expertise in hydraulics, precision machining, and assembly techniques. However, there is a notable gap in technical training and specialized education in India for this domain. Many workers lack hands-on experience with quality control tools, digital design, and the ability to interpret technical specifications, impacting the overall quality and innovation in the sector.

Compliance and standardization challenges

To compete globally or supply to high-end domestic industries (such as aerospace, defence, or oil & gas), manufacturers must comply with strict quality and safety standards such as ISO, DIN, and SAE certifications. Smaller firms often lack the infrastructure, testing facilities, and documentation practices required to meet these norms. This limits their ability to expand into export markets or become qualified vendors for multinational OEMs.

Intense price competition and margins pressure
The Indian market is highly price sensitive. Buyers often choose fittings based on cost rather than performance or durability. This puts immense pressure on manufacturers to reduce prices, sometimes at the expense of quality. Small companies struggle to maintain profitability while investing in innovation, R&D, or facility upgrades. Additionally, cheaper imports and grey market products further undercut domestic pricing.

Inefficient logistics and infrastructure
India's infrastructure, especially in industrial belts and remote regions, is still developing. Transportation delays, road conditions, and inadequate warehousing facilities affect the timely delivery of hydraulic components.

Dependence on imported raw materials
India lacks sufficient domestic production of high-grade materials like stainless steel alloys, carbon steel, and special sealing polymers used in advanced hydraulic fittings. Manufacturers depend heavily on imports, especially for high-tensile and corrosion-resistant metals. This dependency exposes the industry to fluctuations in international prices, currency volatility, and global trade restrictions. Long lead times for imported materials further disrupt production schedules.

Low R&D and innovation investment
Despite growing demand for advanced and application-specific hydraulic solutions, R&D spending in the Indian hydraulic fitting sector remains minimal. This limits the development of new designs such as quick-connect couplings, leak-proof seals, and smart diagnostic-enabled fittings. Lack of innovation hampers differentiation in the market and reduces competitiveness against international players.

4. Key end user industries

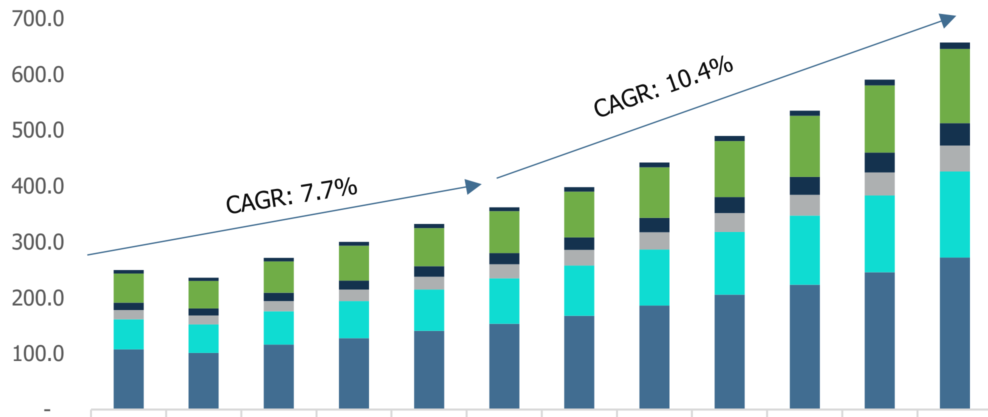
The usage of hydraulic fittings can be segregated into end use industries such as construction equipment, mining equipment etc. and intermediaries such as Injection Moulding Machines as detailed below:

- **Agricultural equipment:** farming equipment
- **Construction equipment:** Earth Moving, Road Construction, Concrete equipment
- **Automotive:** Heavy Vehicle
- **Railways**
- **Hydraulics System**
- **Other equipment:** Vibration control systems for Trains & High story building, Hydraulic lifts, Crushers

Note: the above list is not exhaustive in nature.

Consumption of Hydraulic Fitting across end-user Industries

Chart 16 : Consumption of Hydraulic Fitting across end-user industries



	CY19	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
Others	6.1	5.8	6.3	6.7	7.1	7.4	7.9	8.6	9.2	9.7	10.3	11.0
Railways	52.2	49.2	56.5	62.2	68.6	74.6	81.8	90.6	100.2	109.0	119.9	133.1
Automotive	13.1	12.6	14.7	16.5	18.5	20.4	22.8	25.7	28.9	32.0	35.7	40.3
Hydraulic Systems	17.0	16.2	18.5	20.5	22.9	25.1	27.7	30.5	33.8	37.3	41.2	46.0
Agriculture	53.9	51.3	59.5	66.2	73.9	81.3	90.0	100.7	112.5	123.9	137.8	154.4
Construction Equipment	107.5	101.1	116.2	127.8	141.1	153.3	167.8	186.0	205.3	223.5	245.5	272.1

Construction Equipment   Agriculture   Hydraulic Systems   Automotive   Railways   Others

Source – Maia Research, CareEdge Research

The consumption of hydraulic fittings across end-user industries in India, has shown consistent growth over the years. From CY19 to CY24, the sector experienced a historical CAGR of 7.7%, reflecting steady demand driven by industrial activities and key sectors such as agriculture, manufacturing, construction, and automotive. Looking forward, the market is projected to grow at a faster rate, with an expected CAGR of 10.4% from CY24 to CY30. In CY22, the market reached USD 300.2 million, continuing its upward trajectory from USD 271.8 million in CY21 as industries expanded and recovered. This growth continued in CY23, and CY24 with consumption reaching USD 332.5 million, and USD 362.8 million respectively driven by sustained industrial demand. By CY30, the market is expected to hit USD 658.3 million, reflecting strong growth prospects fuelled by infrastructure development, technological advancements, and the increasing adoption of hydraulic systems across various industries.

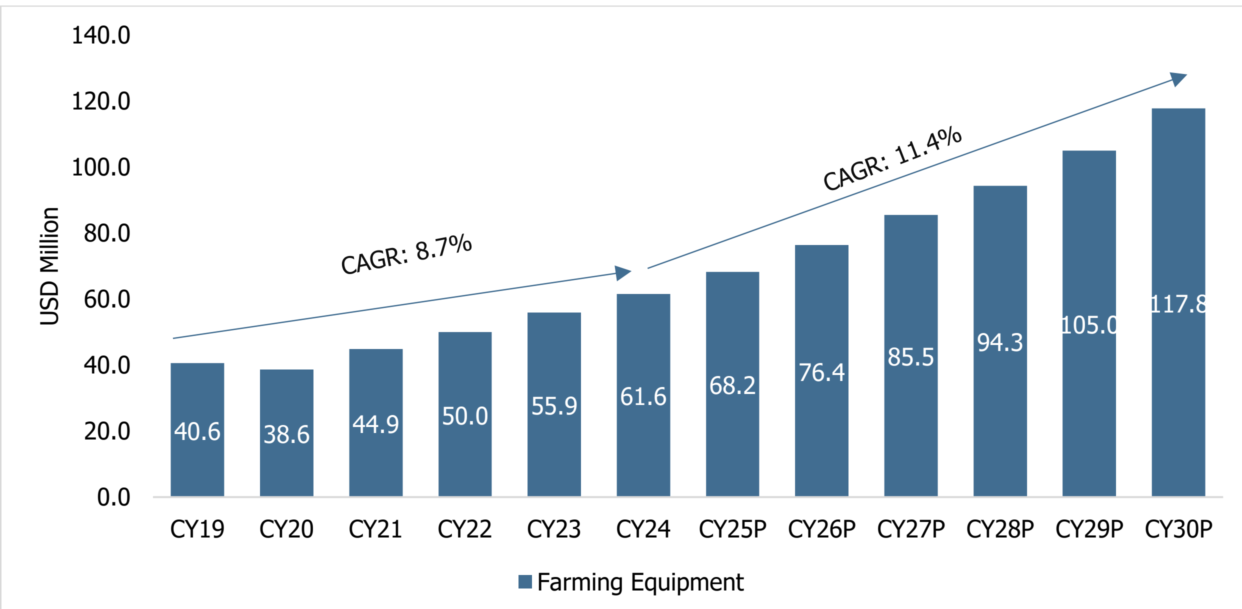
4.1 Agriculture

India's agriculture sector contributes ~16% of India's GDP and employs ~45% of its workforce. With increasing farmer education and focus on mechanization, the sector has witnessed growth in yield and production over the years. Even though the Indian agriculture sector has come a long way, it is still plagued by a labour shortage in the peak season and low productivity, which can be reduced by further improving farm mechanization. The agriculture sector in India is expected to generate better momentum in the next few years due to increased investment in agricultural infrastructure such as irrigation facilities, warehousing, and cold storage.

Over the years, the Government of India has been providing policy support in the form of growing institutional credit, introduction of new schemes such as Paramparagat Krishi Vikas Yojana, Pradhanmantri Gram Sinchai Yojana, Sansad Adarsh Gram Yojana and others while increasing exports of farm produce. Cash support in the form of direct bank transfer to farmers under PM-KISAN scheme contributed to the spending capacity of rural India engaged in agriculture. With the sustained Government focus, the sector is expected to see continued revival in investments.

India Hydraulics Fitting Consumption in Agricultural Equipment sector

Chart 17: India Hydraulics Fitting consumption in Agricultural Equipment sector



Source – Maia Research, CareEdge Research

The consumption of hydraulics fittings in the agriculture sector in India has shown a steady growth trajectory over recent years, reflecting the increasing adoption of mechanized farming and the need for efficient agricultural machinery. India is projected to grow faster in comparison with global consumption, as the demand for hydraulic systems continues to rise. From CY21 to CY24, the total consumption within the sector saw consistent growth. In CY21, the consumption was valued at USD 44.87 million, which increased to USD 61.60 million in CY24. This indicates a growing demand for hydraulic systems as India's agriculture sector continues to modernize. The historical CAGR growth from CY19 to CY24 is approximately 8.7%, reflecting a steady increase in consumption. Looking ahead, projections indicate continued growth for the sector. By CY29, the consumption is expected to reach USD 105.0 million, and by CY30, it is projected to rise further to USD 117.8 million, reflecting a strong demand for hydraulics fittings in the agricultural sector in India over the next decade. The projected CAGR growth is around 11.4%, reaching CY30.

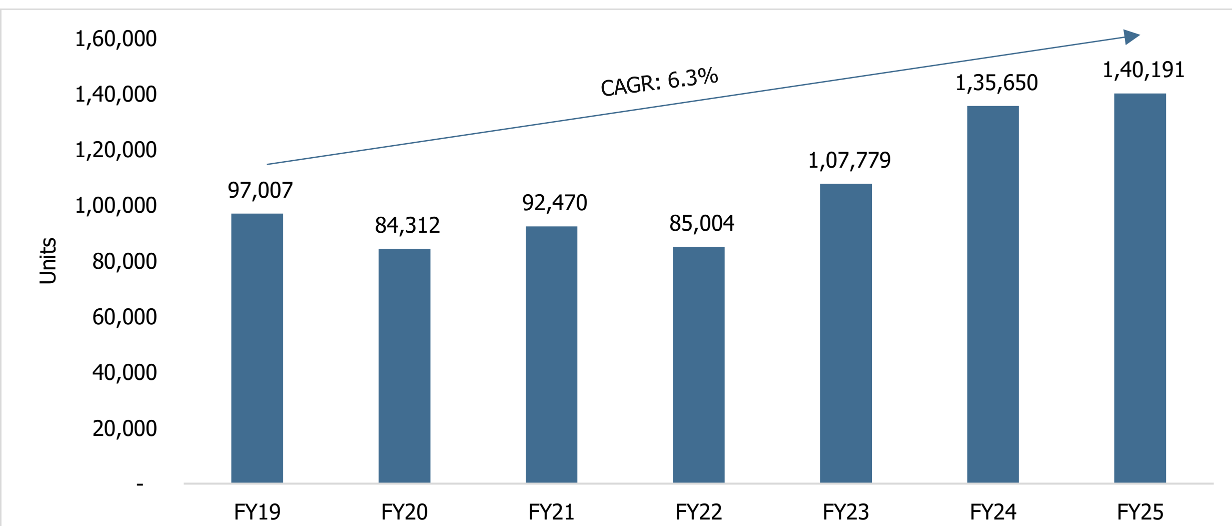
The focus on farm mechanization is led by the need for enhancing agriculture productivity and availability of food grains, increasing agriculture exports, mitigating labour shortage, and also facilitating judicious use of scarce natural resources and farm inputs. This will also lead to increase in adoption of various agricultural machinery such as tractors, automatic seed dispensers, harvesting machines etc.
Hence, use of machines like tractors in agriculture is important for modernization and commercialization of agriculture as it improves productivity and timeliness of agriculture operations, aids in value addition, brings down the cost of cultivation and enables climate change adaptation. Therefore, significant opportunities exist in this space, and this is turn will likely have a positive impact on hydraulic fittings market.

4.2 Construction Equipment

India is the third largest Construction Equipment (CE) market globally, surpassing Japan. China stands in first position, by volume. The Indian CE sector employs more than 3 million people, both directly & indirectly and is represented by a vibrant mix of MNCs and Indian companies. The construction equipment industry has a strong positive correlation with the progress in road construction and mining activities.

The construction sector is projected to grow by 8% to 10% in FY26, reflecting strong demand driven by infrastructure and urban development projects. This growth is directly linked to the construction equipment industry, as increased construction activity fuels demand for machinery like cranes, bulldozers, and excavators. Public investments in infrastructure and advancements in technology, including automation and digitalization, further boost equipment utilization and sales. Consequently, the robust expansion of the construction sector in FY25 signals continued growth for the construction equipment industry, driven by higher machinery demand to meet growing project requirements.

Chart 18: Annual sales across all equipment categories



Source: ICEMA, CareEdge Research

The construction equipment market has seen significant growth in recent years, fuelled by increasing demand for infrastructure development and advanced machinery. After a period of fluctuations, the market picked up momentum in FY23, with sales rising to 1,07,779 units, signalling a strong recovery. This growth continued into FY24, with sales reaching 1,35,650 units, marking a remarkable 25.9% increase. In FY25 sales reached to 1,40,191 and marked ~3.5% yoy growth. The CAGR growth between FY19 and FY25 has been 6.3%, reflecting a steady and consistent expansion of the market over this period, driven by sustained demand for construction equipment.

The Indian CE market can be broadly divided into five main categories and the segment wise share in sales (based on sales volume in FY24) is given below:

Earth moving equipment segment: It mainly comprises excavators (compact excavator, dredging, dragline excavator, front shovel, and others), loaders (skip loader and wheel loader), backhoe loaders, construction tractors and others (grader, scraper, track loader and material handler etc.). Out of all, backhoe loaders which comprise tractors, front shovel/bucket backhoes and small backhoes and are most commonly used to move large amounts of earth or to dig foundations and landscape areas, account for 69 per cent of the earth moving equipment segment. The Indian construction, mining equipment industry continues to be highly dependent on the demand for Backhoe loaders and Hydraulic Excavators.

In India, Backhoe loader is the equipment of choice during the progression from manual labour to mechanization. Hydraulic Excavator is usually considered at the next level. An upgrade to the Backhoe Loader – a noticeable trend among customers was the practice of buying a Hydraulic Excavator within 5-6 years of the purchase of a Backhoe Loader.

Material handling equipment is the second largest segment with a share of 14 per cent. Cranes are the largest category within the material handling equipment. Mobile cranes are the third-largest sold construction equipment type in India, after backhoe loaders and excavators. The pick-and-carry cranes constitute more than 90 per cent of the total mobile cranes market. The demand for pick-and-carry cranes is expected to continue due to the rise in the number of projects in different sectors. There is a gradual shift visible in the pick-and-carry crane models in terms of design and features to address the changing needs of the customers. Meanwhile, the medium and heavy-duty mobile cranes are also finding traction in view of the number of big projects in metro rail, expressways and bridges coming up.

Material processing equipment accounts for 2 per cent of the market. The share of concrete equipment which comprises asphalt finishers, transit mixers, concrete pumps, and batching plants.

Road Construction accounts for 5% share of the construction equipment and consists of Compaction Single Drum Roller, Compaction Pneumatic Roller, and Paving Paver Track. The growth is majorly driven by the growth of demand of the domestic Compaction Double Drum roller sales however the exports have remained flat.

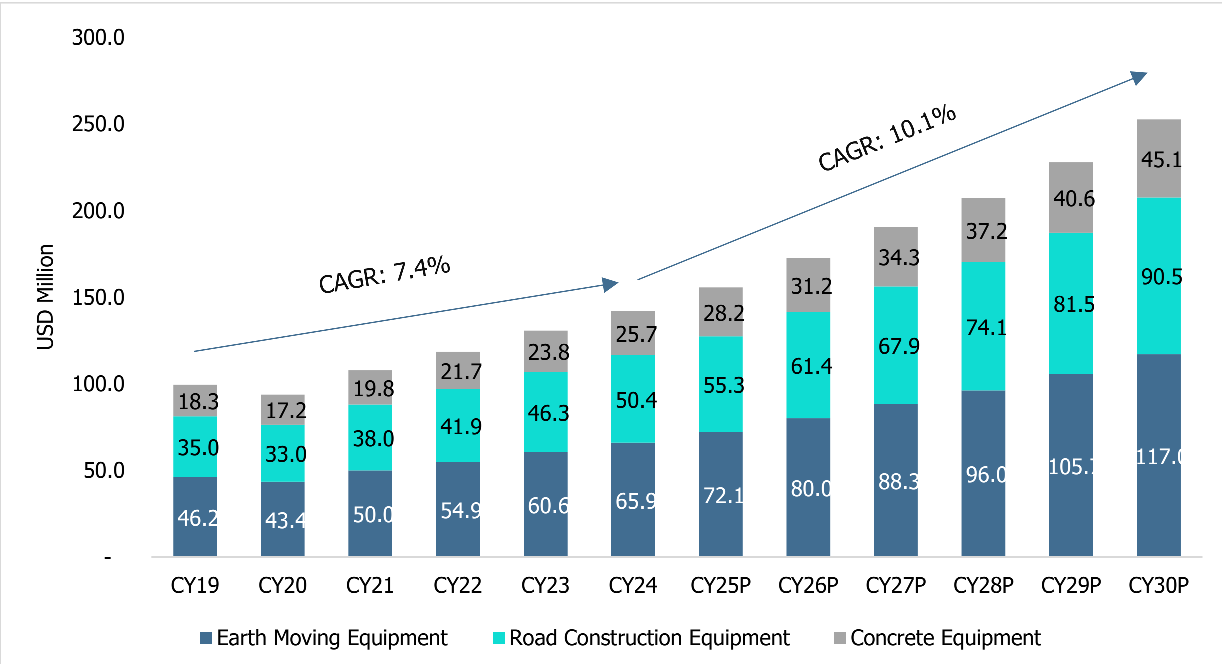
Concrete Equipment accounts for 10% share of the construction equipment and comprises of Batching plants, Concrete pumps, Concrete mixers.

The overall growth of construction machinery has picked up to 9.6% y-o-y in FY25 as compared to FY24 as seen below-

India offers significant potential as an OEM hub due to lower costs and the availability of skilled labour, new equipment manufacturers are expected to establish bases in India. Less than 40 per cent of India highway is four lanes, hence there is immense scope for improvement. Increased construction activities create favourable conditions in the earthmoving machinery segment. From the mid and long-term perspective, given the Government's thrust on monetization through disinvestment and huge investment through projects under NIP, it is expected the industry to show strong recovery going forward.

Consumption of Hydraulic Fitting in Construction Equipment Sector in India

Chart 19: Hydraulic Fittings Consumption in Construction Equipment sector in India



Source – Maia Research, CareEdge Research

The consumption of hydraulics fittings in India's Construction Equipment sector has steadily increased over recent years, driven by the growth in infrastructure development and the rising demand for advanced construction machinery. From CY21 to CY24, the sector showed consistent growth, with consumption rising from USD 116.2 million in CY21 to USD 127.8 million in CY22, and further increasing to USD 144.3 million and USD 141.1 million, and USD 153.3 million in CY23 and CY24, respectively. This growth reflects the ongoing modernization of India's construction industry and the growing reliance on hydraulic systems for machinery. The historical compound annual growth rate (CAGR) from CY19 to CY24 is approximately 7.4%, signalling healthy growth in the sector. Of the total construction equipment consumption in India, the largest share is covered by Earth Moving Equipment (~43%), followed by Road Construction Equipment (~32%), and Concrete Equipment (~16%). Looking forward, the sector is expected to continue its positive growth trend. By CY29, consumption is projected to reach USD 245.5 million, and by CY30, it is expected to increase to USD 272.1 million, showcasing the continued demand for hydraulics fittings in India's construction equipment sector. The expected CAGR growth is around 10.1%, highlighting the robust growth potential for the coming years.

4.3 Automotive

The automotive industry is considered to be one of the major drivers of economic growth due to its linkages with multiple industries. The growth of this sector benefits commodity sector as vehicle manufacturing require steel, aluminium, plastic, etc. The automobile industry in India is one of the largest in the world with sales of about 25.6 million units in FY25. Its contribution to the GDP of India stands at around ~7%. There has been a consistent growth in sales over the past two years: FY23-24 and FY24-25 still the sales have not reached to pre-covid levels due to the impact of Covid-19 induced lockdown restrictions apart from an overall economic slowdown.

But India has favourable growth prospects like it's favourable Foreign Direct Investment (FDI) policy with 100% FDI through automatic route, relatively low cost of manufacturing, adequate manpower pool has attracted several foreign OEMs of the industry to invest in India and set-up manufacturing footprint.

Industry performance

The Indian automobile market can be categorized in four segments – two-wheelers, three wheelers, passenger vehicles and commercial vehicles with two wheelers accounting for the largest segment based on sales volume.

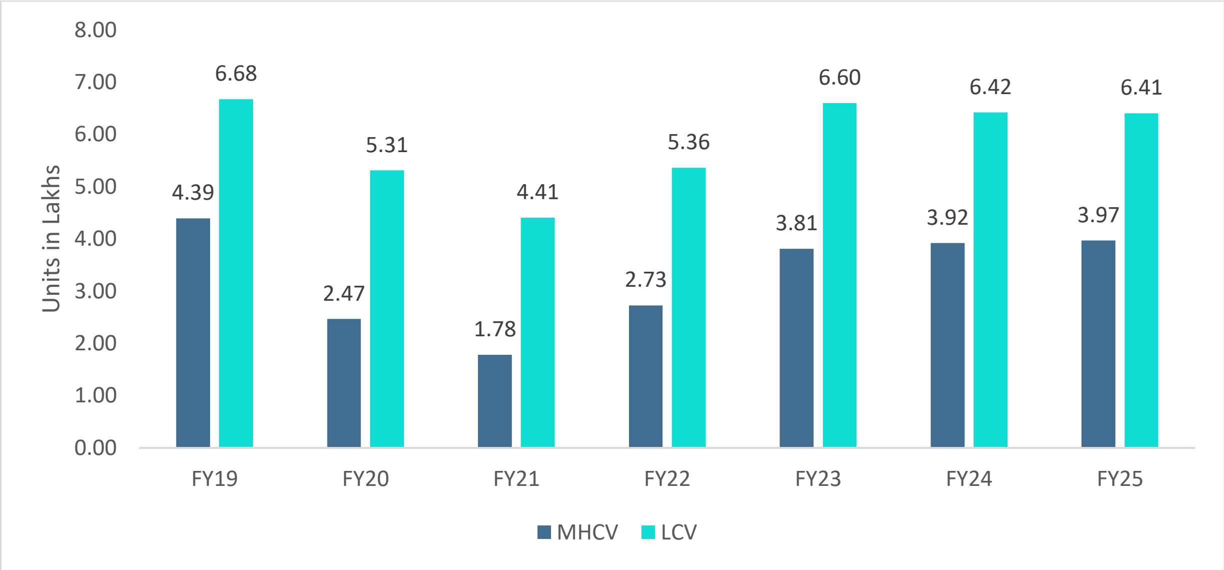
The pandemic had adversely impacted the whole supply chain including auto component and automobile manufacturers, dealerships and consumers. The mobility restriction had created labour shortages and closure of factories leading to significant drop in production levels. The travel restrictions and fear of job losses descended the consumer sentiments and impacted the demand.

With gradual easing of restrictions in FY21 onwards, supply chain gradually restored and there was recovery in sales volume. However, later in the year the industry faced setback due to shortages in semi-conductors which is critical in vehicle manufacturing. Also rise in fuel prices and price hike by OEMs impacted the demand which led to the reduction in domestic sales.

Trends in Medium and Heavy Commercial Vehicle (MHCV) and Light Commercial Vehicle (LCV)

The growth in MHCV is considered to be a crucial indicator for pickup in investment activity while growth in LCV is considered as indicator of consumption demand. The MHCV and LCV segments which are both part of Commercial vehicle and are the end users of hydraulic fittings have witnessed consistent growth in the period FY21 to FY25. It was driven by growth in infrastructure projects, recovery in rural demand, increased investment activity, etc. However, there has been a sharp decline in the sales of the CVs in FY20 onwards. This can be attributed to various factors such as excess freight capacity owing to improved turnaround time post GST & revised axle load norms, transition to BSVI, slowdown in economy, outbreak of Covid-19 etc.

Chart 20: Sales trend of MHCVs and LCVs in India



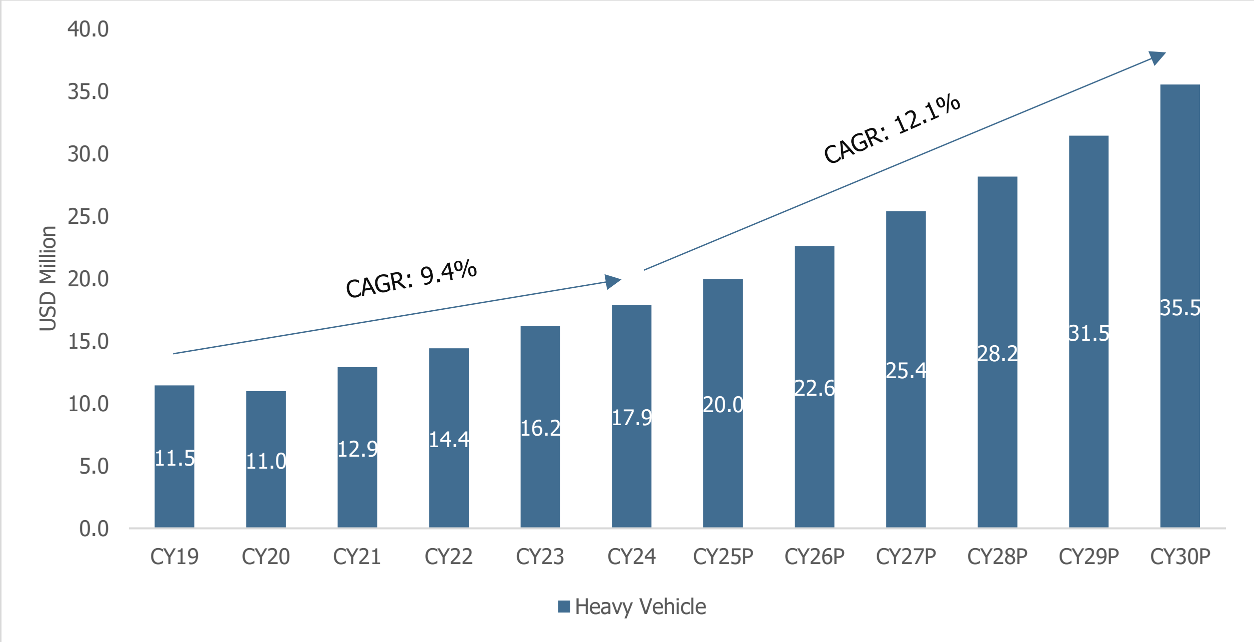
Source – CMIE, CareEdge Research

The Medium and Heavy Commercial Vehicle (MHCV) and Light Commercial Vehicle (LCV) segments have shown a mixed but promising recovery in recent years, especially in FY25. The MHCV sector, which includes vehicles like trucks and buses, saw a significant rise in FY23 with 3.81 lakh units sold, up from 2.73 lakh units in FY22. This growth continued into FY24 and FY25 with sales reaching 3.92 lakh units and 3.97 lakh units respectively. The recovery post-pandemic, coupled with the increase in road construction projects and government initiatives like the vehicle scrappage policy, has bolstered demand.

The LCV segment, which includes smaller commercial vehicles used in e-commerce and agriculture, has also demonstrated a robust recovery. After a dip in sales during FY20 and FY21, the LCV market saw an upswing, with sales reaching 6.60 lakh units in FY23, compared to 5.36 lakh units in FY22. In FY24 and FY25, LCV sales slightly reduced to 6.42 lakh units and 6.41 lakh units respectively, but the sector remains resilient, driven by e-commerce growth and strong demand from the agricultural sector, bolstered by favourable monsoon conditions and increased kharif crop output.

Hence, the improvement in the sales in MHCVs and LCVs will automatically drive up the demand for hydraulic fittings used in the vehicles. Though the industry has a strong long-term growth potential but currently, there are some challenges being faced. The Russia-Ukraine war has once again aggravated the semiconductor shortage with some OEMs reducing production. Russia has around 44% of the global supplies of palladium whereas Ukraine produces nearly 70% of the global supply of neon which are the two key raw materials used to make semiconductors. This is likely to impact the demand for auto components industry going ahead. Therefore, challenges such as semiconductor shortage, any further increase in raw material prices and escalating freight costs may restrict the growth in short-term.

Chart 21:Consumption of Hydraulics Fitting in Automotive sector in India



Source – Maia Research, CareEdge Research

Consumption of hydraulic fittings in the automotive sector in India has steadily increased, from USD 11.5 million in CY19 to USD 17.9 million in CY24, driven by automotive recovery and rising demand for both conventional and electric vehicles. The sector has experienced a historic CAGR of around 9.4%. Projections show continued growth, with consumption expected to reach USD 35.5 million by CY30, driven by advancements in vehicle technology and production. In the near term, consumption is forecasted to rise to USD 35.5 million in CY30. The expected CAGR until CY30 is around 12.1%, reflecting the growing demand for high-performance hydraulic systems in India's expanding automotive market.

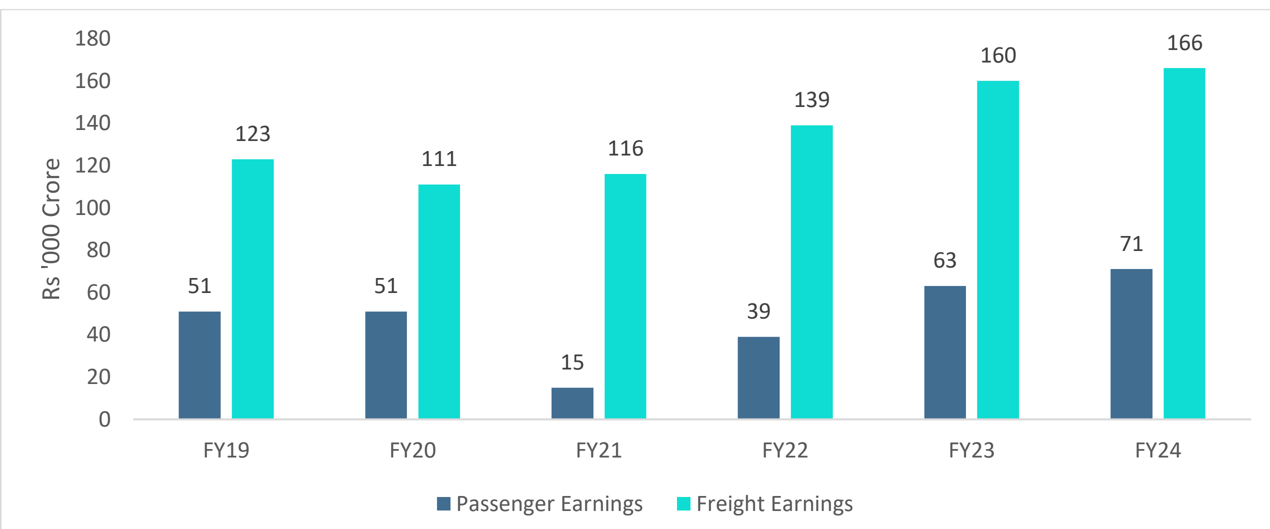
4.4 Railways

Indian railways globally account for the third largest network under single management with over 68,584 route kms. The rail network is suitable for transportation of bulk commodities and movement over long distances. Investments have been made by Indian Railways to improve safety, enhance speed of trains, enhance freight efficiency, improve passenger amenities and ensure better connectivity. Between 2014-15 and 2023-25, Indian Railways laid a total of 32,557.7 km of tracks, averaging approximately 8.9 km per day. This total includes new line construction, doubling, tripling, and gauge conversion projects.

In FY24, the pace of track laying slowed to 2,966 km, with an average of 8.12 km per day. Indian Railways is also embracing indigenous technologies such as KAVACH, introducing Vande Bharat trains, and redeveloping stations to enhance safety and provide a more comfortable travel experience. Moreover, metro rail networks for public transport have been enhanced and more cities have been covered. In FY2024–25, India's urban transit infrastructure experienced notable growth, with the operational metro rail network expanding to approximately 1,010 km across 23 cities. This progress reflects continued investment in efficient and sustainable public transport solutions. Complementing this, around 980 km of metro and regional rapid transit systems (RRTS) are under construction in 29 cities, signalling broader geographic coverage and deeper penetration into urban clusters. The addition of corridors like the Delhi–Meerut RRTS, which saw 62.7 km opened in FY25 alone, showcases momentum toward high-speed connectivity.

The earnings of Indian Railways experienced a significant drop during FY21, primarily due to the impact of the Covid-19 pandemic. Passenger earnings plunged to Rs. 15,000 crores, a sharp decline from the previous years, as travel restrictions and lockdowns led to a dramatic fall in ridership. While freight earnings also saw a slight dip in FY20, they remained relatively stable throughout the pandemic. However, in the recent fiscal years, Indian Railways has seen a strong recovery. In FY25, passenger earnings rebounded to Rs. 71,000 crores, and freight earnings reached Rs. 1,66,000 crores, reflecting a robust resurgence in both sectors as economic activities and travel resumed.

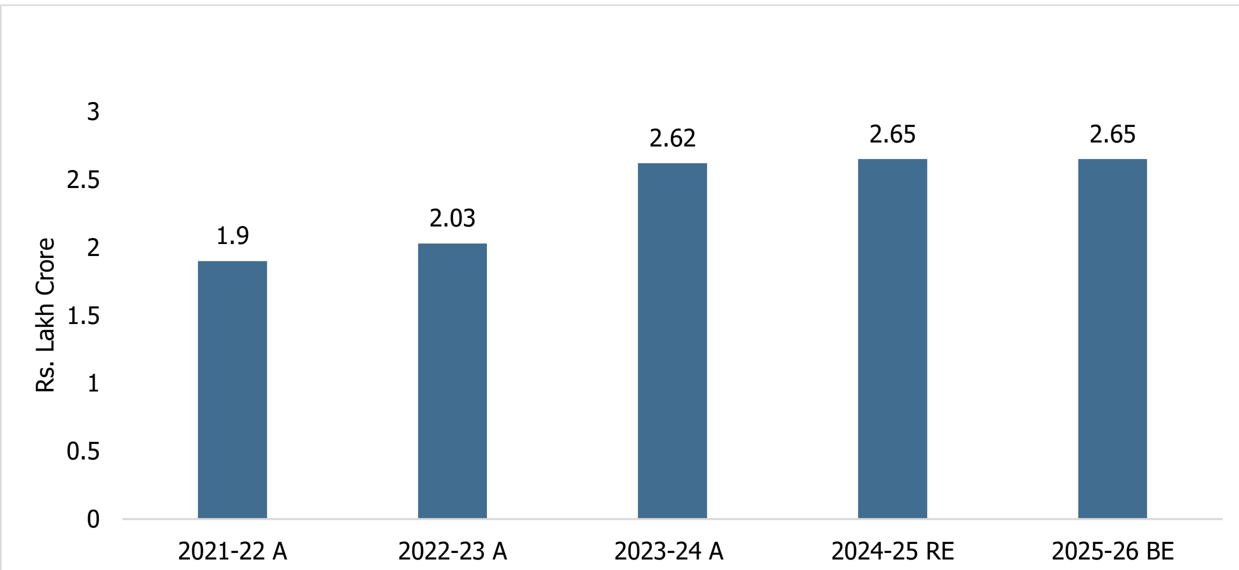
Chart 22: Earnings generated by railways



Source: Ministry of Railways

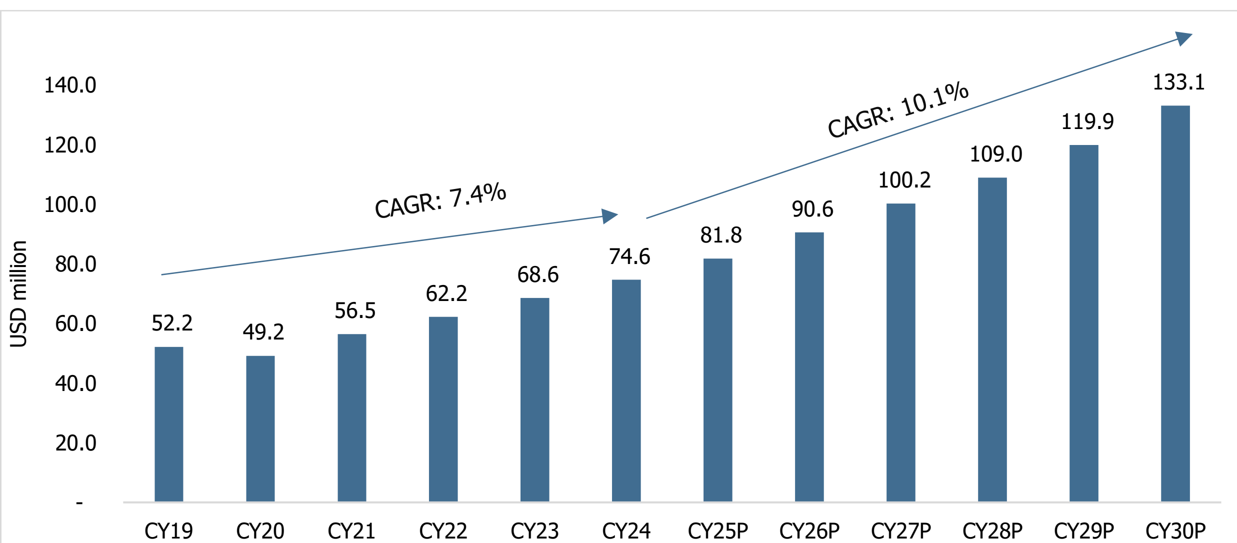
Moreover, keeping in line with Government's continued focus on infrastructure development, the Government has allocated Rs 2.65 lakh crore (Budget Estimates) towards railways in the union budget 2025-26. In addition, several schemes launched by the Government is expected to positively impact the industry. In August 2020, the Government announced National Infrastructure Pipeline (NIP), and it includes both economic and social infrastructure project and the total outlay under this scheme is Rs 111 lakh crores out of which railways accounts for a share of 13%. It was launched with 6,835 projects, which has expanded to over 9,000 projects covering 34 infrastructure sub-sectors. NIP and other Government schemes are expected to attract more investments in the sector and lead to creation and enhancement of rail infrastructure which augurs well for the railways industry.

Chart 23: Capital expenditure allocation towards railways



Source: Union Budget 2024-25 documents

Chart 24: Indian Consumption of Hydraulic Fittings in Railways



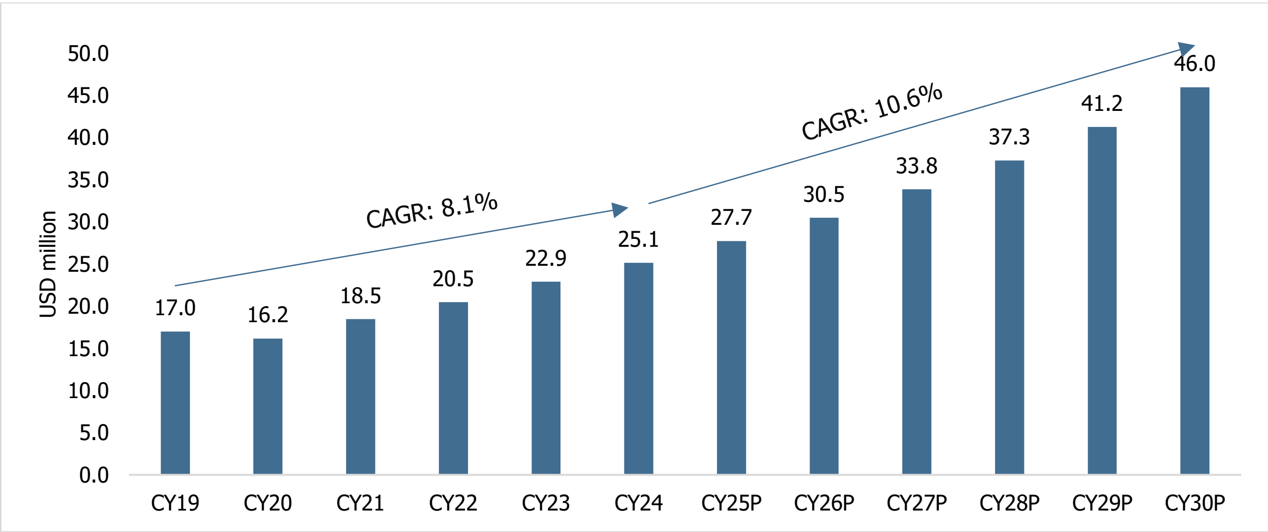
Source – Maia Research, CareEdge Research

India’s consumption of hydraulic fittings in the railway sector has shown steady growth, rising from USD 52.2 million in CY19 to USD 74.6 million in CY24. This growth reflects the ongoing development of rail infrastructure and the increasing demand for advanced hydraulic systems in railway operations. The sector has experienced a historic CAGR of 7.4%, indicating a consistent upward trend despite occasional challenges. Looking ahead, the consumption of hydraulic fittings in India's railway sector is expected to continue expanding, with projections reaching USD 133.1 million by CY30. In the short term, consumption is forecasted to rise to USD 100.2 million in CY27, USD 109.0 million in CY28, and USD 119.9 million in CY29. The expected CAGR until CY30 is around 10.1%, driven by the modernization of India's railways, the adoption of more efficient technologies, and the expansion of the country’s railway network.

4.5 Hydraulic System

Hydraulic systems are integral to a wide range of industries, enabling the transfer of energy through pressurized fluid to perform various mechanical tasks. These systems are composed of key components such as pumps, valves, actuators, and hydraulic fittings, all of which work in unison to ensure the system operates efficiently and reliably. Hydraulic fittings, in particular, are essential in connecting hoses, tubes, and pipes within the system, providing secure, leak-resistant joints that can withstand high pressure and demanding environments. As the demand for advanced hydraulic applications in sectors such as construction, manufacturing, and automotive continues to rise, the growth of hydraulic systems and fittings remains robust. Ongoing innovations in the design and material of hydraulic fittings are enhancing the performance and longevity of these systems, further driving market expansion.

Chart 25: Indian Consumption of Hydraulics Fitting in the Hydraulic System



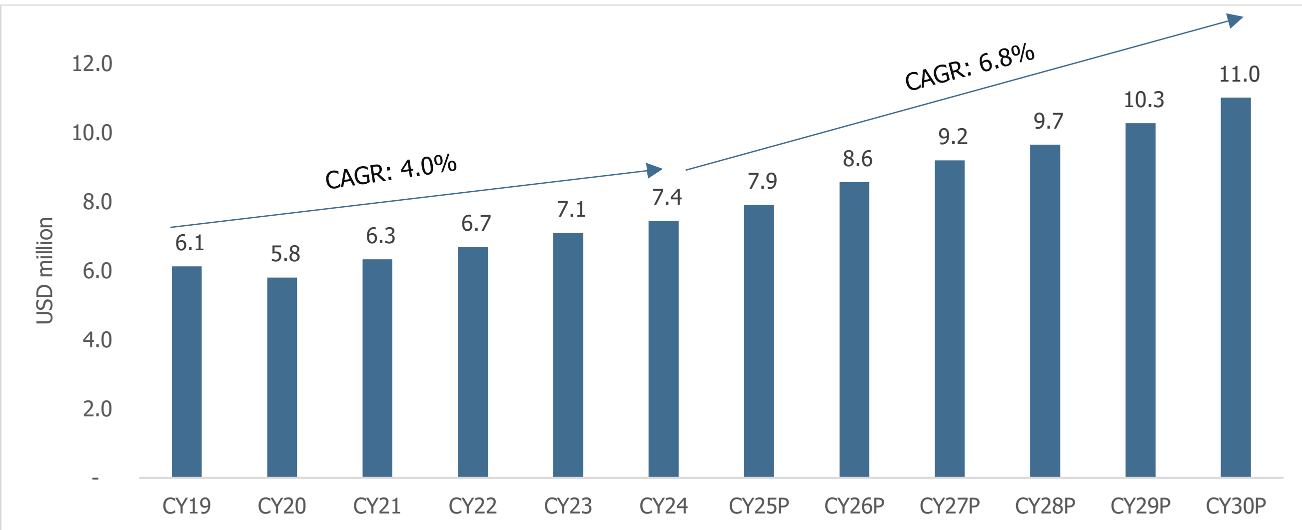
Source – Maia Research, CareEdge Research

The consumption of hydraulic fittings in India's hydraulic systems has shown consistent growth, increasing from USD 17.0 million in CY19 to USD 25.1 million in CY24, with a CAGR of 8.1%. This growth is driven by the expanding use of hydraulic systems in critical applications such as machinery, industrial automation, and infrastructure projects. Hydraulic fittings play a crucial role in ensuring the secure, leak-proof connection of various components within hydraulic systems, which are vital for efficient power transmission and control. With the market expected to grow at a projected CAGR of 10.6% from CY24 to CY30, reaching USD 46.0 million by CY30, the demand for hydraulic fittings is set to rise in tandem with the increasing adoption of advanced hydraulic technologies in sectors like manufacturing, construction, and agriculture. This growth reflects a broader trend of modernization in hydraulic systems, driven by the need for greater efficiency, durability, and reliability in high-pressure environments.

4.6 Other Sectors

The hydraulic fitting sector plays a pivotal role across a wide range of industries, serving as an essential component in the efficient operation of hydraulic systems used in various applications. These fittings, which ensure the secure connection of hydraulic components, are integral to sectors such as construction, transportation, mining, material handling, and manufacturing. As global industries continue to expand, the demand for high-quality hydraulic fittings has surged, driving significant export activity. Countries like India have become key exporters of hydraulic fittings, supplying critical components for machinery used in construction equipment, vibration control systems for trains and high-rise buildings, hydraulic lifts, and crushers in mining operations. The export of hydraulic fittings not only supports the growth of these industries but also highlights the global reliance on engineered components that ensure the safety, efficiency, and durability of hydraulic systems. With ongoing technological advancements and increasing infrastructure projects worldwide, the role of hydraulic fittings in these end-user industries continues to grow, fostering international trade and contributing to economic development

Chart 26: Indian Consumption of Hydraulic Fitting in Other Sectors

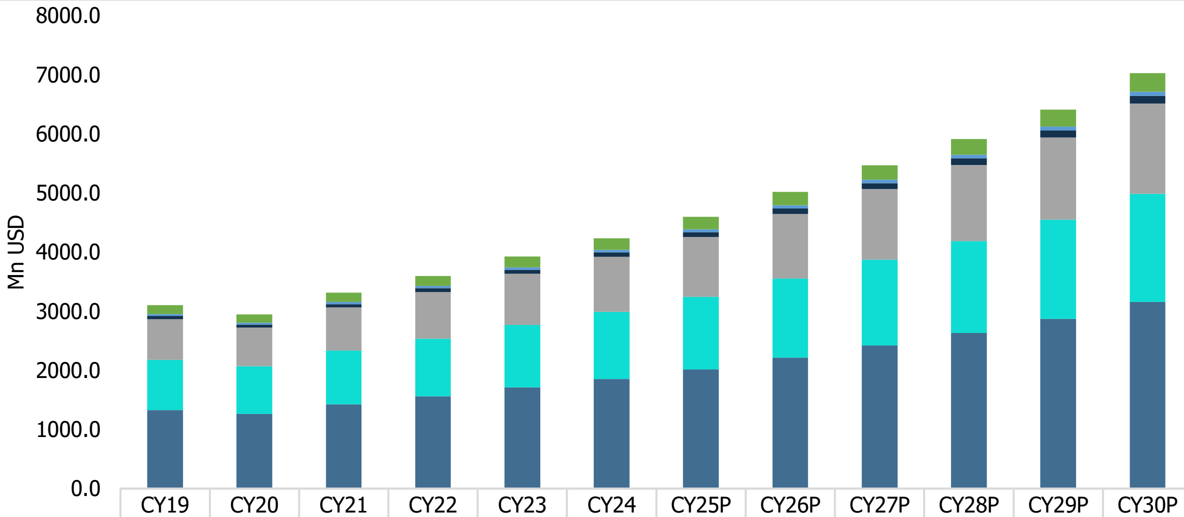


Source – Maia Research, CareEdge Research

The hydraulic fitting sector in India has shown consistent growth, with consumption increasing from USD 6.1 million in CY19 to USD 7.4 million in CY24, reflecting a historical CAGR of 4.0%. This growth is driven by the expanding use of hydraulic systems across various industries, including vibration control systems for trains and high-rise buildings, hydraulic lifts, and crushers in the mining and construction sectors. As demand for infrastructure and advanced machinery continues to rise, the projected CAGR from CY24 to CY30 is expected to accelerate to 6.8%, with consumption reaching USD 11.0 million by CY30. This growth highlights the critical role of hydraulic fittings in supporting India's industrial and infrastructure development.

5. Region- Wise Hydraulic Fittings Market

Chart 27: Region- Wise Hydraulic Fittings Market



	CY19	CY20	CY21	CY22	CY23	CY24	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P
Others	147.5	139.3	155.6	167.7	181.9	194.9	210.1	228.1	246.7	265.0	285.5	310.6
Africa	36.5	34.4	38.1	40.8	44.2	46.8	50.1	54.3	58.2	62.0	66.7	71.9
Middle East	52.5	48.8	55.4	61.1	67.6	73.7	81.2	90.0	98.9	108.7	119.4	132.2
Europe	685.4	651.6	733.9	793.4	862.8	932.2	1007.8	1096.6	1195.8	1288.3	1390.9	1526.1
USA	852.3	807.7	904.6	976.1	1059.6	1138.5	1228.5	1334.4	1447.1	1556.0	1677.1	1829.8
Asia	1327.7	1263.4	1427.8	1558.6	1711.1	1850.7	2018.2	2217.7	2424.3	2633.0	2871.4	3156.6

Asia USA Europe Middle East Africa Others

Source – Maia Research, CareEdge Research

The hydraulic fittings market is experiencing dynamic growth globally, with significant trends emerging across various regions. In Asia, particularly in China and India, industrialization and infrastructure development are driving the demand for hydraulic systems, fuelling the need for hydraulic fittings. The region's expanding manufacturing sectors, such as automotive and construction, are significant contributors to this growth. The hydraulic fittings market in Asia grew at a CAGR of 6.9% from CY19 to CY24 and is expected to grow at CAGR of 9.3% from CY24 to CY30.

Meanwhile, the Middle East is witnessing increased demand due to large-scale oil and gas projects, where high-performance hydraulic systems are essential. The development of renewable energy sources in the region, such as solar and wind, is also contributing to the market expansion. The hydraulic fittings market in the Middle East grew at a CAGR of 7.0% from CY19 to CY24 and is expected to grow at CAGR of 10.2% from CY24 to CY30.

In the USA, the hydraulic fittings market is driven by advancements in automation, aerospace, and agriculture. The country's focus on manufacturing innovations and infrastructure upgrades supports the growing need for hydraulic components. The hydraulic fittings market in the USA grew at a CAGR of 6.0% from CY19 to CY24 and is expected to grow at CAGR of 8.2% from CY24 to CY30.

Europe follows a similar pattern, with increased investments in industrial automation and green technologies like electric vehicles (EVs) and renewable energy contributing to market growth. The demand for hydraulic fittings in sectors such as construction, mining, and transportation is also prominent in this region. The hydraulic fittings market in Europe grew at a CAGR of 6.3% from CY19 to CY24 and is expected to grow at CAGR of 8.6% from CY24 to CY30.

In Africa, while the hydraulic fittings market is still emerging, the oil and gas industry, along with mining operations, is increasingly driving demand for hydraulic systems. The hydraulic fittings market in Africa grew at a CAGR of 5.1% from CY19 to CY24 and is expected to grow at CAGR of 7.4% from CY24 to CY30.

Other parts of the world, such as Latin America, are seeing steady growth due to industrial development and modernization projects in countries like Brazil and Mexico, further pushing the demand for hydraulic components. Globally, there is a noticeable trend towards eco-friendly and energy-efficient hydraulic systems, as companies aim to meet sustainability goals, fostering innovation in materials and technologies across all regions. The hydraulic fittings market in other parts of the world grew at a CAGR of 5.7% from CY19 to CY24 and is expected to grow at CAGR of 8.1% from CY24 to CY30.

6. Raw materials Used

Depending on the end use of hydraulic fittings, fittings are expected to have enough strength to deal with high pressure in hydraulic systems. Fittings should also be corrosion resistant from hydraulic fluids used while operating hydraulic systems.

- **Stainless Steel** has high corrosion resistant properties. It has additions of chromium and other elements such as nickel. Stainless steel has a protective layer of chromium to resist corrosion as the added layer of chromium creates a barrier between the oxygen in the environment and iron content in the metal. Stainless Steel is one of the most suitable materials to be used for manufacturing hydraulic fittings.
- **Carbon Steel** is defined by its carbon content, and it leads to a lower melting point, more malleability and durability. Although it is prone to rust unlike stainless steel, carbon steel is known to be cheaper and has its own different mechanical properties based on the carbon content.

Production of Finished Steel

Domestic crude steel production has grown at a CAGR of 9.9% in the past five years reaching 152 MT in FY25 from 104 MT in FY21.

On the other hand, finished steel production has grown at a CAGR of 11.2% to 147 MT in FY25 from 96 MT in FY21. The growth in production has been backed by a rise in domestic steel consumption on account of growing economic activities in the country supported by an increase in infrastructure and construction spending by the government, a rise in automobile and consumer durable demand, among others.

As per the National Steel Policy 2017, the target of Government is to set the crude steel production to 300 MT by 2030-31.

Table 4: Steel production and consumption

(in MT)	FY21	FY22	FY23	FY24	FY25	Y-o-Y Growth %
Crude Steel Production	104	120	127	144	152	7.60%
Finished Steel Production	96	114	123	139	147	5.70%
Finished Steel Consumption	95	106	120	136	152	11.70%

Source: CMIE

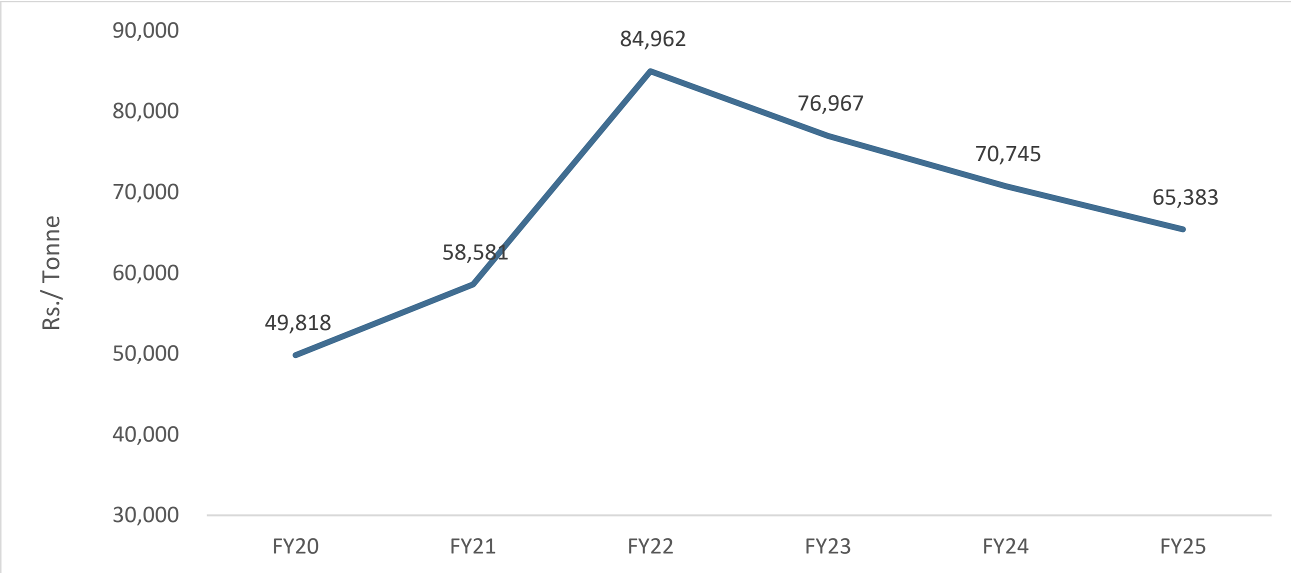
Domestic finished steel consumption has increased at a CAGR of about 12.4% to 152 MT in FY25 from 95 MT in FY21. After a steady increase in steel production, India observed in FY21 due to the outbreak of Covid-19 pandemic. The rebound in domestic demand from the impact of Covid-19 in previous financial years, continuous investment in infrastructure and policy support by the government, and pick-up in real estate construction during FY23 have led to an increase in consumption of finished steel to 120 MT, implying a y-o-y growth of 13.4%. Further, during FY25 the finished steel production and consumption grew by 5.7% y-o-y and 11.7% y-o-y respectively as compared to its previous year.

Steel Prices

Between FY20 and FY22, steel prices saw a sharp rise. In FY20, steel was price was Rs 49,818, which increased moderately to Rs 58,581 in FY21. However, in FY22, prices surged significantly to Rs 84,962, marking an increase of over 45% from the previous year. This increase can be attributed to global supply chain disruptions caused by the COVID-19 pandemic, which limited supply at a time when demand was beginning to recover. Additionally, governments around the world, including India and China, increased their infrastructure spending to revive economic growth, further boosting demand for steel. At the same time, prices of key raw materials like iron ore and coking coal rose sharply, contributing to the overall increase in steel prices.

From FY22 onwards, a downward trend is observed in steel prices. In FY23, prices declined to Rs 76,967, followed by a further decrease to Rs 70,745 in FY24 and Rs 65,383 in FY25. This gradual decline indicates a correction phase in the steel market. As global supply chains normalized and production resumed, the supply of steel increased. On the demand side, economic slowdowns in major markets like China and Europe, along with tighter monetary policies and high interest rates, led to reduced construction and industrial activity, suppressing demand for steel. Moreover, with raw material prices stabilizing, steel producers faced lower cost pressures, which contributed to the fall in prices.

Chart 28: Trend in Steel Prices



Source: CMIE

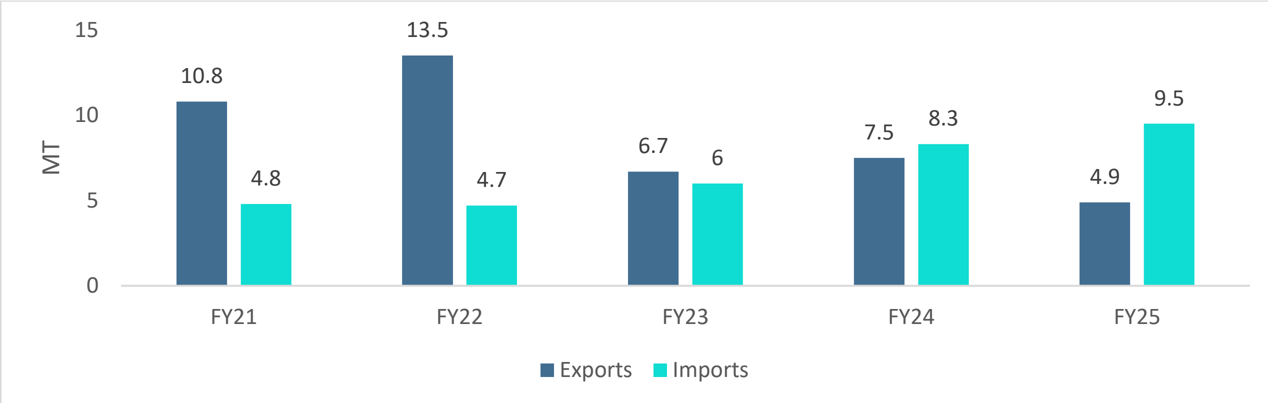
Steel Trade Data

Exports

India's steel trade patterns have changed significantly in the last few years. During FY25, the exports of the country fell sharply by 35.1% year-on-year, extending the decline from FY23. Poor foreign demand, increased competition from cheap Chinese steel—particularly in the Middle East and Vietnam—and lowered exports to major markets such as Italy were responsible for this fall. Despite the overall decline, Italy, Belgium, and the UAE continued to be the most popular destinations for Indian steel.

India's steel exports experienced a short-term recovery in FY24, increasing 11.5% year-on-year, though overall there were difficulties. Still, this increase wasn't sufficient to counter the huge decline last year. In FY23, exports fell by 50.2%, decreasing from 13.5 MT in FY22 to 6.7 MT, ending a three-year rising trend observed in FY20, FY21, and FY22.

Chart 29: India Exports and Imports



Source: CMIE
Note: YTD refers to April to September

Imports
Having been a net exporter for four years in a row, India became a net importer of steel in FY24. Imports rose by 38% year-on-year, from 6 MT in FY23 to 8.3 MT in FY24. This increase was led mainly by low-cost steel imports from Russia and higher Chinese volumes. Imports continued to be high in FY25, increasing 14.6% y-o-y, driven by the arrival of low-cost flat products of steel and special grades which are either not available locally or are short-supplied. Segments like automobile, defence, railways, shipbuilding, and power continued to require these high-grade materials.

7. Outlook and Trends

7.1 Impact of industry 4.0, IoT on hydraulic components manufacturing

Smart Factories
Hydraulic manufacturing units in India are increasingly evolving into smart factories by adopting automation, robotics, and AI-driven systems. These smart factories integrate sensors and software across production lines, enabling automation of tasks such as machining, assembly, leak testing, and finishing. This not only increases throughput and reduces human error but also ensures higher product consistency and quality. The result is faster production cycles and reduced operational costs.

Digital Twin Technology
Digital twin technology enables manufacturers to create virtual replicas of hydraulic systems and components, which can be used for simulation, testing, and optimization before physical production. This reduces the need for multiple prototypes, cutting development time and costs. Especially in applications like heavy machinery, aerospace, and defence, digital twins help ensure that the final product performs reliably under real-world conditions, improving customer satisfaction and system performance.

Predictive Maintenance
With the integration of Industry 4.0, predictive maintenance has become a vital tool. IoT sensors installed in hydraulic machines collect real-time data on pressure, temperature, fluid levels, and vibrations. Using AI and analytics, this data can forecast potential failures before they occur. This minimizes unplanned

downtime and extends equipment life, which is critical for maintaining uptime in manufacturing plants and customer installations such as OEM factories, construction equipment, or power plants.

Mass Customization

The hydraulic industry in India is moving toward low-volume, high-mix production using smart manufacturing tools. Modular tooling and flexible production lines enable quick customization of components such as fittings, cylinders, and actuators to meet specific customer requirements. This capability is particularly important in sectors like defence, shipbuilding, and agriculture, where specialized applications often require tailored hydraulic solutions.

Sensor-Driven Monitoring via IoT and Remote Diagnostics

IoT plays a central role in modernizing hydraulic equipment. Embedded sensors monitor operational parameters like oil temperature, flow rate, and pressure in real time. This data is transmitted to cloud platforms for monitoring and analysis. Operators can remotely assess machine conditions, make informed decisions about performance optimization, and proactively manage wear and tear, thus enhancing operational reliability. IoT connectivity allows hydraulic systems to be accessed and controlled remotely. Technicians can diagnose problems, perform software updates, or recalibrate parameters without being physically present at the site. This feature is especially beneficial in industries such as mining, offshore oil rigs, and remote agricultural operations where service access is difficult and costly. Remote control capability also reduces machine downtime and improves response time to maintenance issues.

Quality Assurance via Machine Vision

To ensure international-grade quality, AI-enabled machine vision systems are now used in production lines to inspect hydraulic parts. These systems automatically detect surface defects, thread damage, or incorrect dimensions at high speed and with greater accuracy than manual inspection. This technology helps maintain consistent product quality and reduces the chances of faulty components reaching customers, thereby enhancing brand reliability and export potential.

Sustainability Advancements

Industry 4.0 supports sustainability by improving resource efficiency. Smart hydraulic systems reduce fluid leakages, optimize component lifespans, and minimize waste through predictive maintenance and efficient design. This contributes to cleaner and greener manufacturing practices, aligning with India’s broader environmental and climate goals. Sustainable operations are also a growing differentiator in global supply chains.

7.2 Opportunities in defence, railways (IRIS, MoD approvals)

The hydraulic fittings industry in India is experiencing growing opportunities in strategic sectors like defence and railways, driven by modernization initiatives, policy support, and a strong focus on indigenization. These sectors require highly specialized, high-performance hydraulic components that can operate reliably under demanding conditions, opening doors for certified and technologically advanced manufacturers.

In the defence sector, the push for self-reliance through government programs such as Make in India and Atmanirbhar Bharat has significantly increased the demand for locally manufactured hydraulic systems and fittings. These components are widely used in critical defence applications, including tanks, armoured vehicles, aircraft landing gear, naval equipment, and missile systems. To supply to defence programs, manufacturers must obtain necessary clearances and certifications from the Ministry of Defence (MoD), including approvals from agencies like the Directorate General of Quality Assurance (DGQA). Gaining MoD approval not only ensures participation in defence tenders but also enhances credibility with public sector undertakings such as HAL (Hindustan Aeronautics Limited), BEML (Bharat Earth Movers Limited), BEL (Bharat Electronics Limited), and DRDO (Defence Research and Development Organisation) linked projects. Additionally, the defence offset policy encourages foreign OEMs to source components from Indian suppliers, presenting an export opportunity for domestic firms with the ability to deliver high-precision, rugged, and custom-built hydraulic fittings. The development of defence industrial corridors in Uttar Pradesh and Tamil Nadu is further expected to boost local manufacturing, creating a cluster-based demand for certified hydraulic components.

Similarly, the Indian Railways sector is undergoing a rapid transformation with projects like Vande Bharat, high-speed trains, electrification, and modern coach manufacturing. Hydraulic systems are critical in areas such as braking mechanisms, suspension systems, coupling devices, and maintenance vehicles. To participate in these projects, manufacturers are required to meet stringent quality standards, notably through obtaining the IRIS (International Railway Industry Standard) certification, which is increasingly being recognized by both Indian and global railway OEMs. This certification not only improves access to Indian Railways tenders but also opens the door for global export contracts with companies like Alstom, Siemens, and Bombardier. Further, the Research Designs and Standards Organisation (RDSO) plays a key role in evaluating and approving products for railway applications, and manufacturers who align with these specifications are prioritized in procurement processes. The expansion of metro rail networks across major Indian cities and the setup of new rolling stock production units are further strengthening the demand for reliable and localized hydraulic solutions.

Indian hydraulic fittings manufacturers have an opportunity to enhance their positioning by investing in product localization, advanced design capabilities, and compliance certifications such as IRIS, ISO 3834, AS9100 (for aerospace), and MoD approvals. These certifications not only improve eligibility for defence and rail contracts but also ensure adherence to international standards, increasing trust and export readiness. Companies that can offer custom-engineered, durable, and efficient hydraulic fittings, while maintaining cost-effectiveness, are well-positioned to form long-term partnerships with Tier-1 vendors and public sector units engaged in railway and defence programs.

7.3 ESG, Carbon-neutral certification in OEM selection

Environmental, Social, and Governance (ESG) factors, along with carbon-neutral certifications, are increasingly influencing OEM selection processes in the hydraulic fittings industry. Global OEMs are now prioritizing suppliers who align with their sustainability and ethical sourcing goals. This shift is driven by tightening environmental regulations, growing investor pressure, and customer demand for greener supply chains.

For hydraulic fittings manufacturers, ESG compliance means adopting sustainable practices across operations, including efficient resource use, responsible waste management, safe labour practices, and transparent governance. OEMs now assess suppliers on these parameters as part of their vendor qualification process. Companies that can demonstrate strong ESG performance and formal sustainability reporting are more likely to win contracts, especially from large multinational clients in sectors such as automotive, construction, and aerospace.

Carbon-neutral certification is becoming a key differentiator. OEMs are increasingly asking suppliers to calculate, reduce, and offset their carbon emissions across the manufacturing and logistics value chain. Manufacturers that achieve certifications like ISO 14064, PAS 2060, or other verified carbon-neutral credentials are seen as reliable, future-ready partners. This is particularly relevant for exports to regions like the EU and the US, where green procurement norms are becoming stricter.

In response, Indian hydraulic fittings manufacturers are gradually adopting cleaner production methods, energy-efficient equipment, and sustainable packaging solutions. Certifications such as ISO 14001

(Environmental Management System) and ESG ratings are becoming essential for qualifying as suppliers in tenders and long-term OEM contracts. Aligning with sustainability targets not only helps improve global market access but also enhances reputation and resilience in a rapidly evolving regulatory environment.

8. Key Policies and Government Initiatives

Some of the key policies that the Government introduced for major end user industries of hydraulic fittings industry is stated below. They are indirectly expected to benefit hydraulic fittings industry.

8.1 Production Linked Incentive (PLI) scheme

In the Union Budget 21-22, the Government announced a financial outlay of Rs 1.97 lakh crores for Production Linked Incentive (PLI) scheme for 13 key sectors for a period of 5 years starting from FY22. This is line with the vision of the Government of an 'Aatmanirbhar Bharat'. The objective of this scheme is to encourage domestic manufacturing in the country and help them become globally competitive. As a result of PLI schemes, it is estimated that the minimum production in the country will be over USD 500 billion in 5 years. The PLI schemes for remaining 10 sectors was approved in November 2020 as follows:

Table 5: Financial outlay under PLI for 10 sectors

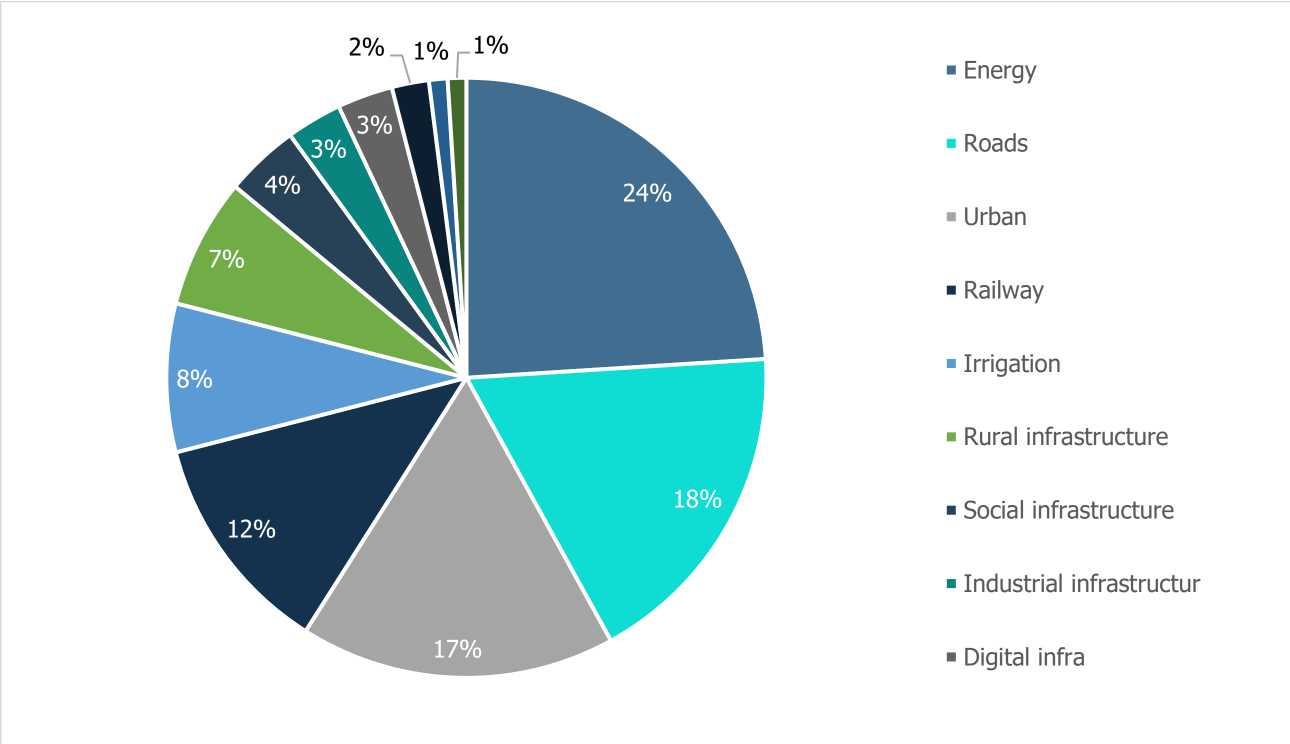
Priority	Sectors	Implementing Ministry/Department	Financial Outlay (in Rs crores)
1	Advance Chemistry Cell (ACC) Battery	NITI Aayog & Department of Heavy Industries	18,100
2	Electronic /Technology Products	Ministry of Electronics & Information Technology	5,000
3	Automobiles & Auto Components	Department of Heavy Industries	57,042
4	Pharmaceutical Drugs	Department of Pharmaceuticals	15,000
5	Telecom & Networking Products	Department of Telecom	12,195
6	Textile Products: MMF segment and technical textiles	Ministry of Textiles	10,683
7	Food products	Ministry of Food Processing Industries	10,900
8	High Efficiency Solar PV Modules	Ministry of New & Renewable Energy	4,500
9	White Goods (ACs & LEDs)	Department for Promotion of Industry & Internal Trade	6,238
10	Speciality Steel	Ministry of Steel	6,322
		Total	**1,45,980**

Source: Press release by PIB

8.2 National Infrastructure Pipeline (NIP)

The Government announced in August 2020 the National Infrastructure Pipeline (NIP) to achieve the GDP of USD 5 lakh crore by 2024-25. NIP includes both economic and social infrastructure project and the total outlay under this scheme is Rs 111 lakh crore. This scheme is expected to attract investments in the following sectors and contribute to the growth of the sectors and the overall economy.

Chart 30: Sector wise breakup under NIP



Source: National Infrastructure Pipeline, CareEdge Research

8.3 PM GatiShakti

This scheme was launched in October 2021 and the PM Gati Shakti - National Master Plan for Multi-modal Connectivity is primarily a digital platform to bring several ministries together to ensure integrated planning and coordinated implementation of infrastructure connectivity projects. The approach under this scheme will be driven by 7 engines:

- Roads
- Railways
- Airports
- Ports
- Mass transport
- Waterways
- Logistics infrastructure

In the Union Budget 2022-23, the Government announced that the projects pertaining to these 7 engines in the National Infrastructure Pipeline will be aligned with PMGati Shakti framework.

In addition, PM GatiShakti will also include infrastructure developed by State Governments as per the GatiShakti Master Plan. Further, assistance will be provided to states for PM GatiShakti related investments and other capital expenditure through allocation of Rs 1 lakh crore through a 50-year, interest-free loans to states. This assistance will be beyond the normal borrowings allowed to the States.

Some other initiatives as part of PM GatiShakti announced in the budget include aim to expand National Highways network by 25,000 km, Master Plan for expressways to be formulated, contracts for multimodal logistics parks in 4 locations to be awarded, 100 cargo terminals to be developed in next 3 years, innovative ways of financing metro projects, development initiative for North East (PM-DevINE) etc.

8.4 Sub-Mission on Agriculture Mechanization (SMAM)

The Sub- Mission on Agriculture Mechanization (SMAM) launched in FY14-15 is scheme under which the Government of India aids State Government to provide demonstration and training of new farm machinery to the farmers and also support them in procurement of agriculture machineries and equipment. The scheme aims to enhance farm mechanization to marginal farmers to improve the productivity.

8.5 The Automotive Mission Plan 2016-26

The Automotive Mission Plan 2016-26 (AMP 2026) is the collective vision of Government of India (Government) and the Indian Automotive Industry on where the Vehicles, Auto components, and Tractor industries should reach over the next ten years in terms of size, contribution to India's development, global footprint, technological maturity, competitiveness, and institutional structure and capabilities.

8.6 National Automotive Testing and R&D Infrastructure Project (NATRiP)

The National Automotive Testing and R & D Infrastructure Project (NATRiP) is an initiative of the Government of India in the automotive sector. The aim of this Project is to improve the core competencies in Automotive sector in India and facilitate seamless integration of Indian Automotive industry with the world as also to position the country prominently on the global automotive map.

The vision of this project involves:

- Deepen manufacturing
- Encourage localized R&D
- Boost exports

It aims to converge India's unparalleled strengths in IT and electronics with automotive engineering sectors, to firmly place India in USD six trillion global automotive business.

Various other schemes by the Government such as Urban Rejuvenation Mission: AMRUT and Smart Cities Mission with budgetary allocation of Rs 14,100 crores as per 2022-23 (BE) to

- Enhance outlay for National Highways Authority of India (NHAI) and other road works from Rs 1.31 lakh crore as per 2021-22 (RE) to Rs 1.98 lakh crore as per 2022-23 (BE).
- Outlay towards Metro projects to Rs 19,130 crores as per 2022-23 (BE) as compared with Rs 18,978 crore as per 2021-22 (RE).

These projects are expected to increase outlay towards infrastructure and to aid the demand for the end use industries which in turn will lead to demand in hydraulic fittings industry.

8.7 Atmanirbhar Bharat

The Atmanirbhar Bharat Scheme and Make in India Scheme are two significant initiatives launched by the Indian government to promote self-reliance, boost domestic manufacturing, and enhance India's global competitiveness. The Atmanirbhar Bharat Scheme, announced in 2020, focuses on making India self-sufficient in various sectors by encouraging local production, innovation, and reducing dependency on imports. It includes measures such as financial support for micro, small, and medium enterprises (MSMEs), increasing production in key sectors, and promoting innovation and entrepreneurship.

8.8 Make in India

The Make in India Scheme, launched in 2014, aims to position India as a global manufacturing hub by attracting foreign investment, improving infrastructure, and fostering innovation. It focuses on promoting manufacturing in 25 key sectors, including defence, automotive, textiles, and electronics, with the goal of creating jobs, enhancing skills, and boosting exports. Both schemes complement each other by encouraging the growth of local industries, supporting the economy, and helping India become a major player in the global supply chain.

9 Risks and Challenges to the products of the issuer's company

Volatile prices of raw materials

As steel is one of the primary raw materials used in the manufacturing of hydraulic fittings, its fluctuating prices can affect the operational income of hydraulic fittings' manufacturers. Constant shifts in consumption pattern during the pandemic has caused high volatility in demand for raw materials which could adversely the manufacturers. Furthermore, global marketplaces that are volatile can also affect the fittings' manufacturers as it may not be possible for them to control additional costs, expenses, and profit when costs of raw materials fluctuate.

Highly competitive industry

With presence of several unorganized players (more than 90% of the industry is unorganized), the competitive intensity is high. The switching cost for the end user is estimated to be lower and the manufacturers may not have significant pricing power.

Exposure to cyclicality in end use sectors

A cyclical industry is sensitive to business cycles such as higher revenues during periods of economic prosperity and lower revenues during times of economic downturns. Hydraulic fittings industry is exposed to the cyclicality in end use industries such as automobiles and construction that in turn could have an impact on revenue generation of fittings' manufacturers. For example, monsoon season is a lean demand period for construction industry which could in turn translate to lower demand for hydraulic fittings.

Fragmented Supply Chain

The hydraulic fittings industry often relies on a wide network of small and dispersed suppliers, leading to inconsistencies in quality, delayed deliveries, and poor coordination — ultimately affecting production timelines and customer satisfaction.

Skilled Workforce Gap

A shortage of skilled technicians and engineers, especially in CNC machining and precision manufacturing, hampers operational efficiency and limits the company's ability to scale or maintain quality standards.

Compliance Hurdles for SMEs

Small and mid-sized players in the hydraulic fittings sector struggle to meet increasingly stringent quality, safety, and environmental standards, which can restrict market access and delay certifications.

Margin Pressure

Intense competition, rising input costs, and customer price sensitivity impact profit margins. This limits the ability to invest in innovation, automation, and capacity expansion.

R&D Gap

Limited in-house research capabilities restrict the development of advanced or customized products. This puts the company at a disadvantage compared to global players investing in new technologies and product innovation.

10 Competitive Landscape

Hy-tech Engineers Limited

Hy-tech Engineers Limited is an engineering company engaged in the manufacturing of hydraulic fittings, with more than four decades of experience in designing and producing a wide range of products for various industrial uses. Its offerings include standard hydraulic fittings such as DIN-metric fittings, JIC flared and flareless fittings, O-Ring Face Seal (ORFS) fittings, and conversion fittings. The company's portfolio covers over 10,000 stock keeping units (SKUs) of hydraulic fittings, which are used in sectors including construction equipment, agricultural machinery, automotive, components, injection moulding machines, and hydraulic systems.

Table 6: Key financial metrics of Hy-tech Engineers Limited (all figures are in million)

Hy-TECH Engineers Limited	FY23	FY24	FY25
Revenue from Operations	1,333.36	1,377.08	1,613.82
Other Income	36.08	34.65	53.25
Total income	1,369.44	1,411.73	1,667.07
Operating EBITDA	277.19	190.86	304.61
Depreciation	61.23	73.39	101.07
Finance Cost	46.30	28.74	48.12
Profit Before Tax	241.83	158.05	261.92
EBIT	252.05	152.14	256.79
PAT	180.02	115.96	196.17
Debt	212.06	408.38	435.25
Equity	713.03	822.17	1,012.49
Current Assets	766.46	691.99	967.66
Current Liabilities	385.5	409.49	438.43
Ratios			
Operating EBITDA%	20.79%	13.86%	18.88%
PAT%	13.15%	8.21%	11.77%
ROE%	28.80%	15.11%	21.38%
ROCE%	31.68%	15.24%	20.46%
DE Ratio	29.74%	49.67%	42.99%
Interest coverage ratio	5.44	5.29	5.34
Current ratio	1.99	1.69	2.21
Working capital cycle	125.18	131.02	142.54
Working capital	380.96	282.49	529.22
Net working capital turnover ratio	3.50	4.87	3.05
Inventory Turnover ratio	2.05	2.28	2.48
Trade receivables turnover ratio	3.23	3.47	3.91
Trade payable turnover ratio	3.92	4.83	6.30
NAV Per share	8.54	9.84	12.12

Source: Industry Financial Reports

Mercury Fittings Private Limited

Mercury Fittings Private Limited was established in 1983 with annual capacity of about 12 million components. The product line of Mercury Fittings Private Limited includes industrial fittings, such as pipe fittings, flanges, valves, hose fittings, and specialized components. These products are made from materials like stainless steel, carbon steel, brass, and alloys, ensuring durability and corrosion resistance. The company also offers customized solutions based on specific customer requirements, providing end-to-end support from design to delivery.

Table 7: Key financial metrics of Mercury Fittings Private Limited (all figures are in million)

Mercury Fittings Private Limited	FY23	FY24	FY25
Revenue from Operations	560.35	516.58	NA
Other Income	5.58	8.04	NA
Total income	565.93	524.61	NA
Operating EBITDA	94.03	68.49	NA
Depreciation	20.81	17.72	NA
Finance Cost	6.03	5.07	NA
Profit Before Tax	78.36	61.77	NA
EBIT	78.80	58.80	NA
PAT	56.12	44.67	NA
Debt	54.49	57.47	NA
Equity	287.04	322.71	NA
Current Assets	238.19	286.58	NA
Current Liabilities	95.07	117.01	NA
Ratios			
Operating EBITDA%	16.78%	13.26%	NA
PAT%	9.92%	8.51%	NA
ROE%	20.74%	14.28%	NA
ROCE%	42.78%	23.84%	NA
DE Ratio	18.48%	17.38%	NA
Interest coverage ratio	13.07	11.60	NA
Current ratio	2.51	2.45	NA
Working capital cycle	95.38	91.94	NA
Working capital	143.11	169.58	NA
Net working capital turnover ratio	3.92	3.05	NA
Inventory Turonver ratio	5.02	4.36	NA
Trade receivables turnover ratio	6.26	5.40	NA
Trade payable turnover ratio	8.49	6.84	NA
NAV Per share	191.36	215.14	NA

Source: Industry Financial Reports

Micron Specma (India) Private Limited

Micron Specma (India) Private Limited was established in 2019 and is based in Haryana. The product line of Micron Specma (India) includes hydraulic cylinders, pneumatic cylinders, hydraulic valves, hydraulic pumps, and associated fittings and components. These products are designed for various applications, including heavy machinery, automotive systems, and industrial automation. The company also specializes in providing custom-engineered solutions tailored to specific customer requirements.

Table 8: Key financial metrics of Micron Specma (India) Private Limited (all figures are in million)

Micron Specma (India) Private Limited	FY23	FY24	FY25
Revenue from Operations	292.98	457.05	NA
Other Income	6.98	8.81	NA
Total income	299.96	465.86	NA
Operating EBITDA	13.80	31.61	NA
Depreciation	10.45	14.46	NA
Finance Cost	6.23	14.12	NA
Profit Before Tax	11.08	20.65	NA
EBIT	10.33	25.97	NA
PAT	-0.91	14.870	NA
Debt	91.26	155.10	NA
Equity	121.66	136.52	NA
Current Assets	126.69	186.57	NA
Current Liabilities	108.62	167.40	NA
Ratios			
Operating EBITDA%	4.71%	6.92%	NA
PAT%	-0.30%	3.19%	NA
ROE%	-0.77%	11.52%	NA
ROCE%	6.52%	18.11%	NA
DE Ratio	75.02%	113.61%	NA
Interest coverage ratio	1.66	1.84	NA
Current ratio	1.17	1.11	NA
Working capital cycle	33.58	23.47	NA
Working capital	18.07	19.17	NA
Net working capital turnover ratio	16.21	23.84	NA
Inventory Turonver ratio	3.27	5.43	NA
Trade receivables turnover ratio	8.40	7.05	NA
Trade payable turnover ratio	2.93	3.78	NA
NAV Per share	10.60	11.89	NA

Source: Industry Financial Reports

Dynamatic technologies limited

Founded in 1973, Dynamatic Technologies Limited manufactures precision-engineered products for the hydraulic, aerospace, and metallurgy sectors. The company is also a Tier-I supplier to aerospace OEMs such as Airbus and Boeing. The company is also vertically integrated, handling everything from alloy-making and casting to using their own green energy sources.

Table 9: Key financial metrics of Dynamatic technologies limited (all figures are in million)

Dynamatic technologies limited	FY23	FY24	FY25
Revenue from Operations	13,157.70	14,293.30	14,038.00
Other Income	97.60	428.20	228.00
Total income	13,255.30	14,721.50	14,266.00
Operating EBITDA	1,715.00	1,165.90	1,355.20
Depreciation	704.20	663.60	692.90
Finance Cost	653.80	625.50	567.20
Profit Before Tax	552.20	733.20	551.10
EBIT	1108.40	930.50	890.30
PAT	427.90	1218.10	430.40
Debt	6,184.00	4,581.60	4,510.40
Equity	5,419.70	6,677.40	7,175.00
Current Assets	8,275.50	7,548.20	8,041.70
Current Liabilities	7,533.50	5,765.70	6,270.80
Ratios			
Operating EBITDA%	13.03%	8.16%	9.65%
PAT%	3.23%	8.27%	3.02%
ROE%	9.27%	20.14%	6.21%
ROCE%	14.69%	9.96%	9.11%
DE Ratio	114.10%	68.61%	62.86%
Interest coverage ratio	1.70	1.49	1.57
Current ratio	1.10	1.31	1.28
Working capital cycle	115.56	138.98	140.30
Working capital	742.00	1782.50	1770.90
Net working capital turnover ratio	17.73	8.02	7.93
Inventory Turonver ratio	2.27	2.21	2.00
Trade receivables turnover ratio	5.62	5.14	4.77
Trade payable turnover ratio	2.82	3.22	3.15
NAV Per share	852.82	983.21	1056.48

Source: Industry Financial Reports

Aeroflex Industries Limited

Aeroflex Industries Limited was established in 1993. They manufacture and design hose and fittings. Aeroflex caters to a wide range of industries, including petrochemical, oil and gas, automotive, power, and chemical processing, offering products that are known for their durability, reliability, and high performance.

Table 10: Key financial metrics of Aeroflex Industries Limited (all figures are in million)

Aeroflex Industries Limited	FY23	FY24	FY25
Revenue from Operations	2,694.61	3,179.07	3,762.28
Other Income	0.39	38.43	25.35
Total income	2,695.00	3,217.51	3,787.62
Operating EBITDA	528.78	579.64	765.11
Depreciation	52.19	62.62	112.72
Finance Cost	34.34	21.39	3.50
Profit Before Tax	443.02	572.50	699.58
EBIT	476.97	555.46	677.73
PAT	301.52	417.34	525.17
Debt	450.06	1.21	5.84
Equity	1140.93	2931.50	3424.16
Current Assets	1544.39	2800.78	2394.82
Current Liabilities	789.32	810.37	822.44
Ratios			
Operating EBITDA%	19.62%	18.23%	20.34%
PAT%	11.19%	12.97%	13.87%
ROE%	30.10%	20.50%	16.53%
ROCE%	37.03%	29.51%	21.34%
DE Ratio	39.45%	0.04%	0.17%
Interest coverage ratio	13.89	25.97	193.80
Current ratio	1.96	3.46	2.91
Working capital cycle	132.14	115.64	129.11
Working capital	755.07	1990.41	1572.38
Net working capital turnover ratio	3.57	1.60	2.39
Inventory Turonver ratio	3.72	3.50	3.56
Trade receivables turnover ratio	4.51	3.93	3.56
Trade payable turnover ratio	4.82	4.39	4.00
NAV Per share	9.98	22.67	26.48

Source: Industry Financial Reports

Yuken India

Yuken India is a subsidiary of Yuken Kogyo Co., Ltd., a Japanese company that designs and manufactures hydraulic equipment. Yuken India was incorporated on June 28, 1976, and started commercial production in 1978. The company is headquartered at No. 16-C, Doddanekundi Industrial Area, II Phase, Mahadevapura, Bengaluru, Karnataka 560048. It manufactures hydraulic pumps, motors, valves, systems, and cast-iron castings used in various industries such as manufacturing, construction, and automotive.

Table 11: Key financial metrics of Yuken India (all figures are in million)

Yuken India	FY23	FY24	FY25
Revenue from Operations	3,724.41	4,225.36	4,573.56
Other Income	27.00	52.72	43.89
Total income	3,751.41	4,278.08	4,617.45
Operating EBITDA	307.17	395.15	504.79
Depreciation	125.83	146.43	171.88
Finance Cost	97.94	84.54	103.99
Profit Before Tax	137.41	269.61	316.69
EBIT	208.35	301.44	376.79
PAT	96.51	187.86	246.02
Debt	1150.40	769.33	886.15
Equity	1993.13	2795.06	3011.52
Current Assets	2219.35	2380.91	2239.76
Current Liabilities	2151.31	1807.17	1931.15
Ratios			
Operating EBITDA%	8.25%	9.35%	11.04%
PAT%	2.57%	4.39%	5.33%
ROE%	4.95%	7.85%	8.47%
ROCE%	10.78%	10.36%	12.33%
DE Ratio	57.72%	27.52%	29.43%
Interest coverage ratio	2.13	3.57	3.62
Current ratio	1.03	1.32	1.16
Working capital cycle	126.11	154.94	157.12
Working capital	68.04	573.74	308.62
Net working capital turnover ratio	54.74	7.36	14.82
Inventory Turonver ratio	1.45	2.39	2.33
Trade receivables turnover ratio	3.19	3.61	3.88
Trade payable turnover ratio	2.50	3.03	3.69
NAV Per share	165.71	215.06	231.70

Source: Industry Financial Reports

11 Operational Parameters

- **Installed manufacturing capacity**

Installed manufacturing capacity	FY23	FY24	FY25
Hy-tech Engineers limited	3,26,00,000 Units	3,66,00,000 Units	4,55,00,000 Units
Mercury Fittings	NA	NA	NA
Micron Specma	NA	NA	NA
Dynamatic technologies limited	NA	NA	NA
Aeroflex Industries Limited	11Mn Mtrs	13.5Mn Mtrs	16.5Mn Mtrs
Yuken India	90000 pumps, 780000 valves, 20000 power packs, 13000 foundry	90000 pumps, 780000 valves, 20000 power packs, 13000 foundry	100000 pumps, 800000 valves, 25000 power packs, 13000 foundry

- **Production Capacity**

Production capacity (No. of units)	FY23	FY24	FY25
Hy-tech Engineers limited	2,47,00,000 Units	2,48,00,000 Units	2,88,00,000 Units
Mercury Fittings	NA	NA	NA
Micron Specma	NA	NA	NA
Dynamatic technologies limited	NA	NA	NA
Aeroflex Industries Limited	NA	NA	NA
Yuken India	NA	NA	NA

- **Capacity utilisation**

Capacity utilisation	FY23	FY24	FY25
Hy-tech Engineers limited	74.87%	73.42%	66.86%
Mercury Fittings	NA	NA	NA
Micron Specma			
Dynamatic technologies limited	NA	NA	NA
Aeroflex Industries Limited	83.00%	87.91%	75.14%

Contact

Tanvi Shah	Director – Advisory & Research	tanvi.shah@careedge.in	022 6837 4470
Vikram Thirani	Director – Business Development	vikram.thirani@careedge.in	022 6837 4434

CARE Analytics and Advisory Private Limited
(Wholly-owned subsidiary of CARE Ratings Ltd.)
Office No. 303, 3rd Floor, Time Square Building, Marol, Andheri East, Mumbai, 400059, Maharashtra, India
Phone: +91-22-68374400

Connect:

About:

CareEdge is a knowledge-based analytical group that aims to provide superior insights based on technology, data analytics and detailed research. CARE Ratings Ltd, the parent company in the group, is one of the leading credit rating agencies in India. Established in 1993, it has a credible track record of rating companies across multiple sectors and has played a pivotal role in developing the corporate debt market in India.