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FINANCE SQUEEZE?

With India aiming to increase its manufacturing capacity to \$ 1500 billion by 2032 from \$ 447 billion in 2022, small & medium enterprises (SMEs), accounting for 45% of manufacturing output, need to invest in modernisation. But, in the absence of access to credit, who will finance this upgradation mission?

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India's engineering goods exports edged up to \$ 109 billion in 2023-24 (compared to \$ 107 billion in 2022-23) despite a slowdown in some of the major global markets amid geo-political tensions.

Growth, Despite Global Constraints

India's manufacturing activity (with Purchasing Managers' Index at 58.8) witnessed a dip in April 2024 from the 16-year high in March 2024 (PMI at 59.1). In spite of a fall, the HSBC final India Manufacturing Purchasing Managers' Index (PMI) number, signalled the second-best improvement in the health of the manufacturing sector for 3.5 years. The PMI was comfortably above the neutral mark of 50.0 and its long-run average of 53.9.

Supported by buoyant demand, companies have experienced a sharp upturn in new business intakes in the last two months. Total new orders rose sharply, with the pace of expansion being the second strongest since the start of 2021. Despite higher costs of raw materials and labour, inflation remained below the historical average and firms were able to pass these increases onto consumers with demand remaining resilient (resulting in improvement in margins).

A positive outlook for the year ahead has prompted manufacturers to expand their staffing levels. According to TeamLease EdTech, fresher hiring in the manufacturing sector is seeing an uptick currently, in the first half of calendar 2024, because of an increase in capital investments, mergers and acquisitions activities in the automobile, electronics, and textile domains and an increased focus on manufacturing.

With a sustained improvement in demand from all regions, Asia, Australia, Europe and the Americas, export orders increased markedly. India's engineering goods exports edged up to \$ 109 billion in 2023-24 (compared to \$ 107 billion in 2022-23) despite a slowdown in some of the major global markets amid geo-political tensions. As per EEPIC India officials, FY24 closed on a strong note, with engineering exports rising 10.66 per cent year-on-year to \$11.28 billion in March 2024 against \$10.19 billion in the same month last year.

The major reasons for this good show, according to Arun Kumar Garodia, Chairman, EEPIC India, were China Plus One policy (which is driving all countries to look at India for sourcing), substantial rise in exports to new markets (for example, Russia), and signing of free trade agreements (FTAs) with UAE and Australia. India has gained from the crisis between Russia and Ukraine, as India's engineering exports to Russia has doubled to \$ 1.22 billion till February during the 2023-24 fiscal (compared to \$ 616.68 million in the previous fiscal). Similarly, India has seen 60 per cent jump in exports to Saudi Arabia. Newly signed FTA with the European Free Trade Association (which include countries like Switzerland, Iceland, Norway and Liechtenstein) and about-to-be-concluded FTAs with Gulf Cooperation Council (GCC) and Oman will further help India to boost exports and expand its reach.

With India maintaining its high growth rate in the last few years, multinational firms are very bullish on the country. This was quite evident when Smart Manufacturing & Enterprises (SME) spoke to global leaders during Hannover Messe 2024, one of the world's largest industrial trade fairs hosted in Hannover (Germany) from April 22-26. After the new government assumes office in June, one would expect the economic activity to gain momentum.



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Yokogawa Electric Corporation and energy IT solutions provider GridBeyond of Ireland have concluded a strategic partnership agreement. Furthermore, Yokogawa has participated in GridBeyond's Series C funding round.

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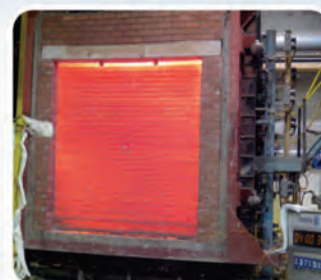
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Toy Manufacturing

Candytoy Corporate to set up a third manufacturing unit in Indore

Candytoy Corporate (CTC), the largest manufacturer of plastic promotional toys and confectionery, has announced that it will be opening a new 82,000 sq ft production facility in Indore, Madhya Pradesh, India. This will be Candy Toy Corporate's 2nd such facility in Indore city that will employ 900 people to bring an entirely new product range of inflatable toys and plush toys.

Within just four years of its inception CTC, headquartered in Indore, today boasts a production capacity of 10.5 million candy Toys per day through strict quality control with over 250 machines in its four factories at Indore, Delhi & Hyderabad, employing over 1000 people. The new plant will be its 5th in India.

Gaurav Mirchandani, Director, Candytoy Corporate



said, "All our current facilities are working at full capacity. We have seen a 30 per cent growth in orders Year on year for the past 2 years now. This plant will help us not just in catering to the growth in demand but also bring a newer product line. We have invested Rs 35 crore in this new facility and expect production to start in the next two months".

CTC today exports to Europe, the US, African countries, Turkey, South Africa, Japan, Saudi Arabia, Oman, Kuwait & UAE among others.

CTC's two units in Indore are spread across 1 lakh sq. ft. and 60,000 sq ft. The plant in Delhi is 26,000 sq. ft. and the plant in Hyderabad is 20,000 sq ft. With this addition Candytoy corporate boasts of a total of 2,88,000 sq. ft. area spread across three states in India.

Construction Equipment

CASE India rolls out 20,000th vibratory compactor in India

CASE Construction Equipment has achieved a significant milestone of producing 20,000th Vibratory Compactors, from its state-of-the-art facility in Pithampur, Madhya Pradesh. The facility is the sole manufacturing hub for CASE's compactors globally in CNH. The company is now aiming to ramp up their production capacity to 10,000 units for all products annually by next year, making it the second-largest manufacturing facility by CNH globally and CASE's largest export hub.

Built in the year 1989, CASE's Pithampur facility, near Indore, has been manufacturing a comprehensive array of cutting-edge construction machinery, including Compactors, Loader Backhoes, and Crawler-Excavators. At this moment, the facility exports the range of compactors to 44 countries and caters to the construction equipment requirements of over 105 countries across Africa, the Middle East, Asia Pacific, Latin America, in addition to India.



On the milestone, Shalabh Chaturvedi, Managing Director, CASE Construction Equipment – India & SAARC region said, "As a world-leader in Vibratory compactor segment, it is a moment of pride for us to roll out 20,000th made-in-Bharat compactor. This milestone is a testament of customer's trust on CASE products in India as well as in overseas markets. Our India facility has been essential to our global operations, demonstrating the industrial capabilities of the country. We believe, this accomplishment will not only add value to our India operations, but are also a step towards Viksit Bharat. We thank our esteemed customers, dealers and vendor partners for their support and look forward to achieving many such milestones in the future."

With eight unique models in its compactor portfolio, the manufacturing facility caters to both domestic and foreign markets and provide a wide range of alternatives, including soil and asphalt compactors in addition to vibratory compactors.

Electrical and Electronics

Schneider announces Anshum Jain as VP

Schneider Electric, the leader in the digital transformation of energy management and automation, has announced the appointment of Anshum Jain as the Vice President of their Global Supply Chain in India. In his role, Jain will focus on driving the performance of the Global Supply Chain vertical in the country and building supply chain capabilities in India in a synergistic way. He will be part of a supply chain council that will focus on creating a strong supply chain ecosystem in the country to meet the growth aspirations of both domestic and international markets.

With 27 years of domestic and international experience in managing all aspects of manufacturing, operations, and supply chain, he has navigated the complexities of global operations, international markets, and diverse business environments. Before joining Schneider Electric, Anshum held the position of Chief Operating Officer at Daimler India Commercial Vehicles.



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Packaging

Manjushree Technopack signs deals to acquire Oricon Enterprises' plastics packaging business

Manjushree Technopack (MTL), India's largest rigid plastics packaging manufacturer, has entered into definitive agreements to acquire the plastics packaging business of Oricon Enterprises. Oriental Containers is one of the largest manufacturers of plastic caps & closures and preforms (intermediate form of PET bottles largely used in beverages) in India.

This transaction will double MTL's current market share in the caps and closures segment, making it the market leader, with an installed capacity of nearly 15 bn pieces per annum. The acquisition includes two manufacturing plants in Goa & Odisha, that will augment MTL's existing production capacity. The combined business will have a wider array of moulds, machines and SKUs, and will strengthen unit economics due to operational synergies as well as deepening key customer relationships. The acquisition will also help augment capacity in the preforms segment, where MTL is already



the market leader.

Along with gaining access to the preforms and closures market in eastern India, this transaction will help underscore MTL's overall position as the market leader in the rigid plastics packaging sector in India. The transaction is consistent with MTL's growth strategy, adding to a track record of successfully creating value from acquiring and integrating businesses.

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Air Conditioning

PG Technoplast unveils integrated AC manufacturing facility in Rajasthan



PG Technoplast marked a significant milestone with the unveiling of its new marquee air conditioning manufacturing facility for North India in Bhiwadi, Rajasthan. This strategic investment aims to meet the growing demand for energy-efficient and sustainable cooling solutions in India and expand the company's footprint in the rapidly growing air conditioning market. The ceremony was graced by the esteemed presence of Kamal Nandi, Business Head and Executive Vice President, Godrej Appliances; NS Satish, President, Haier India; and Pradeep Jain, Managing Director, Jaina India, who officially unveiled the state-of-the-art facility.

The brand-new facility, spanning an impressive 200,000 sq ft manufactures a comprehensive range of split ACs ranging from 0.75T to 2.0T with installed annual capacities of 360k AC Indoor Units, 360k AC Outdoor Units and 250k Window ACs.

The facility is designed with sustainability at its core. It features a state-of-the-art Learning Centre to educate apprentices and trainees to nurture the next generation of manufacturing talent and provide continuous on-the-job training to company's stakeholders. It also features water conservation and integrated facility management systems to reduce plastic, corrugated, and paper waste generation.

Marking yet another significant achievement this month, PG Technoplast, became the first beneficiary to receive incentives under the air conditioning (AC) components target segment of the government's Production Linked Incentive (PLI) scheme, after being recognized for their incremental investment and sales performance during the fiscal years 2021-22 and 2022-23. PG has now firmly established itself as the second largest ODM for Room Air Conditioners in the nation having entered the category just 3 years ago in 2021.



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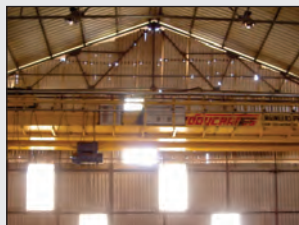
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Electric Vehicles

Tata Passenger Electric Mobility and Shell team up for EV charging in India



Tata Passenger Electric Mobility (TPEM), known for pioneering India's electric vehicle (EV) revolution, has signed a non-binding Memorandum of Understanding with Shell India Markets (SIMPL) to collaborate in establishing public charging stations across India. The collaboration will leverage Shell's widespread fuel station network and TPEM's insights from over 1.4 lakh Tata EVs on Indian roads to set up chargers at locations frequently visited by Tata EV owners. Additionally, both companies will work towards delivering superior charging experiences.

To improve the experience of EV owners across India, this agreement between TPEM and Shell India Markets (SIMPL) aims to explore synergies between the two companies to encourage more people to adopt electric vehicles in the country. The two companies are also exploring introducing convenient payment systems and loyalty programs, which will add significant value to TPEM's customers.

TPEM is the market leader of EVs in India, commanding a market share of 71 per cent in electric passenger vehicles with four products in its portfolio. TPEM has led the rise of the EV ecosystem in the country by introducing its first EV-exclusive store in Gurugram to working with various charge point operators to grow India's charging infrastructure.

Shell EV Recharge locations provide reliable and ultra-fast charging, with a 98-99 per cent charger uptime. These locations also offer convenient retail, including fresh food and beverage options. All these factors help enhance the overall customer experience and provide added value and convenience.



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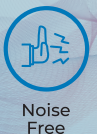
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Highlights of the 52nd Edition of IPF Annual

Industry Leaders presented their thoughts on carbon-neutral strategies spanning R&D, Product Development, Manufacturing, Supply Chain & Logistics, and overall business. Some of them are:

- Zurvan H Marolia, Sr. VP, Godrej & Boyce Mfg. Co. Ltd
- Ravichandran Purushothaman, President, Danfoss India
- Manish Bhatnagar, MD, SKF India Ltd
- Hemant Minocha, Chairman, Plexconcil
- Prof R Jayaraman of S P Jain Institute of Management and Research
- Meenu Singhal, Regional MD, Socomec India
- Shubhankar Chatterji, Chief Supply Chain Officer, Cummins India
- Shivaji Waghmare, CEO, Fuji Electric India
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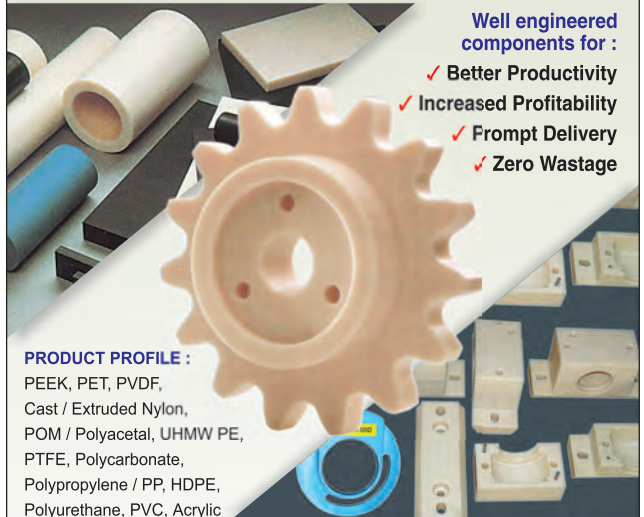


Warehousing & Logistics

TVS ILP invests Rs 125 crore in Cuttack

TVS ILP (a part of TVS Mobility Group), a leader in the warehousing industry, recently broke ground for a new state-of-art warehouse in Cuttack, Odisha. The event marks a significant milestone in the company's expansion efforts in Eastern Markets. The upcoming facility spans 24 acres of land, housing two large warehouses totalling 5 lakh square feet, catering sectors like FMCG, FMCD, 3PL, and e-commerce. With its presence at a strategic location at the confluence of the Mumbai and Chennai-Kolkata highways (off NH 55), it enjoys excellent connectivity to the Paradip port and the major parts of the country. TVS ILP will invest around Rs 125 crore in the project and it anticipates its completion by the end of December 2024. The Cuttack logistics park is expected to generate over 110 direct jobs and between 500 to 1,000 indirect employment opportunities in the region. Plans are underway to certify the park with Edge Advanced Green certification.

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Fabrication

HHV Group marks 60th anniversary, plans facility in Bengaluru

Bengaluru based HHV Group, India's premier Vacuum, Optics, and Thin-film technology company announced its 60th anniversary celebrations. Established in 1965 in the name of Hind High Vacuum Co (HHV) as a small-scale industry in Bangalore by S V Narasaiah, a pioneer of vacuum technology in India, the company has since made significant contributions to the advancement of vacuum-related technologies in the country.

Founded at the IISc, six decades later, HHV has grown enormously as a group employing 800 people and with sales and service centres across the globe. HHV has diversified over its six-decade journey into various fields including solar module manufacturing, thin film coating services and equipment development, optics fabrication,



etc. From developing India's 1st Indigenous vacuum coating unit to successfully installing a 3.7 meter Telescopic mirror coater at Mount Abu in January 2024, HHV has contributed to many strategic projects and research in the country.

This noteworthy occasion of 60 years is being celebrated at HHV Peenya (Bengaluru) facility.

This includes an exhibition where

each company in the group displayed new products and developments achieved in the year passed. The HHV Group Managing Directors Nagarjun Sakhamuri and Prasanth Sakhamuri in their addresses to the audience outlined the challenges faced in the areas of high technology development and way forward for the group in the years to come.

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Chemical process

Coromandel to build acid plants in AP

Coromandel International, India's leading agri solutions provider, has commenced the project activity to set up its Phosphoric Acid-Sulphuric Acid complex facility at Kakinada, Andhra Pradesh. In an event organised on 26 April 2024, Arun Alagappan, Company's Executive Chairman, was present for the groundbreaking ceremony and S Sankarasubramanian, Executive Director, Nutrient Business signed the key contracts with global technology partners. With an estimated outlay of Rs 1000 crores, the project is expected to be commissioned in two years' time. The proposed 650 tpd Phosphoric Acid facility is designed with advanced DA-HF (Dihydrate Attack-Hemihydrate Filtration) process technology and automated DCS system. This will enhance Company's backward integration capacities and provide stable supplies of phosphoric acid for its fertiliser manufacturing by replacing more than 50 per cent of Kakinada plant's imported acid requirement.

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The Indian Textile Industry witnessed a surge in demand with exports touching a record \$43 billion in FY22 post covid restrictions. During 2022-27, the textile industry worldwide is anticipated to witness a projected CAGR of 5.67 per cent, prompting the Government of India, on its part, to take various initiatives to revive the fortunes of the textile industry such as: formulation of the PLI scheme, launch of mega textile parks, signing of FTAs and MoUs with many countries, etc.

ISSUE HIGHLIGHTS:

ITJ Annual 2024 will suggest steps to be taken to give impetus to the "Mission \$100 billion" target. It will broadly highlight on:

- Impact of various government schemes and policies
- How India could use the changing geopolitical situation to its advantage
- Using circularity and quality to enhance India's global appeal
- Banking on latest technologies to increase efficiency and productivity
- Leveraging on FTAs to increase exports, etc.

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Power generation

Godrej & Boyce undertakes orders worth Rs 1000 crore plus in FY'24



Godrej Electricals & Electronics, a business unit of Godrej & Boyce announces the acquisition of orders worth Rs 1000 crore plus in FY24 for their Power Infrastructure business. These orders predominantly entail both Air Insulated Switchgear (AIS) and Gas Insulated Switchgear (GIS) substations across India, with certain projects of up to 765kV capacity. Each of these projects ranges from 100 crores to 400 crores in value. PIRE has made significant contributions in the domains of power transmission, railways, and solar projects, aligning seamlessly with the government's vision of a developed nation. These projects demonstrate a robust trajectory of growth and expansion for the business and showcase how Godrej & Boyce plays a pivotal role in advancing India's journey towards sustainable energy.

Raghavendra Mirji, Executive Vice President & Business Head, Godrej Electricals & Electronics said, "We are delighted with our recent order acquisitions, which further solidify our presence in the segment of over 400kV and reflects our unwavering commitment to excellence and nation building. Securing our inaugural 765kV GIS order for execution in Khavda marks yet another significant milestone for us, symbolizing our dedication to pushing the boundaries of technological advancement. India has set an ambitious target at the COP26 of transitioning to 500 GW of non-fossil fuel-based energy by 2030, which is one of the world's largest expansion plans in renewable energy. Majority of our orders secured in FY'24 pertaining to renewable energy evacuation not only underscores our industry leadership but also resonates with the country's commitment, echoing our collective vision for a greener and more resilient future."

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MSMEs: The Fight for Financing

As India seeks to become the world's third-largest economy by 2027, measures are afoot to resolve the funding-related challenges routinely faced by the country's humongous MSME segment to truly transform it into a strong industrial economy backbone, says **Manish Pant**.

When the national space agency Indian Space Research Organization (ISRO) employees Pawan Kumar Chandana and Naga Bharat Daka founded Skyroot Aerospace in 2018 to build space launch vehicles or rockets, most were apprehensive about the venture ever taking off. Not only was a private company aspiring to build rockets unheard of in India but attracting a huge amount of capital required to run the enterprise appeared almost impossible.

"Raising capital in spacetechnology was very challenging during the first couple of years as there was no policy

or precedence of similar companies in the sector as well as no thesis for any institutional funding for the space sector," **Pawan Kumar Chandana, Co-founder & CEO of Hyderabad-headquartered Skyroot Aerospace** told SME one Sunday evening in April.

Seven years later, Skyroot Aerospace has not only successfully launched the country's first privately built rocket but has also raised \$95.5 million in funding, thanks largely to support from the Department of Space (DoS) and its agencies ISRO and Indian National Space Promotion and Authorization Centre

(IN-SPACe). The company's rise abetted by an enabling policy environment can serve as a template for millions of other players wanting to make it big in India's vibrant Micro, Small and Medium Enterprise (MSME) segment.

India boasts of over 43.1 million registered MSMEs – unofficially, the figure may be as high as 75 million – to rank second after China. These entities located all over the country are engaged in providing a variety of products and services. As the world's fastest-growing economy seeks to replace Japan and Germany as the world's third-largest economy by





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Pawan Kumar Chandana, Co-founder & CEO, Skyroot Aerospace

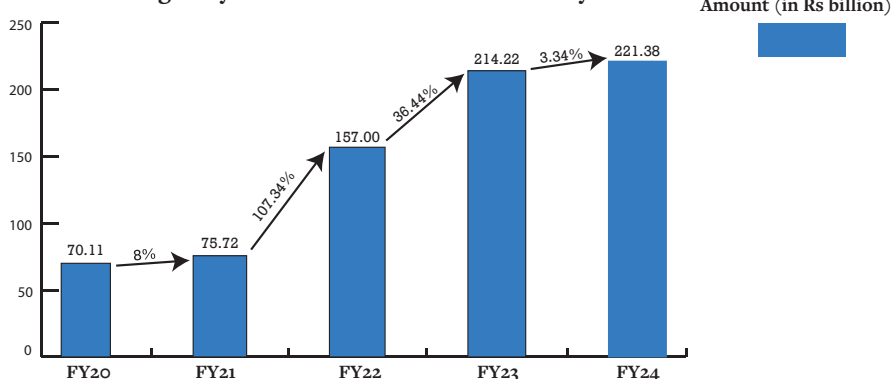
2027, this base will expand further to play an increasingly important role in becoming the backbone of its industry. After all, it is the presence of a robust SME segment that propelled the rise of Japan, Germany, South Korea, and China as global economic powerhouses in the past.

Experts feel the government's thrust on infrastructure creation and putting in a significant amount of investment through initiatives such as the Production Linked Incentive (PLI) schemes for the manufacturing sector to build an export-based economy will help boost the demand for MSME products.

“A far stronger MSME ecosystem would be required in the areas of services, component manufacturing, machining, or technology. Fortunately, India has a good amount of entrepreneurship at the small and the medium-scale level, which is ready to take up these challenges to support the large growth programmes the government has set in motion,” declares **Deven Choksey**, MD of **Mumbai-based wealth management firm KRChoksey Holdings**.

Simultaneously, the focus on reducing import dependence is also pushing up requirements for goods and services domestically. “Be it railway, defence, electronics

Table 1: Budgetary Allocation for MSME Ministry



Source: Ministry of Finance

manufacturing, engineering R&D, or contract manufacturing, all of these areas are demanding the MSME segment to play a larger role,” says Choksey.



“Unlike in the past where it took around 40 years for some smallcap stocks to become large cap, we are likely to see a plethora of smaller entities that may not be worth even \$1 million today become \$1 billion-plus firms over the next ten years!”

Deven Choksey, MD, KRChoksey Holdings

This will be aided by Indian businesses seeking to emerge as important players in the current round of globalisation even as traditional supply chains have been disrupted owing to geopolitical conflicts and global corporations looking to diversify their manufacturing outside China under the China Plus One strategy. “Globalisation isn't about putting everything in one place, it's about becoming more diversified. That's the direction we will continue to see in supply chains. India has a great opportunity there and we are starting to see some significant momentum,” states **Steven A**

Altman, Adjunct Assistant Professor & Director of the **DHL Initiative on Globalisation** at the **NYU Stern School of Business**.

For instance, in 2023, India attracted the second-largest amount of announced greenfield FDI after the US. This marked increase in the share of investment going to manufacturing signals India's growing role in global supply chains. Altman feels that despite the competition from countries like Vietnam, the country has the key ingredients such as scale to become a leader.

“A fact that was news to me is that India's exports as a share of GDP of goods and services combined are now higher than China's! That means India is now an economy that is more oriented towards exporting overall goods and services than



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Financing-related challenges depend upon the type and age of the enterprise.

China, which is a very notable development.”

Needless to say, those companies will be relying on the MSME segment to supply them with everything from raw materials to hi-technology components as part of their vendor ecosystem. Yet, complications

around easy financing needed for creating a vigorous MSME ecosystem persist.

The capital conundrum

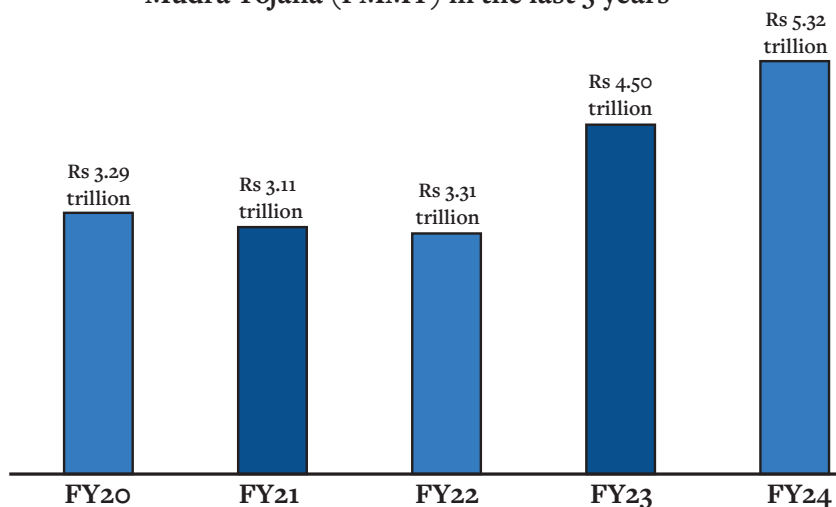
The COVID-19-induced lockdowns led the government to announce measures including an

upward revision in MSME categorisation and the introduction of the Emergency Credit Line Guarantee Scheme (ECLGS) to assist such firms in meeting their working capital requirements. More measures have been rolled out since. However, only half the battle in the war to reclaim the country's rightful share of the global GDP has been won till now.

Financing-related challenges depend upon the type and age of the enterprise. “A first-generation entrepreneur setting up a greenfield project has difficulty in arranging equity to raise loans. Secondly, all entrepreneurs find it difficult to arrange assets that could be pledged as collateral security to raise loans from banks,” avers **Anil Bhardwaj, Secretary General** of the **Federation of Indian Micro and Small & Medium Enterprises (FISME)**, the country's apex trade body for the segment.

Bhardwaj has a point. Research and analytics advisory CRISIL estimates the share of bank loans to

Loans disbursed under Pradhan Mantri Mudra Yojana (PMMY) in the last 5 years



Source: Mudra portal



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Anil Bhardwaj, Secretary General, FISME

the segment at nearly 80 per cent, though the share of Non-Banking Finance Companies (NBFCs) has also been increasing year-on-year.

“Even if credit guarantee funds are there, bankers’ insistence on collateral security remains, if not for term loans rather than for working capital. Finally, a fast-growing enterprise even after several decades of credit history without blemish struggles to find adequate equity and collateral to fund expansion,” he is quick to add.

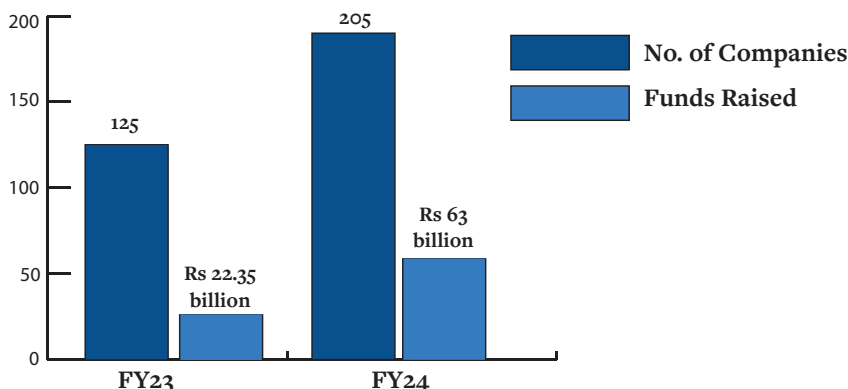
Seconding him **Sanjay Agarwal**, Senior Director at research and analytics advisory **CareEdge Ratings** adds a lack of sufficient data and documentation to assess business metrics, ignorance regarding awareness of relevant loan schemes and financial products, and absence of



“MSMEs resorting to informal sources for funds lack documentation, leading to their being viewed as new credit customers by banks and NBFCs, making it difficult for them to secure financing.”

Sanjay Agarwal, Sr Director, CareEdge Ratings

IPOs by SMEs in FY23 & FY24



Source: Prime Database

credit history or financial records to the list. The last especially can prove to be a significant hurdle.

“Since a considerable number of these businesses do not have access to formal funding channels, there is no documented record of their credit behaviour. Additionally, MSMEs resorting to informal sources for funds lack documentation, leading to their being viewed as new credit customers by banks and NBFCs, making it difficult for them to secure financing.”

Deepak Jasani, Head of Retail Research at the brokerage **HDFC Securities** attributes this reluctance by banks to MSMEs historically either being simply unable or unwilling to repay loans. “The lack of repayment results in high NPAs (Non-Performing Assets), which is a pressing concern for banks. A lot of MSMEs do not have the necessary collateral needed for borrowing.” Therefore, underwriting such loans in the absence of collateral may require a deeper understanding of the borrowers’ profiles and behaviors.

Jasani also shares an interesting data point concerning women in the segment. “Women entrepreneurs who account for a minor share of the MSME sector face hindrances due to a lack of financing. As per a World Bank report, the funding rejection rate of women entrepreneurs in the country

is double that of their male counterparts!”

Buyers often delay payments for goods and services purchased from MSMEs to further muddle the situation. “Such delays in receiving payments from customers lead to cashflow challenges for MSMEs, thereby impeding their ability to not only expand but also to repay existing debts or obtain new loans,” says Agarwal.

To address this issue, a regulation that bars businesses from claiming tax rebates if payment to the MSME is not contractually honoured within 45 days kicked in April this year. Under Section 43B(h) of the Income Tax Act, this can lead to a higher tax liability for errant buyers.

Schemes such as Credit Guarantee Fund Trust for Micro and Small



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Deepak Jasani, Head of Retail Research, HDFC Securities

Notable MSME Schemes

Pradhan Mantri Mudra Yojana (PMMY)

Micro Units Development and Refinance Agency (MUDRA) loans up to Rs 10 lakh to non-corporate and non-farm SMEs.

Amount: In FY24, Rs 5.32 trillion was disbursed.

Prime Minister's Employment Generation Programme (PMEGP)

This scheme focuses on generating self-employment opportunities in the non-farm segment in the micro-enterprises.

Amount: The maximum cost of the project admissible for the manufacturing sector is Rs 2.5 million and business/service sector is Rs 1 million.

Credit Guarantee Trust Fund for Micro & Small Enterprises (CGTMSE)

Established jointly by the MSME Ministry and SIDBI, CGTMSE provides financial assistance to SME without any third-party guarantee or collateral.

Amount: CGTMSE coverage ranges from 85% for micro-enterprises (up to Rs 0.5 million), 75% for others and 50% for retail activity on a ceiling of Rs 50 million.

Fund of Funds: Self-Reliant India Fund

The fund provides equity funding for MSMEs having growth potential and viability, with a provision of Rs 100 billion from the government and Rs 400 billion through PE/VC funds.

Amount: From inception in 2021 to November 2023, the total equity infusion under the SRI Fund for MSME was Rs 48.85 billion, including the government contribution of Rs 5.294 billion, in November 2023.

Credit Guarantee Scheme for Subordinate Debt (CGSSD)

The scheme supports promoters of MSMEs who are stressed and on the verge of becoming non-performing assets.

Amount: The promoters are given credit equal to 15% of their stake (equity plus debt) or Rs 7.5 million, whichever is lower.

SIDBI Make in India Loan for Enterprises (SMILE)

Designed to boost MSME participation in the government's Make in India campaign, the scheme provides a soft loan-like quasi-equity. Loans are also offered on easier terms to enable MSMEs to meet the required debt-equity ratio for their establishment as well as pursue growth opportunities.

Amount: The minimum loan offered is Rs 1 million. The repayment tenure is up to 10 years, including the moratorium period of 36 months.

psbloansin59minutes.com

Launched in 2019, the fintech platform processes MSME business loans for startups in 59 minutes. The scheme aims to automate and digitalise various business loan processes, including term loans, working capital loans, and Micro Units Development & Refinance Agency (MUDRA) loans.

Amount: Rs 710 billion loans disbursed to date.

Enterprises (CGTMSE) have helped a large number of MSMEs to raise loans without collateral. Established by the Ministry of Micro, Small and Medium Enterprises and refinancing institution Small Industries Development Bank of India (SIDBI), it provides up to 85 per cent credit guarantee. Similarly, the government's mega schemes such as MUDRA and SVANidhi for disbursing small loans have helped generate self-employment opportunities.

However, raising capital remains

an uphill task for companies in the formal sector. So, what more needs to be done? Bhardwaj suggests a holistic approach. "The foremost is inducing competition in commercial lending by privatisation and mergers of public sector banks. We have far too many small banks under government control; the banking sector needs reforms similar to what was done in telecoms."

He also goes on to recommend the establishment of a National Small Industries Bank. Unlike SIDBI, the

proposed entity would be a full-fledged commercial bank offering a bouquet of financial products from branches spread across districts. He also seeks expansion of CGTMSE, credit guarantee for equity support, and insurance surety to replace bank and performance guarantees.

The digitalisation opportunity

Advancements in fintech have led to the rise of online lending platforms that streamline the

application process and offer quicker approvals. “Technologies such as artificial intelligence and machine learning are now aiding fintech companies to give loans to MSMEs more efficiently, allowing businesses to grow,” informs HDFC Securities’ Jasani.

The emergence of specialised digital marketplaces is also helping. The rollout of e-commerce platforms Open Network for Digital Commerce (ONDC) and Government eMarketplace (GeM) has boosted business opportunities for MSMEs. “Both these platforms have been created to enable smaller companies to sell their goods to the larger companies,” says KR Choksey Holdings’ Choksey. The GEM platform doubled its Gross Merchandise Value to more than Rs 4 trillion in FY24.

As the country goes about modernising its military, the Ministry of Defence has emerged as one of the largest buyers of MSME goods on the GeM portal. The Indian Navy, for instance, is working with a clutch of MSMEs, startups, academia, students, and innovators through the three-tier Naval Innovation and Indigenisation Organisation (NIIO) to seamlessly merge the elements of innovation, indigenisation and *aatmanirbharta* (self-reliance).

“This has resulted in the Navy showcasing 75 prototypes under seven categories, including several global firsts, game changers, and force multipliers last year. We have more than 100 challenges under the iDEX (Innovation for Defence Excellence), with 15 solutions worth about Rs 15 billion being granted Acceptance of Necessity,” **Admiral (Retd) Radhakrishnan Hari Kumar, Former Chief of Naval Staff**, informed a select gathering in New Delhi recently. Additionally, the MoU inked between the Indian Navy and the SIDBI has led to proposals from a large number of MSMEs and startups being approved for loans.



“We have more than 100 challenges under the iDEX (Innovation for Defence Excellence), with 15 solutions worth about Rs 15 billion being granted Acceptance of Necessity.”

Admiral (Retd) Radhakrishnan Hari Kumar,
Former Chief of Naval Staff

Other than being a regulatory requirement, MSME lending offers a major growth opportunity for banks. “For NBFCs and fintechs it offers an outlet, which if done prudently can help expand their NIMs (Net Interest Margins) as well as diversify their loan portfolio. Lenders have over time become smarter in mostly avoiding the pitfalls and making the best of the opportunity,” discloses Jasani.

Markets to the fore

Easy availability of long and short-term financing will enable the Indian MSMEs to leverage the emerging opportunities. “Funds can be utilised for various purposes including procurement of raw materials, machinery, supply chain financing, and working capital loans. Improved technology and digitalisation facilitate faster loan processing during customer onboarding,” affirms CareEdge’s Agarwal. Most importantly, MSME sector’s inclusion in Priority Sector Lending (PSL) also helps reduce the traditional reliance on informal sources of funding such as moneylenders, and the pitfalls associated with such capital.

In her Interim Budget speech in February, Nirmala Sitharaman, Union Minister of Finance specifically observed, “It is an important policy priority for our government to ensure timely and

adequate finances, relevant technologies and appropriate training for the MSMEs to grow and also compete globally. Orienting the regulatory environment to facilitate their growth will be an important element of this policy mix.” And if the recent buzz emanating from government quarters is to be believed, the centre is already working on revamping several schemes announced for the segment, including expanding incentives on procurements from MSMEs, streamlining discounts and enhancing export credit guarantees. However, the final details will emerge only after the presentation of the full budget if Prime Minister Narendra Modi-led National Democratic Alliance (NDA) succeeds in winning a third term.

Over time, capital markets have also become an important source of funding. In the previous fiscal, more than 200 MSME firms entered the stock market through IPO listings on the benchmark BSE SME and NSE Emerge exchanges. The total amount collected by Systemic Investment Plan (SIP) mutual funds was nearly Rs 200 billion during the period. “The SIPs are now ready to pump in more money into small and mid-cap companies because the growth there is exponentially higher, while the growth for larger companies would be limited between 15-20 percent,” says Choksey. He foresees small midcap firms raising anywhere between \$600-800 billion from capital markets over the next four years. But that’s not all.

“Unlike in the past where it took around 40 years for some small-cap stocks to become large-cap, we are likely to see a plethora of smaller entities that may not be worth even \$1 million today become \$1 billion-plus firms over the next ten years!” he asserts.

That may be a bullish forecast. But then, so far, we have only skimmed the surface.

SME



TReDS: The Innovative Financing Route

Exclusion of many MSMEs from formal lending ecosystems often inhibits their growth. Trade Receivables electronic Discounting System (TReDS) – an electronic platform that allows businesses to obtain immediate cash by selling their accounts receivable to a third party at a discount – can be a useful tool for MSMEs to address cash flow challenges, opines **Sundeep Mohindru**.

The micro, small and medium enterprise (MSME) sector forms the cornerstone of India's economic growth, contributing to 30 per cent of the country's gross domestic product (GDP), 35 per cent of the manufacturing output and 40 per cent-45 per cent of its exports. Recognising the significant role of the MSME sector, Finance Minister Nirmala Sitharaman, during her Interim budget speech in parliament in February 2024, emphasised the sector's importance in India's journey towards becoming a \$ 5-trillion economy in near future and \$ 7 trillion economy by 2030.

However, the exclusion of many MSMEs from formal lending ecosystems inhibits their growth. According to a report by the Reserve Bank of India (RBI) expert committee on MSMEs, the sector has an estimated credit gap of \$ 530 billion. A majority of MSMEs do not have access to sufficient credit and liquidity required for daily working capital needs.

This is where fintechs can play a bigger role in terms of inclusivity, sustainability, and customer-centricity. They bring in innovation in the financial services ecosystem and unlocks credit access for all tailoring products, and services as per MSME needs and preferences.

Navigating the challenges with innovative solutions

The MSME base in India is projected to grow from 6.30 crore to an astounding 7.50 crore units, presenting both vast opportunities and unexpected challenges, particularly in the world of financing. Business challenges for MSMEs often revolve around market competition, scalability, and innovation. Access to credit remains a persistent issue, with formal sources of credit reaching only about 39 per cent of MSMEs, leaving a



substantial gap in financing accessibility. This challenge is further aggravated by the absence of easily available and accessible collateral-free sources of credit. Working capital shortages impede day-to-day operations and hinder growth opportunities for MSMEs. Moreover, delayed payments from customers disrupt cash flow, leading to liquidity crunches and hampering business sustainability.

For new players entering the SME landscape, navigating financing options can be tricky. Traditional lenders often require extensive collateral and a proven track record, making it challenging for startups and emerging businesses to secure funding. Here innovative financing solutions tailored to the needs of early-stage enterprises are gaining traction.

One such innovative solution to address cash flow challenges for MSMEs is TReDS. This electronic platform allows businesses to obtain immediate cash by selling their accounts receivable to a third party at a discount. This works by discounting unpaid invoices, enabling SMEs to access much-needed liquidity swiftly.

The liquidity can then be utilised to meet operational expenses, invest in growth initiatives, or seize market opportunities. This offers a flexible and efficient way to manage cash flow, particularly for businesses with long payment cycles. As an alternative to traditional loans, TReDS offers quick access to funds without incurring additional debt. Moreover, it enhances financial visibility and stability, enabling SMEs to navigate through uncertain economic conditions.

In its current form, TReDS primarily serves MSME suppliers of large corporates, leaving smaller players in the lower tiers of the supply chain in need of quicker capital infusion. Recently the RBI has approved a plug and play deep tier financing to assist small MSME sellers in obtaining cash-flow-based financing. This inclusive approach offers a 'win-win situation' for both suppliers and buyers, ensuring stable cash flows and reducing the risk of disruptions in the domestic and global supply chains.

Expanding access to tier 2 and 3 MSMEs with deep tier financing

Deep-tier supply chain financing bridges the financing gap for MSMEs by extending affordable funding solutions throughout the supplier ecosystem. Financial institutions use the fintech platform to offer financing beyond large suppliers, reaching down to tier two, three, and beyond MSMEs. By developing a linkage within the supply chain, deep-tier financing promotes transparency and stability while empowering MSMEs to address trade financing shortfalls. This innovative model enhances cash flow and strengthens MSMEs' positions within the supply chain, enabling them to access quick credit and facilitating growth initiatives at scale.

Inhouse data analytics tools, such as Credit Analytic Engines (CAE), facilitate the expansion of SCF to smaller enterprises by analysing vast amounts of data to map the behavioural patterns and business transactions. This enables financial institutions to assess



The MSME base in India is projected to grow from 6.30 crore to an astounding 7.50 crore units, presenting both vast opportunities and unexpected challenges, particularly in the world of financing.



By addressing cash flow challenges, expanding access to supply chain finance, and exploring innovative financing options, we can unlock the full potential of small and medium enterprises.

creditworthiness and manage risks effectively. By leveraging data analytics, lenders can make informed decisions, extend financing to underserved MSMEs, and create inclusive economic growth.

Alternate solutions for SME financing

In addition to invoice discounting, supply chain finance, and alternative funding sources, several other innovative solutions are reimagining SME financing. As India's MSME sector progresses towards significant expansion, the demand for innovative financial solutions becomes increasingly pronounced. Peer-to-peer lending platforms, for instance, connect borrowers directly with investors, bypassing traditional financial intermediaries. This democratized approach to lending offers competitive interest rates and streamlined application processes, making it highly appealing for SMEs in need of swift access to capital.

Final thoughts

Consistent access to finance is imperative for driving economic growth, building entrepreneurship, and promoting inclusivity. By addressing cash flow challenges, expanding access to supply chain finance, and exploring innovative financing options, we can unlock the full potential of small and medium enterprises. As technology continues to evolve and financial ecosystems become more interconnected, the future of SME financing holds exciting possibilities for businesses worldwide. These advancements will drive collaboration between stakeholders, thereby creating a more resilient and vibrant ecosystem for small and medium enterprises to flourish.

SME

About the author:

Sundeep Mohindru is a Promoter & Director at Mixchange. Mixchange TReDS is a digital marketplace to sell the receivables to banks/NBFC set up under the approval of Reserve Bank of India (RBI) to facilitate the discounting of invoices and bills of exchange on a PAN India basis.



Servo Motors Market on Overdrive

The market for servo motors was significantly influenced by the growing use of automation across a number of industries, including manufacturing, automotive, electronics, and packaging, says Adroit Market Research report.

A closed-loop control system is used by servo motors, which means that it constantly receives data from position sensors (such as encoders) regarding the motor's real location. The controller can properly maintain the correct position and make real-time modifications thanks to this feedback. Servo motors may control the rotating position with great precision and accuracy. Even with fluctuating weights or outside pressures, they can keep a certain angular position steadily. Both accurate torque control and variable speed control are capabilities of these motors. They are appropriate for a variety of applications that call for varying degrees of force and movement thanks to their flexibility.



Market dynamics

Since servo motors are often tiny and light, they are simple to integrate into a variety of systems, including both huge industrial machines and smaller applications like RC (radio-controlled) models. Servo motors are useful in situations where high performance is required yet there is a need for small size and relatively highpower outputs. Fast reaction times are a common characteristic of servo motors. They are appropriate for activities that need for fast modifications since they can swiftly alter their direction or speed in response to control signals. Servo motors often create reduced vibration and noise levels as compared to other types of motors because of their precise control and closed-loop operation.

The market for servo motors was significantly influenced by the growing use of automation across a number of industries, including manufacturing, automotive, electronics, and packaging. When it comes to providing accurate motion control for automated operations, servo motors are essential. The market for servo motors was being driven by the rising need for robots in manufacturing, logistics, and other industries. Servo motors are the favoured option for robotic applications because robots need accurate and effective movement. When compared to certain other types of motors, servo motors are renowned for their energy efficiency. The need for energy-efficient servo

motors grew as environmental issues and energy-saving programmes gained popularity.

The market was expanding as a result of ongoing developments in servo motor technology, including the creation of more lightweight, potent, and intelligent servo motor systems. The market for servo motors was expanding as they were finding new uses in industries including renewable energy systems, consumer electronics, medical equipment, and aerospace. The demand for servo motors, which are utilised in a variety of EV components, including electric power steering and electric brake systems, was being driven by the expansion of the electric vehicle (EV) sector.

Growth propellers

According to Adroit Market Research, the market for servo motors is anticipated to grow to \$ 22 billion by 2030, with a CAGR of 6 per cent. The market for servo motors was dominated by the Asia-Pacific region. Several countries, including Japan, China, South Korea, and India, had a big impact on the servo motor industry. The market in this area was primarily driven by the region's strong manufacturing sector, expanding industrial automation, and the existence of sizable electronics and automotive sectors.

The need for robust and dependable servo motors is rising along with the use of robotics and automation



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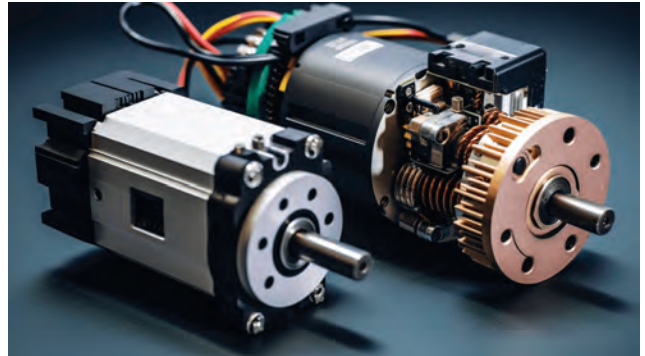
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across a variety of sectors. There are opportunities in robotic applications such as collaborative robots (cobots), drones, and autonomous vehicles, where servo motors are essential for delivering accurate motion control. The capacity of servo motors to provide precise and effective motion control can be advantageous for the renewable energy sector, including wind turbines and solar tracking systems. Servo motors may be used to optimise renewable energy generating and distribution systems as the globe progresses towards more sustainable energy alternatives. Servo motors employed in different EV components, such as electric power steering, electric brake systems, and electric vehicle charging infrastructure, provide prospects due to the continuous expansion of the electric vehicle industry.

The rising popularity of the Industrial Internet of Things (IoT) and Industry 4.0 projects helped servo motors. Servo motors can provide the precise and sophisticated motion control that smart factories and networked industrial systems demand. Servo motor integration with IoT systems enables data-driven decision-making, proactive maintenance, and increased operational effectiveness.

Miniaturised and tiny servo motors are increasingly



Servo motors are the favoured option for robotic applications because robots need accurate and effective movement.

in demand across a range of sectors, including consumer electronics, wearable technology, medical equipment, and more, as technology advances. The creation of more compact yet potent servo motors creates new possibilities for their application in applications with limited space. **SME**

Courtesy: Adroit Market Research
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Big Impact: Siemens' New Acquisition

Siemens' acquisition of ebm-papst's industrial drive technology (IDT) business opens up wider global market access for these products, leveraging Siemens' extensive global sales channels, says **Vanessa Lopez**.



Ebm-papst, with over \$50 million in sales, ranks 13th in the global market. The majority of its revenue comes from the EMEA region, where it holds 10th position in the regional market. Siemens' acquisition of ebm-papst's IDT division opens up wider global market access for these products, leveraging Siemens' extensive global sales channels.

As stated in the official press release Siemens published in late March, one of the company's main goals with this acquisition is being able to offer a more complete solution for "... intelligent, battery-powered drive solutions." While this could include many pieces of equipment, we believe the primary target is mobile robot applications.

Mobile robots are experiencing early-stage growth. As predominantly battery-powered solutions, these robots typically utilise either 24v or 48v DC motors (what we term ultra-low voltage motors). The demand for ultra-low voltage drives and motors is therefore reflecting this upward trajectory. According to Interact Analysis' ultra-low voltage drives report, revenues are projected to grow at a CAGR of 25.9per cent, reaching \$3.1 billion by 2027. Similarly, ultra-low voltage motors, extensively utilised in mobile robots, are expected to witness substantial revenue growth, reaching \$6.5 billion by 2027, as indicated in Interact Analysis' ultra-low voltage motors report. This surge in demand

If you've been following manufacturing news, Siemens has been making big waves in its divestitures and acquisitions over the last few years. Most recently, it divested several business units worth nearly €3 billion into the newly formed Innomotics, which is currently up for sale.

On March 21, 2024, Siemens announced yet another acquisition. In a press release, the company unveiled its plans to acquire ebm-papst's industrial drive technology (IDT) business. What makes this move most interesting is the acquisition of ebm-papst's ultra-low voltage motor offering. In a report published by Interact Analysis in late 2023, we found the market for these products is growing strongly, particularly in applications relating to conveying and mobile robotics.

Below, we will examine the acquisition announcement in detail and explain why we believe Siemens has made a smart investment.

What does this deal mean for Siemens?

From a product perspective, ebm-papst's portfolio is a valuable addition to Siemens' portfolio. While Siemens has been active in the ultra-low voltage drive market, it previously lacked a complimentary motor offering.



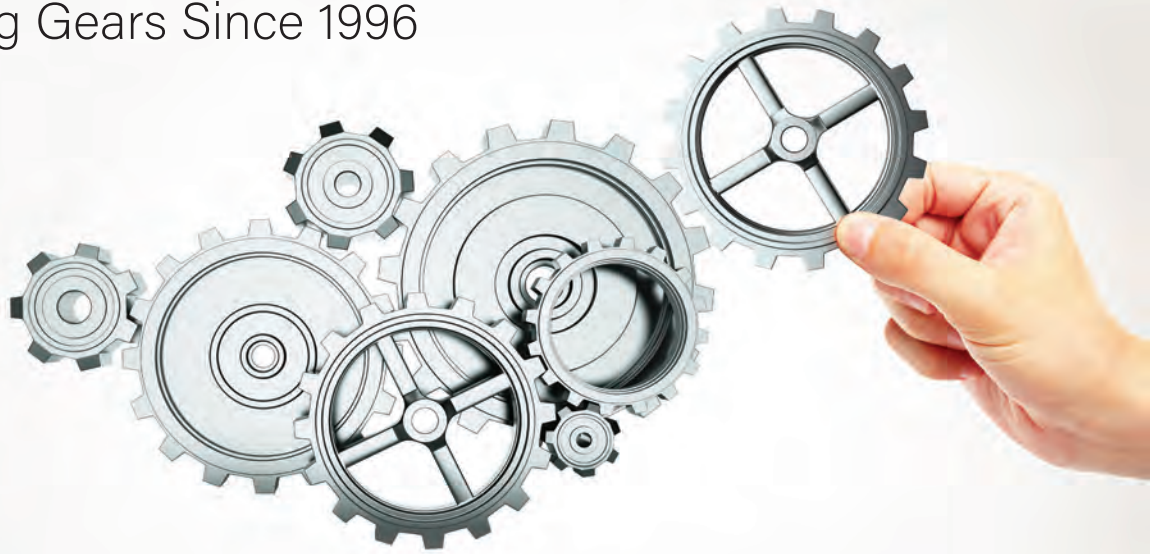
The accelerated surge in warehouse automation, including the adoption of mobile robots and roller conveyors, presents substantial avenues for Siemens to expand its footprint and secure market share.



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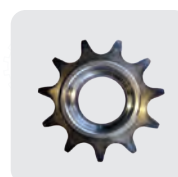
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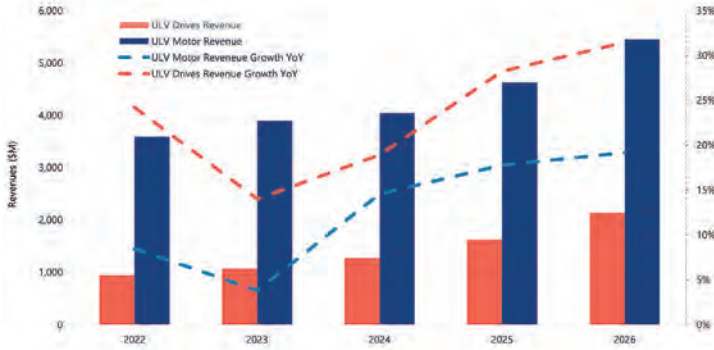


Figure 1: Global ultra-low voltage drives & motors market 2022 to 2027; Revenues in \$ million

Source: Interact Analysis

can be attributed primarily to the burgeoning adoption of mobile robots, particularly in warehouse automation applications.

Also notable is the rapid growth seen by roller conveyors in both segments of the ultra-low voltage markets under discussion. These products are highly compact and often operate at either 12V or 24V, making them an ideal application for ultra-low voltage motors. Moreover, most conveyor manufacturers purchase motors rather than manufacturing them in-house.

Our conversations with ultra-low voltage motor vendors consistently highlighted roller conveyors as a significant area of interest for future growth. Interact Analysis estimates this market will nearly double by 2030.

Final thoughts

The accelerated surge in warehouse automation, including the adoption of mobile robots and roller conveyors, presents substantial avenues for Siemens to expand its footprint and secure market share. By strategically aligning itself to meet the escalating demand for ultra-low voltage drives and integrated motor solutions, Siemens is poised to benefit from this surging market. Therefore, we consider Siemens' acquisition of ebm-papst's industrial drive technology business as a pivotal and forward-looking investment.

SME



About the author:

Vanessa Lopez is a Research Analyst at Interact Analysis, specializing in the Industrial Automation sector. With a master's degree in communications and a background in quantitative and qualitative research, Vanessa brings a comprehensive skillset to her role.

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NORD: Driving Green Solutions for Environment

NORD will present its drive solutions for the industry at IFAT 2024 – the leading trade fair for water, wastewater and waste management in Munich.

NORD DRIVESYSTEMS will present its drive solutions for the industry at IFAT 2024 – the world's leading trade fair for water, wastewater, waste and raw materials management from May 13-17, 2024 in Munich. For distributing drinking water, conveying wastewater, and circulating activated sludge, pumps, mixing and agitating systems complete important tasks in environmental technology. They have to meet high demands: High performance, robustness, availability, reliability, longevity and also energy efficiency are required. NORD DRIVESYSTEMS drive solutions meet these requirements.

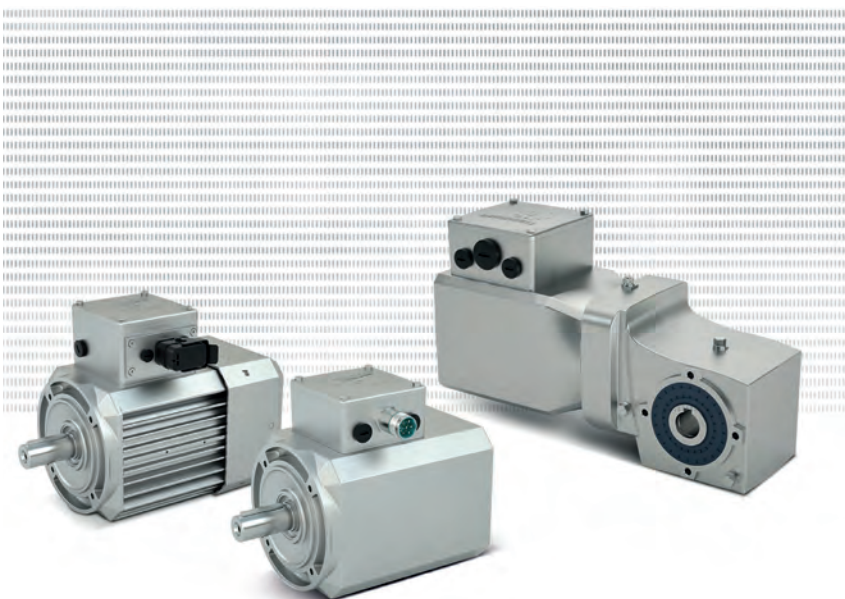
As a system supplier, the company offers fully matched drive systems consisting of gear unit, motor and frequency inverter that are tailored to the respective requirements of the customer application. NORD drive solutions can be networked, operate autonomously, and their functions and performance are scalable.

Drive solutions for various applications

MAXXDRIVE industrial gear units easily move large masses in agitating and mixing applications thanks to their high power density, reliability and long service life. They offer high output torques from 15 to 282 kNm and ensure reliable operation even under extreme conditions. Their FEM-optimised, compact design in a UNICASE housing ensures maximum strength and rigidity.

With its efficiency, the NORD IE5+ synchronous motor even exceeds the highest defined efficiency class and is perfect for conveyor and pump applications. It features a compact and hygienic design in a very small space and ensures high corrosion resistance and easy cleaning.

Even greater system efficiency is offered by the patented DuoDrive geared motor which features an IE5+ motor integrated into a single-stage helical gear unit. With a system efficiency of up to 92 per cent, the wash-down-capable geared motor has one of the highest efficiencies on the market in this power class, and also achieves very high efficiency in partial load operation.



NORD's high-efficiency IE5+ synchronous motor is also available as a smooth-surface motor in a wash-down-capable version.

Together with simple plug-and-play commissioning, this results in a significant reduction in the Total Cost of Ownership (TCO) compared to other drive systems.

Adapting pumps to different requirements

The decentralised frequency inverters from NORD are particularly suitable for controlling pump applications. They provide significant advantages: They save space in control cabinets, reduce costs for wiring and cable, simplify maintenance and therefore increase the efficiency of the entire drive system. Actuating the pump drives via frequency inverters allows for the selection of different pump characteristics by simple parameter changes. The parameter sets are directly stored in the inverter and pumps can be adapted to different media, flow rates or process requirements.

NORD also delivers numerous drive components as explosion-protected ATEX versions. The company is a long-term certified manufacturer and has many years' experience with explosion-protected drive technology.



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Igus: Putting Innovation in Motion

The Germany-based igus, which recorded Euro 1.136 billion turnover in 2023, will invest in 247 new motion plastics products in 2024. In 2023, it managed to increase the number of active customers by 6.7 per cent.



After two years of rapid growth totalling 57 per cent, the Cologne (Germany) headquartered motion plastics specialist igus was able to maintain its billion-euro turnover in 2023 despite the challenging global economic situation. In 2024, the company will invest in 247 new motion plastics products and digital services. More favourable and better solutions for lubrication-free movements, low-cost automation and CO₂-reducing products are the focal points. The use of artificial intelligence (AI) has now made it possible to bundle hundreds of thousands of test data and millions of applications from 60 years of igus experience into a simple solution finder for the "Zero Lubrication" goal: the igusGO app. 433 million euros of investment in the last three years, around half of it in Germany alone, is accelerating this technical progress and delivery from stock worldwide. This trend is set to continue in 2024.

Despite the tense global economic situation, igus increased the number of its active customers by 6.7 per cent in 2023 and achieved an annual turnover of Euro 1.136 billion. This means that the company only recorded a slight decrease of 1.65 per cent compared to the previous year. "Declines in regular customers due to the economic situation were largely offset by new customers and new applications. We are confident that we will continue our growth in 2024. The first quarter was difficult, but the annual forecast for 2024 is good," said **Tobias Vogel**, Managing Director of Bearings and Linear Technology at igus.

Michael Blass, Managing Director of e-chain

systems at igus, added, "With major projects such as the shore power supply for container ships in the Port of Hamburg, we are looking positively to the future. The requirements and wishes of our customers are constantly driving us to create new internal start-ups. We combine our core technology of motion plastics with digitalisation and AI. We are well on the way to establishing digitalisation as an equal technology at igus. This was the only way to achieve successes such as our smart plastics, the RBTX robot marketplace and the igusGO app for zero lubrication."

247 innovations: From battery production to autonomous robotic arms

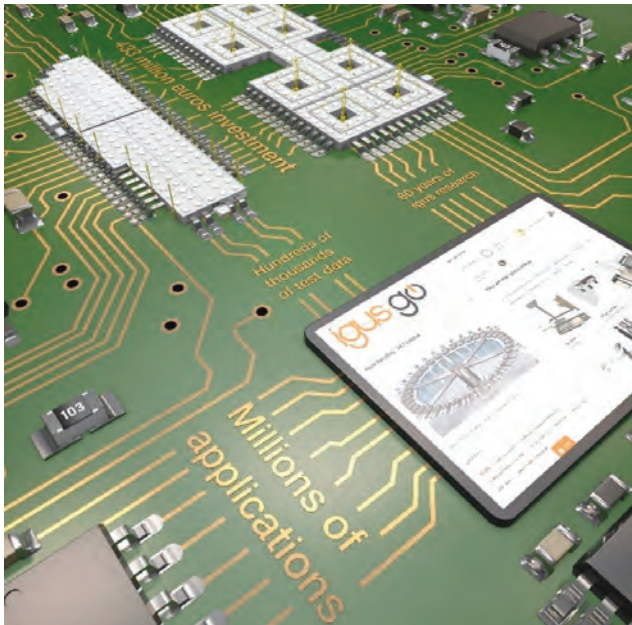
This year, igus presented 247 new products at the Hannover Messe 2024 trade fair. Among this, high-load bearings for heavy machinery, crucial for the "Zero Lubrication" range. Three new materials, which have already proven themselves with users such as excavator manufacturers, are coming onto the market. "igus, make the excavator lubrication-free!" can already be realised via voice control in the igusGO app. This is where material technologies and AI come together and offer simple and secure access to a wealth of information and suggestions for all industry professionals around the world via AI chat," said Tobias Vogel.



In lieu of the technological revolution, customers want deliveries within 1-3 days and at favourable prices. Thanks to our investments, we are doing this better than ever before, even worldwide. 🌐

Michael Blass,
MD – e-chain systems, igus

The app is based on hundreds of thousands of test data and millions of applications from 60 years of igus successes. But sustainability goes beyond avoiding



The igusGO app is the result of 60 years of polymer research, hundreds of thousands of test results and millions of applications.

lubrication: with a new slewing ring bearing made of 50 per cent wood and 50 per cent high-performance plastic, igus is taking the integration of renewable raw materials into industrial production one step further. The wide range of PTFE- and PFAS-free solutions for linear and plain bearings and the comprehensive 4-year guarantee for all igus products with online service life calculation also represent progress towards genuine sustainability. The strategy of many companies to build battery factories in Europe is also sustainable. Batteries are manufactured in dry rooms, and this requires machine components that are lubrication-free and do not become brittle. Igus now supplies a wide range of products for this purpose, all tested in specially built dry labs. And the fact that state-of-the-art automation can be affordable for almost any factory is demonstrated by the "ReBeL on Wheels". The ReBeL robotic arm on a low-cost autonomous vehicle as a solution for SMEs is available from Euro 17,999, while the education version for universities and schools is available for Euro 14,699.

Euro 433 million in investments in three years

The fact that igus is constantly expanding the motion plastics product world, always with the aim of "improving what moves", is a consequence of the long-term corporate strategy. Following the breakthrough to the first billion euros in sales in 2022, igus set a new target: one million industrial customers per year. At the time, this represented a 5.5-fold increase.

"We are therefore pleased that we have at least come

a little closer to this goal in a difficult year. We have invested Euro 433 million in this plan over the last three years, Euro 210 million of which at the Cologne site," said Michael Blass. This includes the new 22,000 sq m factory, machines, systems and IT innovations, and the GO Zero Lubrication apps for example. The figure includes a strategic doubling of global stocks of catalogue parts. "In lieu of the technological revolution, customers want deliveries within 1-3 days and at favourable prices," explained Blass. "Thanks to our investments, we are doing this better than ever before, even worldwide."

The median delivery time worldwide is currently six days, including numerous engineering projects with long lead times. Investments will continue at the same pace in 2024 and in Germany. New machines and automation solutions are purchased for the new factory in Cologne where many of the internal start-ups are based, forming a motion plastics tech centre. Additionally, the conversion of a 2,800 square metre office building into a further start-up and training centre which will be open to customers, will soon begin. Expansions are continuing around the world, with a focus on fast delivery times. Decisions with construction measures have already been made for China, Taiwan, India, Italy, Spain, Poland, the USA, Mexico and Turkey. Tobias Vogel: "We are investing wherever our customers are in the world and in Germany."



Tobias Vogel,
MD - Bearings and Linear Technology, igus

Igus' lubrication-free, high-performance polymers improve technology and reduce costs wherever things move. In energy supplies, highly flexible cables, plain and linear bearings as well as lead screw technology made of tribo-polymers, igus is the worldwide market leader. The family-run company based in Cologne, Germany, is represented in 31 countries and employs 4,600 people across the globe. In recent years, the company has expanded by creating internal startups, e.g. for ball bearings, robot drives, 3D printing, the RBTX platform for Lean Robotics and intelligent "smart plastics" for Industry 4.0. Among the most important environmental investments are the "chainge" programme – recycling of used e-chains – and the participation in an enterprise that produces oil from plastic waste.

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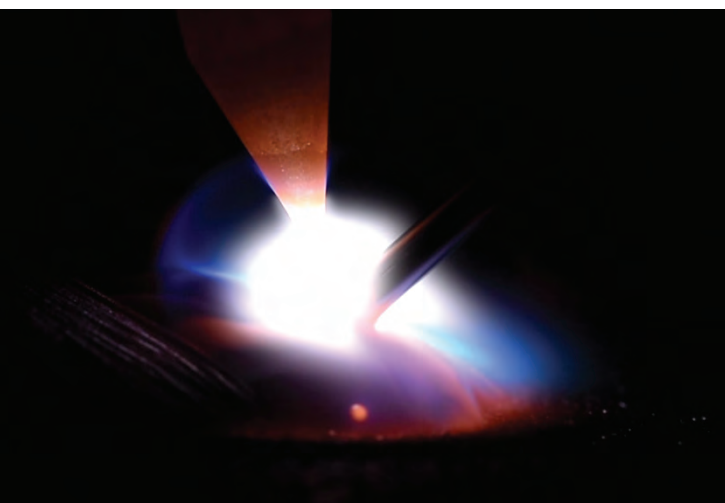




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TIG Welding: Dynamic Advantage

TIG welding with dynamically regulated wire feed speed is an advanced method that enables higher productivity in manual welding and can be easily automated. It ensures a stable welding process and increases productivity.



During TIG welding, an electric field (E-field) is generated between the tungsten electrode and the workpiece, which can be measured. Figure 1 shows a schematic measurement of the E-field between the workpiece and the arc column on the left. The voltage in the electric field depends on several factors, including electrode diameter, current strength, arc length, base material, and type of shielding gas. The measurement point along the arc column is also an important factor, as the voltage decreases when the measurement point is further away from the tungsten electrode. By understanding the voltage distribution in the arc column, the filler material can be used not only as a welding filler but also as a measuring line, enabling the active and

dynamic regulation of the wire during the welding process.

As mentioned, the E-field voltage in the arc column is sensitive and can be affected by small changes such as electrode diameter or electrode grinding angle. As a result, relying solely on the E-field voltage as a reference value to ensure a stable welding process is impractical. The E-field voltage can fluctuate quickly due to unpredictable variations in the arc, leading to impairment of the welding process.

Basic principle of TIG welding with dynamically regulated wire feed speed

Dynamic wire control TIG welding is an innovative type of welding in which a voltage of approximately 18 Volts (V) is applied between the welding wire and the workpiece. Figure 2 illustrates the applied voltage of 18 V between the filler wire and the workpiece. This applied voltage is necessary to compensate for the unpredictable effects of the electric field in the arc and to ensure a stable welding process.

The welding wire serves a dual purpose: it acts as filler material that is introduced into the molten pool to join the workpiece with the weld metal and also serves as a measuring line for monitoring and controlling the welding process.

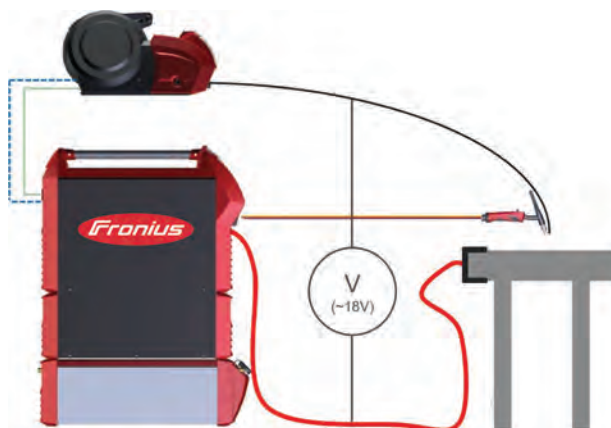


Figure 2: Voltage measurement between the filler wire and the workpiece

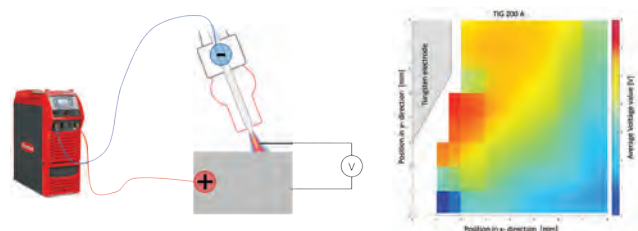


Figure 1: On the left, a schematic measurement of the E-field between the workpiece and arc column; on the right, the voltage distribution in the arc column

In dynamic wire control, the welding wire is automatically fed forward until it touches the molten pool, creating a short circuit. Once the short circuit is detected, the wire stops and begins to melt, thereby introducing material into the molten pool. After the droplet of the filler material in the molten pool is completely melted, the short circuit breaks, and the wire is automatically pushed forward again. This process is repeated continuously to ensure a uniform and precise welding joint as well as a stable process.

Figure 3 illustrates the process of dynamic wire control in TIG welding. The wire-workpiece-measurement voltage (V) provides information about the distance between the welding wire and the workpiece. When a short circuit occurs, it means that the welding wire touches the workpiece, causing a sudden drop in voltage, which reaches almost zero (Figure 2, points 2 and 3). Once the short circuit breaks, the voltage between the welding wire and the workpiece begins to rise again. At a certain voltage threshold, the wire begins to move forward again to supply more filler material into the molten pool. The green line in Figure 3 illustrates the speed at which the welding wire is fed into the molten pool. After the welding wire touches the molten pool, the wire feed automatically stops, and the wire begins to melt. Once the droplet is melted, the wire feed is automatically restarted to ensure a uniform welding joint.

Advantages of dynamic wire control speed in TIG Welding

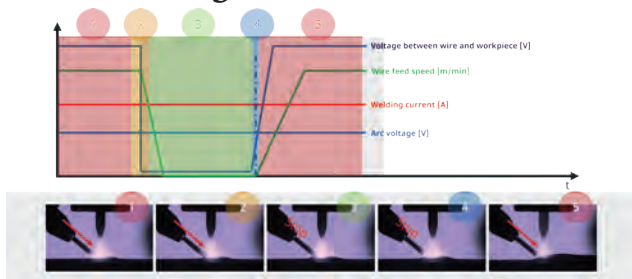


Figure 3: Basic principle of TIG welding with dynamically regulated wire feed speed

Dynamic wire control is a technology that emulates manual TIG welding performed by skilled welders. In TIG welding, filler material is added continuously or intermittently, without being withdrawn, to keep the hot end of the filler material always under the shielding gas cover. This protects the molten pool from impurities and ensures high-quality weld results. Dynamic wire control ensures the optimal amount of filler material is introduced into the molten pool for optimised welding joints.

The combination of dynamic wire control and TIG welding allows for precise and controlled welding

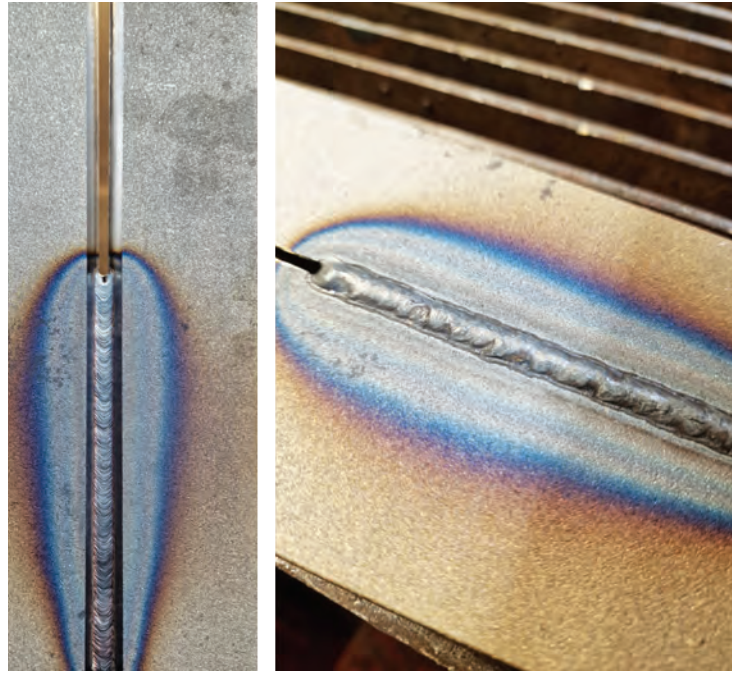


Figure 4: Root welding with dynamically controlled wire feed speed

results, as shown in Figure 4. During the welding process, the wire feed is continuously monitored and adjusted to ensure a uniform welding joint. This leads to higher efficiency, productivity, and a lower error rate. Overall, dynamic wire control provides a reliable and advanced technology to ensure precise and high-quality welding joints.

TIG welding with dynamic wire control offers several significant advantages over conventional semi-automated TIG welding. One of the most important advantages is the improved flow behavior of the weld joint, as the molten pool is stimulated by wire feed during the welding process.

This results in a more uniform weld result. Another advantage is the ability to easily compensate for part tolerances, as dynamic wire control allows for continuous regulation of wire feed. This allows welders to react to part tolerances and optimise welding quality only through the welding torch movement, without interrupting the welding process.

Furthermore, dynamic wire control simplifies the welding process, as it automatically compensates for component tolerances, burner positions, and changes in arc length. With dynamic wire control, welders can focus on the actual work, which increases the efficiency of the welding process.

Overall, TIG welding with dynamic wire control offers a range of advantages that lead to higher welding quality, easier handling, and increased efficiency of the welding process.

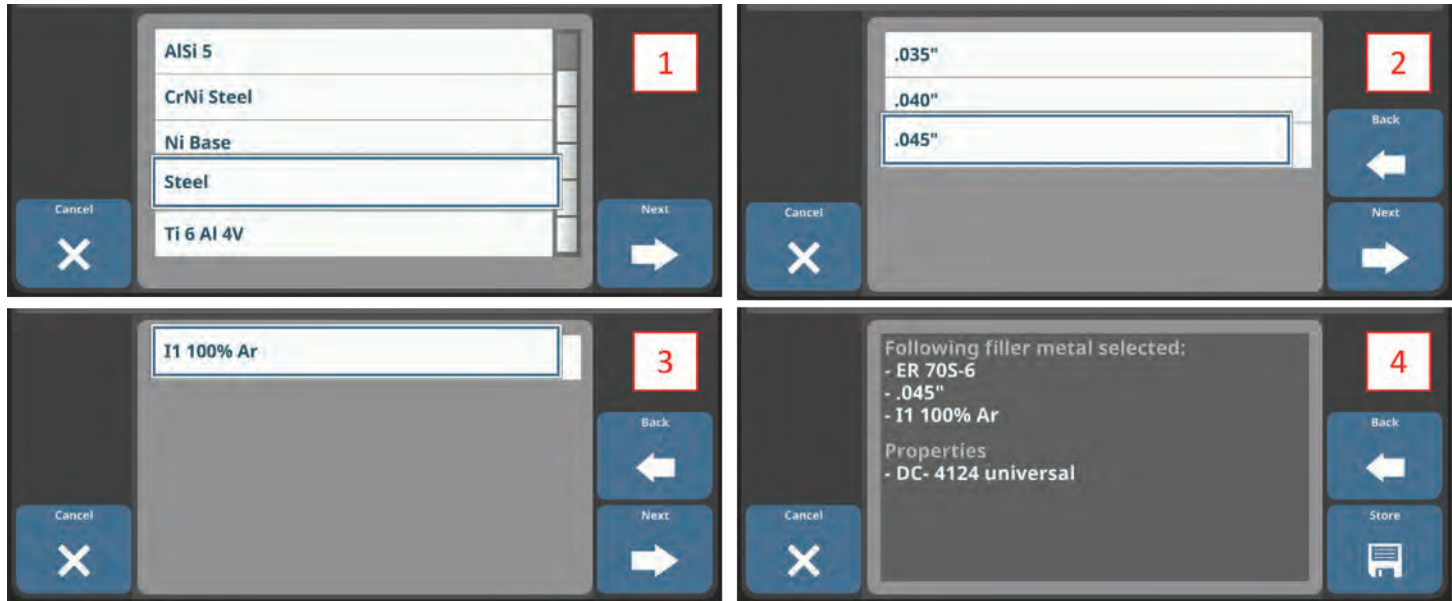


Figure 5: Selection of the characteristic curve (Synergic Line) on a TIG power source from Fronius

Synergic mode for TIG welding with dynamic wire control

The Synergic Mode is a valuable feature to consider when using partially mechanised TIG welding with dynamically controlled wire feed speed. This mode enables welders to select a predefined characteristic curve, which is optimised for various filler materials and applications, as demonstrated in Figure 5.

The quality of the weld joint depends on the characteristic curves, which come with predetermined parameters tailored to specific welding requirements. When the welding current is set as the guiding parameter, the wire feed speed adjusts automatically to achieve optimal welding quality. During welding, welders can also adjust the parameters to further optimise the weld joint and attain perfect results. Besides automatically adjusting the wire feed speed, the characteristic curve provides a forecast for the average wire feed speed and a guideline for the material thickness of the workpiece to be welded, as shown in Figure 6. This information simplifies parameter adjustments and helps welders choose the appropriate welding program to achieve optimal weld joints. The Synergic Mode is an essential function that enables welders to set parameters quickly and easily, without extensive training. It leads to precise and high-quality weld joints, increasing the efficiency of the welding process, resulting in higher productivity and profitability.

TIG welding with dynamically regulated wire feed speed is an advanced method that enables higher productivity in manual welding and can be easily

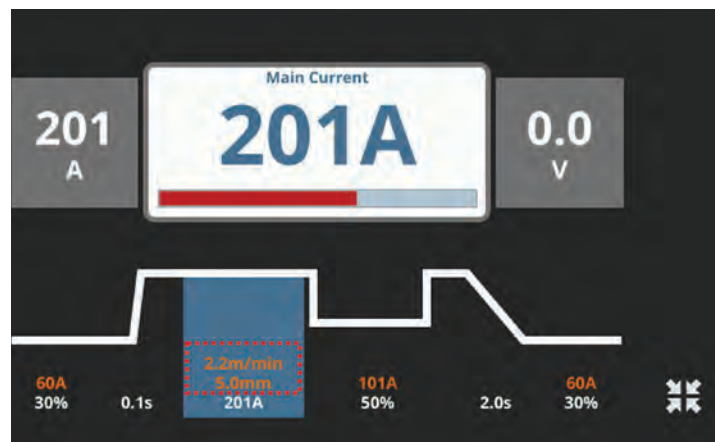


Figure 6: Display of the predicted values for the average wire feed speed and the reference value for the material thickness to be welded

automated. Unlike conventional methods, the wire speed automatically adjusts to the arc length and component tolerances, preventing the torch from being pushed away and spatter formation by regulating droplet detachment and wire speed. The method mimics manual welding, where the filler rod is not withdrawn to protect the wire end from oxidation. Application personnel work in synergic mode and only set one parameter while all other parameters are automatically adjusted.

In summary, TIG welding with dynamic wire regulation speed is a method that ensures a stable welding process and increases productivity.

SME

Article Courtesy: Fronius



“Focus on welding safety and ergonomics is increasing.”

The Indian Institute of Welding (IIW-India) is a professional body devoted to the cause of promotion and advancement of welding science and technology in India. Established in the year 1966, with its registered office at Kolkata, it has 13 branches and two centres located all over India. **Deepak Acharya, President, Indian Institute of Welding (IIW India)**, gives a brief overview of the welding industry and also shares the emerging trends in this interview.

What is the market size of the welding industry in India? Which segments within the welding industry are showing strong growth?

The welding industry in India is experiencing steady growth, driven by infrastructure development, manufacturing expansion, and investments in sectors like automotive, construction, and energy. However, specific market size figures can vary year by year due to economic factors and industry trends.

In terms of market size, the Indian welding industry is estimated to be worth around \$3.5 billion by 2025. This figure includes welding equipment, consumables, and services.

Segments within the welding industry that were showing strong growth included:

Automotive welding: With the growth of the automotive sector in India, demand for welding equipment and technologies used in automotive manufacturing also increased. This includes welding robots, automated welding systems, and advanced welding consumables.

Infrastructure and construction: As India continues to invest in infrastructure projects such as roads, bridges, and buildings; there is a growing demand for welding in construction activities. This includes welding of structural components, pipelines, and other infrastructure elements.

Energy sector: The energy sector, including power generation, oil, and gas, requires welding for various applications such as pipeline construction, maintenance of power plants, and fabrication of equipment.

Heavy machinery and fabrication: Industries involved in heavy machinery manufacturing and fabrication, such as industrial equipment, agricultural



machinery, and mining equipment, contribute to the demand for welding products and services.

Defence and aerospace: With a focus on indigenisation and defence manufacturing in India, the defence and aerospace sectors are also driving growth in welding technologies, particularly for specialised applications requiring high precision and quality.

What are some of the emerging trends in the industry?

(With respect to equipment, accessories, consumables, raw material, etc.)

Several emerging trends are shaping the welding industry, influencing equipment, accessories, consumables, raw materials, and overall practices. Here are some of these trends:

Advanced welding equipment: The industry is seeing a rise in advanced welding equipment that offers enhanced capabilities such as multi-process functionality, integrated automation features, and connectivity for data monitoring and analysis. This includes welding machines with built-in welding intelligence, touch screen interfaces, and remote control capabilities for improved user experience and productivity.

Robotics and automation: Automation and robotics continue to be a significant trend in welding. Collaborative robots (cobots) are gaining popularity for their ability to work alongside human operators, increasing efficiency and safety in welding operations. Automated welding systems with vision systems and programming flexibility are also becoming more prevalent for complex welding tasks.

Digitalisation and IoT integration: The integration of

digital technologies and IoT in welding equipment enables real-time data collection, monitoring, and analysis. Welding machines and accessories equipped with IoT sensors can provide insights into welding parameters, productivity metrics, and predictive maintenance requirements, leading to optimised performance and reduced downtime.

Augmented Reality (AR) and Virtual Reality (VR):

AR and VR technologies are being applied to welding training and simulation. Virtual welding simulators allow trainees to practice welding techniques in a virtual environment, providing a safe and cost-effective way to enhance welding skills and proficiency.

Environmentally friendly consumables: There is a growing demand for environmentally friendly welding consumables, including low-emission shielding gases, eco-friendly welding electrodes, and recyclable packaging materials. Manufacturers are focusing on developing sustainable welding solutions that minimise environmental impact without compromising performance.

Advanced welding processes: Emerging welding processes such as laser welding, friction stir welding, and electron beam welding are gaining traction for their ability to weld dissimilar materials, high-strength alloys, and thin-gauge components with precision and efficiency. These processes offer advantages such as reduced heat-affected zones, minimal distortion, and superior weld quality.

High-performance materials: The use of high-performance materials such as advanced alloys, composites, and lightweight materials is driving the demand for specialised welding consumables and techniques. Welding solutions capable of handling these materials while maintaining structural integrity and quality are in demand across industries like aerospace, automotive, and electronics.

Welding safety and ergonomics: There is an increased focus on welding safety and ergonomics, leading to the development of ergonomic welding equipment, personal protective gear, and safety features in welding machines. This includes innovations such as lightweight welding helmets with integrated respiratory protection, ergonomic welding torch designs, and safety interlocks in automated welding systems.

What is the outlook for the welding industry in India?

The outlook for the welding industry in India is positive, with several growth opportunities, advancements in technologies and raw materials, increasing automation, and the adoption of Industry 4.0 principles. Continued investments in infrastructure projects, including railways, roads, bridges, ports, and

urban development, will drive demand for welding in construction, fabrication, and infrastructure maintenance. The growth of solar, wind, and other renewable energy sectors will create opportunities for welding in solar panel manufacturing, wind turbine fabrication, energy storage systems, and renewable energy infrastructure. The shift towards electric mobility presents growth opportunities in welding for EV manufacturing, including chassis assembly, battery pack fabrication, powertrain components, and lightweight materials welding. Defense indigenisation efforts, aerospace manufacturing, and space exploration programs will contribute to demand for welding in defense equipment, aircraft production, missile systems, and aerospace structures. The development of hydrogen infrastructure, fuel cell technology, and hydrogen production systems will require welding for hydrogen storage, transportation, and distribution.

With respect to new technologies, we see increase in adoption of advanced welding processes such as laser welding, friction stir welding, ultrasonic welding, and electron beam welding for improved efficiency, precision, and quality. Use of specialised materials such as high-strength alloys, aluminum alloys, composites, and advanced plastics will drive demand for welding expertise and techniques tailored to these materials. Development and use of environmentally friendly welding consumables, low-emission shielding gases, and sustainable welding practices to meet environmental regulations and sustainability goals.

Adoption of robotic welding systems for automated welding, material handling, and production line integration to enhance productivity, consistency, and safety. Integration of digital technologies, IoT sensors, data analytics, and cloud-based platforms for real-time monitoring, predictive maintenance, and optimisation of welding processes.

Welding firms are focusing on implementation of quality management systems, weld inspection technologies, non-destructive testing (NDT), and certification processes to ensure high-quality welds, compliance with standards, and customer satisfaction. Emphasis on welding safety practices, personal protective equipment (PPE), training programs, and risk mitigation strategies to enhance workplace safety, reduce accidents, and promote a safety culture. Overall, the outlook for the welding industry in India is characterised by growth opportunities across multiple sectors, advancements in technology and materials, increasing automation and digitalisation, and a focus on quality, safety, and sustainability. Adapting to these trends, investing in innovation, skill development, and collaborative partnerships can help welding companies thrive in the evolving industry landscape.



The Power of Hydraulics!

The 3-jaw LGH3100 Lock-Grip Puller gives operators the ability to detach heavy and stubborn, large shaft mounted components efficiently and without damage.

Enerpac announces its largest lock-grip puller system so far, the LGH3100 synchronous lock grip system delivers up to 100 tons of hydraulic force for pulling medium to large size wheels, sprockets, bearings and other similar shaft-mounted parts. The puller's self-centring closing "Lock-Grip" system moves all jaws simultaneously, allowing a single operator to safely handle removal of large wheels, bearings, and couplers with ease.

Removing large, shaft mounted, components that may have become seized and corroded can be challenge for maintenance operators. Dangerous practices such as torching, cutting and hammering are liable to damage expensive parts leading to maintenance delays and extended equipment downtimes. The 3-jaw LGH3100 Lock-Grip Puller gives operators the ability to detach heavy and stubborn, large shaft mounted components efficiently and without damage.

The 100 ton lock grip puller is mounted on an ergonomically designed rolling cart with a low centre of gravity that minimises the physical effort needed to



Enerpac LGH3100 Lock-Grip Puller safely removes large shaft mounted components without damage.

position and operate the puller. The cart features large industrial castor wheels and pockets for use with a forklift. The hydraulic pulling power is provided by the onboard Enerpac ZE3-Series electric two stage pump and remote operating control pendant.



Removing a wheel shaft with the Enerpac LGH3100 100-ton Lock-Grip Puller.

Removed components are captured and held securely within the synchronous locking jaws. With a maximum reach of 1219 mm, the smooth action, hydraulic scissor lift on the LGH3100 cart provides effortless centre height adjustment from 698 mm to 1679 mm. When both space and budgets are tight, the 3-jaw LG3100 is easily converted into a 2-jaw, 70 ton capacity configuration, avoiding the need to use valuable budget on a separate 2 jaw puller.



The 100 ton lock grip puller is mounted on an ergonomically designed rolling cart with a low centre of gravity that minimises the physical effort needed to position and operate the puller.

"The LGH3100 Lock-Grip Puller is the safe and productive way to remove large shaft mounted components without damage," said Diego Rossi, Commercial Director Rail Markets EMEA, Enerpac. "The combination of a smooth action scissor lift, synchronised grip jaws and an intuitive operator station creates a stable and efficient pulling tool, allowing a single operator to remove, for example, large wheels, bearings, and couplers with unmatched ease."



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Empowering Manufacturing in India

Industry professionals, entrepreneurs, and decision-makers can use the platform of Pune Machine Tool Expo (PMTX) and FACTEQ 2024 to explore the future of manufacturing and avail the opportunities for growth and collaboration.

Indian Machine Tool Manufacturers' Association (IMTMA) is organizing the third edition of Pune Machine Tool Expo (PMTX) and the first edition of FACTEQ 2024 from May 23-26, 2024, at Pune International Exhibition and Convention Center.

PMTX 2024, recognized as a premier business-to-business exhibition, is dedicated to empowering Micro, Small, and Medium Enterprises (MSMEs) by enhancing their competitive advantage. With a focus on showcasing the latest advancements in metalworking machinery, accessories, subsystems, and components, PMTX 2024 will feature over 180 exhibitors from around the globe. From metal cutting and metal forming to welding, automation robotics, Industry 4.0, and 3D Printing, visitors can expect to see some groundbreaking innovations revolutionizing the manufacturing landscape.

Simultaneously, IMTMA is introducing FACTEQ 2024 – showcasing the entire spectrum of factory equipment essential for designing, building, operating, and maintaining modern factories. This inaugural edition aims to bring together key stakeholders to explore the latest solutions driving efficiency and productivity across factory operations. Quality in manufacturing happens when goods are produced the right way. Aptly, many firms are striving to get it right and have industries bank more on homegrown machine tools and factory equipment through technological improvements. FACTEQ promises to help the factories of tomorrow build, maintain, and upgrade their plants. Exhibitors will showcase air and water systems, material storage and transport, security and safety systems, electrical and lighting systems, sustainable and environmental solutions, factory furniture, building and construction equipment, and many more factory-specific solutions.

“PMTX 2024 and FACTEQ 2024 offer unparalleled networking opportunities for regional industries to access the latest technologies and solutions,” said Rajendra S Rajamane, President, IMTMA. Elaborating further he added, “With our commitment to empower MSMEs and drive technological innovation, we are



23 - 26 May 2024

Pune International Exhibition and Convention Center, Moshi, Pune

confident that the expo will pave the way for transformative advancements in the manufacturing landscape.”

Jibak Dasgupta, Director General & CEO, IMTMA, commented, “Industry demands, especially related to technology, are evolving swiftly and expos like PMTX and FACTEQ are great enablers to address the requirements. Pune has the presence of a large number of auto, heavy engineering, aerospace and defence, and other manufacturing industries, and the show will be an important platform to meet manufacturing needs. We expect visitors not just from Pune but also from other industrial towns of Maharashtra and neighbouring States.”

It is believed that upgrading technology will make plants and factories more efficient and a reconfiguration will give rise to the need to procure factory equipment that will potentially aid in curbing imports. The use of superior technology in all future factory spaces will ensure energy efficiency and usher green environment. It will enable Indian industries to design, manufacture, and commission higher-efficiency factories with technology and manufacturing processes founded in India.

With a large proportion of Union Government incentives directed toward new-age manufacturing and positioning India as a new factory of the world, great things are expected, and India may perhaps cross the \$1 trillion export target. Pune is home to numerous startups, manufacturing units, and research centres. FACTEQ along with Pune Machine Tool Expo will bode well for the development of factories in and around Pune, the western and northern regions of India.

SME

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“Festo sees India very positively and continues to invest heavily in it.”

Artificial intelligence (AI), as part of industrial automation process, is increasingly being applied in manufacturing to enhance production and quality while keeping environment in mind. Esslingen (Germany)

headquartered Festo – known for producing pneumatic & electrical control systems, and drive technology for process automation – has been providing solutions to drive the industrial transformation towards carbon-neutral, sustainable production. In this interview with Rakesh Rao during Hannover Messe 2024, **Frank Notz, Member of the Management Board – Sales, Festo SE & Co KG**, emphasised on the importance of investing in AI, battery recycling, circular economy, and hydrogen technology. He also shed light on Festo’s India plans.



What has changed in the last one year for the industry?

There have been multiple changes with respect to technology and we are seeing much more consequent application of artificial intelligence (AI). We offer simple solutions that can easily be adapted to existing manufacturing set-up in many different use cases. One is, of course, predictive maintenance and quality, but we also apply it in the B2B environment, which is something really innovative. I think we have done a lot to understand our customers better and, therefore, we can also provide better solutions using AI, which has really developed in the recent years.

Hydrogen has emerged as a hot topic of discussion across the world. It is a highly dynamic market and customers are trying something new to improve efficiency of production, storage & transportation, applications, etc. Battery recycling is gaining momentum as the industry embraces the circular economy with a clear intent to save the environment and raw materials, which are expensive and little scarce. So we are getting into battery recycling.

Biotechnology is becoming the next big thing. Companies are adopting biotechnology to provide

solutions for challenges related to food, healthcare, energy, etc. It has the potential to produce organs (for organ donation) and to provide customised medication. It's a matter of scale now. Bioreactors play a big role in the success biotech with bioreactors of different sizes (miniature to very large size) being built. This is the next big thing in terms of automation.

So, there are new things, new markets which is good news. At the same time, limitation of workforce availability is triggering adoption of automation. It is a very interesting environment and a lot of things are changing.

How big the opportunity is in the battery recycling space?

When you look at the process, there are two fundamental things relevant. First, is the automatic disassembly of the battery and second is the manufacturing process from battery cells to milling to basically process (chemical) industry methods. This is a normal automation and not much of a challenge; now, it is more about heavy investments that is coming into this space.

At present, we still see 30-40 per cent of the cells produced are not of good quality; thus, there is a lot of scrap produced at the cell manufacturing stage. Sooner or later, because of circular economy, recycling plant will become a pre-requisite right next to the giga factory, which requires investment of millions of dollars. Recycling waste will be a profitable proposition for them.

How are you gearing up to tap the hydrogen industry?

Hydrogen, which is expected to play a key role in the future energy landscape and in the decarbonisation of energy-intensive industries, is a very interesting space. On one side you have established players (who have been dealing with industrial gases), on the other side you see a lot of start-ups who are working on solutions that can increase the usage of hydrogen in lot of new applications. Green hydrogen is very much relevant for India to produce eco-friendly steel, so you will have hydrogen unit close to steel mills. Here investments are already being made by industry players.

Companies are still experimenting with usage of hydrogen in transportation or household application, and there is still some uncertainty. But, one thing is clear that hydrogen is the media where you can store green electrical energy.

Festo has broad portfolio of solutions to support the industrial transformation of the hydrogen sector with the right technological innovations. This market has a huge potential.

How do you see India as a market?

In short and mid-term, we see India very positively. India is very well positioned in receiving foreign investments as it has a good combination of accessibility to latest technology and talented labour force, which has open mind-set. India will benefit a lot with everybody applying the concept of "local for local" or "regional for region". Companies have realised the need to have supply chains more resilient in all dimensions and directions, which will certainly benefit India. That's why Festo has invested heavily in India and continues to do so.

We are building a new plant in India at Hosur, Tamil Nadu, and will bring a broad set of products to meet local requirements. The new plant, which is close to the main Indian site in Bengaluru, will create the conditions for further growth in India over the next few years and help us to secure the supply chain for the entire Asian market. The first phase of the new plant is expected to become operational next year.

We are looking at new demand trends and will manufacture as much as possible in India. We already have a lot of process automation related products in India, and along with manufacturing tasks we also bring engineering solutions that are the key. If you really want to be successful in markets, you need to offer end-to-end solution from engineering to manufacturing to your customers.

We want to expand capacity and the product portfolio with the new plant, which will manufacture automation products like cylinder valves, process equipment, etc. Though it will primarily cater to the requirements of the domestic market, the plant will also export products.

With the Indian government providing lot of incentives for local manufacturing, what it means to companies like Festo?

Access to technologies and governmental support programs present a good environment for start-ups who use their brain power to find a smart way to invent something new. It is important for us to be close to this environment. Not all of these start-ups will become a large size company, but it is important to listen to them as they have many smart ideas, which can be potentially good business proposition for the future.

From Festo's perspective, we just follow our customers. India is gaining prominence in the manufacturing space and global companies are looking at it as a reliable sourcing partner. As Indian companies invest in new ideas and technologies, it presents good opportunity to us for growth. Being closer to the market, we can understand the requirements of our customers much better and provide solution faster.

SME



Wireless Revolution on Factory Floor

Guiding the AGVs effectively relies on good communication between the automated guided vehicles (AGVs) and the factory's control system. This case study discovers how HMS Networks' wireless expertise and Anybus products took Mercedes-Benz's AGV installation to the next level.



Safety first. From January 2027, all AGVs must comply with the 2006 EU Machinery Regulation (EU) 2023/1230

When Mercedes-Benz wanted to expand their Automated Guided Vehicle (AGV) installation, they called HMS. HMS provided the wireless expertise, products, and hands on support to ensure the AGVs moved efficiently and safely around the factory.

About Mercedes-Benz

Mercedes-Benz, a globally recognized automotive manufacturer, is renowned for its innovative technology, craftsmanship, and luxury design. At their state-of-the-art automotive factory in Ludwigsfelde, over 70 AGVs move automotive parts to the assembly line. These AGVs transport everything from heavy engines to smaller electronics across distances ranging from 300 to 800

meters. Each AGV is equipped with an on-board Programmable Logic Controller (PLC) from Siemens or Schneider Electric, which ensures their efficient and safe navigation.

Good communication is key

Guiding the AGVs effectively relies on good communication between the AGVs and the factory's control system. This communication enables the factory to track the AGVs' whereabouts, cargo, and real-time status.

Mercedes-Benz's previous AGV system used Bluetooth technology and HMS' Anybus Wireless Bolt and Anybus Bridge products. However, they wanted to improve the system's efficiency and be able to comply

with the Machinery Regulation (EU) 2023/1230, which becomes mandatory in January 2027. Maximilian Lichan explains: “While Bluetooth worked well, we now want to enhance our AGV system to support higher throughput, fast roaming, and lower latency. We also need to comply with the soon-to-be mandatory EU safety regulations. Equally important, we want the equipment and experts from the same company, and we want them to come onsite, install the equipment, and verify that everything works”.

Time to see how HMS helped implement a wireless system to meet the needs.

HMS wireless experts pave the way

Mercedes-Benz provided key information, such as floorplans, to HMS’ wireless experts. Using this information, HMS first conducted a predictive site survey to determine the optimal placement and number of access points required. HMS then visited the factory to verify the accuracy of the survey and make any necessary adjustments.

Mercedes-Benz used the updated predictive site survey to install the required power outlets and network cabling. Once the required infrastructure was in place, HMS returned to install and configure the Anybus Wireless products before verifying that the installation worked as planned.



HMS’ wireless experts were onsite to ensure the installation worked as planned.

Anybus wireless products

The wireless infrastructure uses Anybus Access Points powered by Anybus PoE L2 Managed Switches, with an Anybus Wireless Bolt II mounted on each AGV. The Anybus Wireless Bolts handle communication from the AGVs to the traffic control system and connect to the 12 different access points in the factory’s ceiling. As an AGV moves out of range of one access point, it transitions to the next, ensuring uninterrupted



Access Points were strategically placed around the factory to ensure seamless connectivity.

communication.

A critical aspect to the project’s success was the utilisation of the 5GHz frequency band, while the Bolt II’s similarity to its predecessor also simplified the installation. Maximilian explains: “We wanted to use the 5GHz frequency band where we have four dedicated channels that didn’t interfere with our existing systems. It was also convenient that the Bolt II fits in the same hole as the original Bolt”.

The results

With the wireless expertise of HMS and their Anybus Wireless products, Mercedes-Benz successfully achieved its goal of efficient and safe transportation of goods within the factory. Maximilian happily reflects on the outcome:

“Everything worked as we hoped. The connection is very stable, and we are now able to comply with the safety machinery regulation. The support for more bandwidth has even allowed us to manage and configure the AGVs remotely, which, while not a key objective is a nice bonus”.

Finally, what are your tips to users who are thinking of going wireless?

“A key factor for us was that HMS were on hand to design and install the wireless infrastructure. That was important for us. We wanted to have wireless experts onsite to ensure that everything went smoothly. We’re not wireless experts, HMS are. We make cars, which you probably already knew,” Maximilian adds with a smile. **SME**

Courtesy: HMS Networks AB – a provider of solutions in industrial information and communication technology (Industrial ICT).

HMS develops and manufactures products under the Anybus, Ewon, Intesis and Ixxat brands. Headquartered in Halmstad (Sweden), HMS employs over 780 people and reported sales of SEK 2,506 million in 2022.

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Machine Vision: Growth Drivers

While many new vendors are entering the machine vision market, global corporations are investing in acquiring technology and expertise in each of the machine vision component sectors, says **Jonathan Sparkes**.

The global machine vision market is expected to return to growth in 2024, expanding by around 1.4 per cent this year. This is partially due to the continued growth of the 3D camera market, but is also a result of a return to growth in key machine vision consuming sectors (such as semis and electronics), which are expected to perform better in 2024 than the wider manufacturing industry. However, growth for some is also stimulated by acquisition, as companies seek opportunities to broaden their machine vision portfolio in order to offer customers a more complete solution. This trend, which is common across all facets of industrial automation, seems to be especially prevalent in the machine vision market right now.

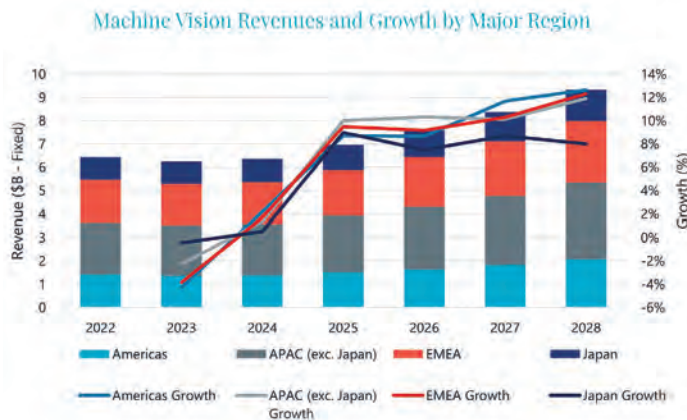


Figure 1: Region-wise growth in machine vision revenues

Source: Interact Analysis

The Figure 1 shows growth by major region and we anticipate that by 2028 the Americas and EMEA will have the largest growth, at 12.6 per cent and 12.3 per cent respectively. We see this growth potential as a result of the continued partnering and acquisition culture among large machine vision vendors. Companies are looking at ways to expand their portfolio to develop a full offering and a solution-based service to customers. While there are many new vendors entering the machine vision market, global corporations investing in acquiring

technology and expertise in each of the machine vision component sectors.

Table 1: Share of major companies in the global machine vision market

World Market Share - Total Machine Vision Products (\$US M)								
2023 Rank	2022 Rank	Company	2022 Revenue	2023 Revenue	2022 Share	2023 Share	Gain/Loss	
1	1	Keyence			13.5%	14.5%	1.0%	
2	2	Cognex Corporation			12.0%	11.0%	-1.0%	
3	3	Teledyne Imaging			7.0%	7.0%	0.0%	
4	4	TKH Vision			7.0%	7.0%	0.0%	
5	5	Hikrobot			5.5%	6.0%	0.5%	
6	6	Basler			4.5%	3.5%	-1.0%	
7	7	Omron			2.5%	2.5%	0.0%	
9	8	Baumer Optronics			2.0%	2.0%	0.0%	
8	9	OPT			2.0%	2.0%	0.0%	
11	10	Zebra Technologies			2.0%	1.5%	-0.5%	
10	11	SICK			1.5%	1.5%	0.0%	
12	12	CCS			1.5%	1.5%	0.0%	
13	13	Toshiba TEL			1.5%	1.5%	0.0%	
14	14	IDS Imaging Development Systems			1.0%	1.0%	0.0%	
15	15	Vieworks			1.0%	1.0%	0.0%	
		Others			37.0%	37.0%	0.0%	
Total Market Size			6,445	6,219	100.0%	100.0%		

Source: Interact Analysis

Table 1 shows the percentage share the top 15 machine vision vendors had globally in both 2022 and 2023. While it demonstrates very little movement in terms of positioning, it does show some companies, such as market leader Keyence, increasing market share with a strong performance in 2023.

Cognex Corporation, headquartered in the US, made the decision in August 2023 to acquire Japanese optics components specialist Schott-Moritex for a fee of around \$ 275 m. Scott-Moritex has a strong presence in Japan and the acquisition will give Cognex a greater footing in the Japanese market, while also increasing its lens capabilities. The additional income from Scott-Moritex will help Cognex grow its market share in 2024 and beyond.

Teledyne Imaging, headquartered in Canada, is already a large multi-company corporation that has made many substantial acquisitions in recent years to grow and supplement its machine vision portfolio. In February 2024, Teledyne Imaging announced it would be acquiring Netherlands-based camera manufacturer Adimec



Companies are looking at ways to expand their portfolio to develop a full offering and a solution-based service to customers.

Holding B.V for an undisclosed fee. Adimec specialises in customized high-performance industrial and scientific cameras that solve applications where image quality is of greatest importance. This acquisition will further supplement Teledyne Imaging's large portfolio and allows it to further grow its market share going forwards, strengthening its presence in the EMEA market.#

TKH Vision, headquartered in the Netherlands, is also a very large corporation that has acquired many supplementary vision companies in recent years. TKH's individual companies include: Allied Vision (Germany), which specializes in area scan cameras; LMI Technologies (Canada), which specializes in 3D laser-triangulation cameras; Chromasens (Germany) which specialises in Line-Scan cameras; SVS-Mikrotron (Germany) which specialises in high-end and high-speed cameras; NET (Germany) which specializes in machine vision components; Nerian (Germany) which specialises in 3D stereo cameras; and Tattile (Italy), which focuses

on area-scan, line-scan and smart cameras. TKH has a strong presence already in the EMEA region and, with further acquisitions, it will continue to strengthen its position as a leading machine vision vendor.

Despite a recent flurry of activity, with a relatively fragmented vendor base, Interact Analysis expects further consolidation and acquisitions for the machine vision industry in the future, enabling vendors to provide a complete solution to customers, rather than having to combine their products with other suppliers' technology. When speaking to vendors, they have said customers are increasingly looking for a complete solution to be provided, or a one stop shop where all future maintenance and services can be met by one company instead of several. The growth in automation in general is allowing new companies to enter the market with strong new products or designs and grow significantly. Meanwhile, long-standing and large vendors look to these new and exciting products to supplement and grow their portfolios.

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About the author:

Jonathan Sparkes is the Research Analyst at Interact Analysis. A thoroughly professional, analytical, and highly educated researcher, Jonathan gained his analysis and modelling skills from a Bsc in Mathematics. He works in our industrial automation sector with a focus on machine vision and is particularly interested in how technology can be used to improve systems

News Snippet

Robotics promises big productivity gains in auto industry: GlobalData

In a dynamic era of technological advancement, the automotive industry stands at the precipice of a revolution driven by robotics, as per GlobalData's new research report, "Robotics in Automotive". With automation at its core, robotics is reshaping the landscape of automotive manufacturing, driving efficiency, precision, and innovation, the report says. From assembly line optimisation to the development of autonomous vehicles (AVs), robotics has significantly impacted the automotive industry, says GlobalData.

GlobalData's latest report provides an overview of the "robotics" theme and identifies automotive challenges, such as ESG, CASE megatrends, geopolitics, labour shortages, cost efficiency, high inflation, and supply chain disruption, and an impact assessment of



robotics on the automotive industry, addressing these challenges. Joseph Simpson, Associate Thematic Intelligence Analyst at GlobalData, comments:

"Automation is the fastest way to improve productivity for automotive manufacturers. In factories, plants, and

warehouses, human staff work alongside robots that are incredibly good at performing repetitive and dangerous tasks but do not look or behave like humans. Integrating robotics in automotive manufacturing has increased precision, reduced human error, and improved safety conditions."

Furthermore, the advent of AVs has deepened the role of robotics in the sector, requiring sophisticated artificial intelligence (AI) technologies for navigation and decision-making.

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GenAI: Manufacturers' Choice

According to Rockwell Automation's Global State of Smart Manufacturing Report, AI ranks as the top capability that manufacturers believe will drive the biggest business outcomes. 83 per cent of manufacturers expect to use generative AI (GenAI) in their operations in 2024.



GenAI emerges as top tech investment for manufacturers and 94 per cent expect to maintain or expand their workforce, according to Rockwell Automation's State of Smart Manufacturing Report, which surveyed more than 1,500 manufacturers across 17 of the leading manufacturing countries. This year's report reveals a focus on harnessing new and emerging technologies to build resiliency, improve quality, maximise workforce potential, and drive sustainable growth.

"A skilled workforce is the cornerstone of any successful manufacturing operation, but attracting, managing and retaining workers is proving to be an ongoing challenge," said Cyril Perducat, senior vice president and chief technology officer, Rockwell Automation. "The survey found technology alone is not the answer. To remain competitive, manufacturers need to focus their staff on embracing new technology as a core part of their evolving organizational culture, creating a technology/worker partnership that drives their business forward."

Key global findings of report include:

- AI ranks as the top capability that manufacturers believe will drive the biggest business outcomes. 83% of manufacturers expect to use generative AI (GenAI) in their operations in 2024.
- 95% of manufacturers are using or evaluating smart manufacturing technology – up from 84% in 2023.
- 94 of manufacturers plan to maintain or grow their workforce due to smart manufacturing technology adoption, with a heavy focus on repurposing workers to new or different roles

and/or hiring more workers.

Change management is the leading workforce-related obstacle for manufacturers in 2024.

Manufacturers cite "improved quality" as the top positive outcome they hope to achieve from existing smart manufacturing technology for a second consecutive year. Additionally, "quality control" ranks as the #1 AI/Machine Learning use case in 2024.

For the first time, cybersecurity is listed as one of the top five external risks for manufacturers in 2024, ranking third overall.

"The workforce of 2019 is not coming back," said **Allison Kuhn**, Principal Analyst, LNS Research. "Developing a sustainable workforce strategy is critical to successfully navigate daunting manufacturing challenges. Leaders are winning the war for talent by embracing this new reality and with a laser focus on three imperatives: 1) Total Employee Experience, 2) Servant Leadership, and 3) Connected Frontline Workforce (CFW) Applications."



Manufacturers cite "improved quality" as the top positive outcome they hope to achieve from existing smart manufacturing technology.

Manufacturers continue to face a significant challenge: combining people, processes, and technology to drive long-term business growth and resilience. According to the report, around one-third of manufacturing leaders cite "matching technology and talent to business need" and "effectively managing people and resources" as the biggest obstacles their organisations face over the next year. Manufacturers can overcome this challenge by selecting a partner with relevant industry expertise and experience who can provide tailored solutions and support in aligning technology and talent with business objectives.

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“Dormer Pramet has ambitious plans for India.”

Dormer Pramet is a leading global supplier of metal cutting tools and related services. With their two global product brands, Dormer and Pramet, the company can boast more than 150 years of specialist cutting tool knowledge and experience. Dormer Pramet’s huge variety of rotary and indexable tooling can meet virtually all hole-making, turning, milling and threading needs, from one single, simple source. Furthermore, following the acquisition of Miranda Tools in December 2020, we have expanded our operations to include a manufacturing facility in Ankleshwar, Gujarat. **Amit Raina, Country Manager for India, Dormer Pramet**, in this interview with Rakesh Rao, shares the company’s expansion plans in India.

Please brief us about Dormer Pramet’s presence in India and its acquisition of Miranda Tools?

In 2020, Dormer Pramet acquired the plant of Miranda Tools located in Ankleshwar, Gujarat. This acquisition bolstered our presence in India, where we operate our sole manufacturing facility in India. Our Ankleshwar plant specialises in the production of high-speed steel cutting tools, catering to industries such as automotive, heavy engineering, and metalworking. While previously our tools were primarily sourced from our European Distribution Centre, the Ankleshwar facility now fulfils specific product lines, alongside supplies sourced from our European distribution centre. Globally, Dormer Pramet operates three dedicated manufacturing facilities: one in Ankleshwar, India; another in Sao Paolo, Brazil; and the third in Šumperk, Czech Republic.



Could you elaborate on the synergy between the two companies (Miranda Tools and Dormer Pramet) and the subsequent benefits realised by you?

For Dormer Pramet, establishing a presence in the Indian market was paramount. Globally, Asia has emerged as a significant region in comparison to Europe and America. Dormer Pramet’s footprint in Asia has been relatively modest, making the acquisition of Miranda crucial for expanding our presence in the region. Miranda not only provides us with production capacity but also serves as a strategic foothold in Asia. Our

Ankleshwar plant is now fully integrated, manufacturing not only Miranda products but also Dormer Pramet and other brands. The synergy between Dormer Pramet and Miranda strengthens our position as one of the leading companies in high-speed steel (HSS) products such as drills and taps. Miranda’s competitive production facility in India, serves as a launchpad for our growth in Asia.

What are the current challenges encountered by manufacturers in India? What solutions does your company offer to address these issues?

Indian manufacturers face constant price pressure due to the competitive environment. India’s substantial population of 1.4 billion makes it an attractive market for global players across various sectors, including cutting tool manufacturing and automotive. This intensifies the pressure on pricing. In response, manufacturers must focus not only on cost but also on productivity to remain competitive. Automation is increasingly becoming necessary to enhance productivity, reliability, and quality. Consequently, there is a growing trend of integrating automation solutions to optimise production processes and reduce overall costs. Global & local integrators, are emerging as key players in this domain.

From Dormer Pramet’s perspective, offering a wide range of products is crucial. Unlike many competitors who specialise in specific types of cutting tools, Dormer Pramet provides a comprehensive portfolio, covering

everything from HSS to high-end robotic machines. This breadth allows Dormer Pramet to serve as a one-stop solution provider, catering to diverse customer needs across different price points and performance levels. Given the varied equipment setups in today's manufacturing facilities, Dormer Pramet's versatility ensures it can address the requirements of clients operating everything from conventional to CNC and robotic machines. This comprehensive approach underscores Dormer Pramet's commitment to delivering value to its customers.

Kindly share with us the R&D initiatives undertaken by your company for machine manufacturers?

Lightweighting constitutes a key aspect of the overarching solution. It is driven by two primary factors: energy efficiency and additive machining. Additive machining enables the creation of parts with more integrated designs, consolidating multiple components into a single piece. This process contrasts with subtractive machining, where material is removed from a block to achieve the desired shape, often resulting in significant material wastage. With additive machining, the need for excess material is minimised, leading to more efficient utilisation. Consequently, the weight reduction of components is substantial.

Traditionally, cutting tools utilised in subtractive machining are being replaced by more efficient alternatives suited to additive processes, such as semi-finish and round tools. This shift not only optimises material consumption but also enhances precision and accuracy in manufacturing. As part of our commitment to lightweighting, we are actively expanding our tooling portfolio to meet evolving industry demands, particularly in semi-finish applications. Our strategic focus also involves enhancing retention capabilities and elevating our product offerings to align with future requirements.

The government has announced significant investments in sectors like railways, defence, electronics, etc. What opportunities does your company anticipate in these areas?

Regarding railway projects such as Vande Bharat and others announced by the government, significant investments are anticipated. We are actively engaged in numerous ongoing projects within this sector, leveraging our expertise as a core strength. Our company maintains a dedicated railway track catalogue showcasing innovative solutions.

With extensive experience in European and other global markets, particularly within the railway segment, we are well-positioned to provide tailored solutions to

our customers. We are optimistic about the abundant opportunities emerging in India and beyond, especially considering the current and forthcoming projects in the railway sector. Notably, there is a noticeable interest from both private and government entities in manufacturing wheels and tracks, presenting promising prospects for our involvement. Recognising the shortage of wheels in ongoing projects, we view this as a significant opportunity. While confidentiality restricts us from elaborating on specific projects, we are actively engaged in initiatives related to wheels, tracks, and other railway components, areas where we excel.

Defense, along with electronics, forms a pivotal sector for Dormer Pramet. As part of our strategic approach, we are aggressively pursuing mergers and acquisitions to enhance our portfolio in these segments. Our existing repertoire of aerospace products and clientele lays a strong foundation, with promising new products in the pipeline. Moreover, we are actively scouting for potential acquisitions globally, including in Asia and India, to optimise our operational efficiency.

What are your strategic growth initiatives for India?

Dormer Pramet has ambitious growth plans in Asia, with a specific focus on India, which is considered a key market. The acquisition of Miranda has provided a strong foundation for production and an extensive end user distribution network. Over the next three to four years, significant growth is anticipated in the Indian market.

Expansion plans for the Ankleshwar plant are currently underway, involving investments in machinery, automation, and vacuum furnaces. This process is being carried out incrementally, with a focus on technological integration and future-oriented planning. As Ankleshwar is now part of our global production network, efforts are being made to introduce advanced technology while considering future requirements.

Currently, some of our products are exported, while India serves as a significant sales entity, the plant operates as a global production hub, catering to markets worldwide. As capacity and technology are enhanced, this facility will contribute substantially to the Make in India initiative, potentially manufacturing a wide range of products for global distribution.

Regarding changes in end user industries, the railway sector is expected to see growth, although automotive remains dominant, accounting for 65-70 per cent of the market. While the railway sector may see a modest increase, automotive is likely to maintain its prominence in the India region. However, incremental growth opportunities are anticipated in the railway sector due to our specialised segment expertise, which can benefit our customers.



Food for ‘Green’ Thoughts

While environmentally friendly and ozone-friendly refrigerants provide a clear path forward for food manufacturing companies, their implementation carries certain system design and maintenance implications, writes **Emily Newton**.



Most food manufacturers are facing the critical decision of which alternative ozone-friendly refrigerants to adopt, leaving them with much to consider in a relatively short timeframe. Why are manufacturers rushing to adopt eco-friendly refrigerants?

What prompted the emergence of alternatives?

Numerous regulators and governments have outlined usage restrictions for synthetic refrigerants for decades. The Montreal Protocol, enacted in 1987, was the first significant step toward alternatives. It implemented an ozone-depleting substances (ODSs) phaseout after the discovery that chlorofluorocarbons (CFCs) were causing a hole in the ozone.

The Montreal Project allowed exceptions for seemingly ozone-friendly CFC alternatives called hydrofluorocarbons (HFCs). Their adoption rate surged in response in the late 1980s and early 1990s. Later, it emerged this chemical is hundreds to thousands of times stronger than carbon dioxide (CO₂), making it one of the most potent greenhouse gases on the planet.

The Environmental Protection Agency (EPA) accelerated the phaseout of ODSs in the 1990s and early 2000s under the authority of the Clean Air Act, primarily focusing on CFCs and hydrochlorofluorocarbons (HCFCs), which it categorizes as Class I and Class II substances. One of the latest moves by the U.S. government has been to ban R22 in 2020 — commonly known as Freon — after classifying it as an ODS.

As these regulations and agreements suggest, the push for eco-friendly refrigerants isn't part of a recent surge in sustainability awareness. Rather, it is part of a decades-long strategy to make industrial refrigeration systems more climate and environmentally friendly.

Why eco-friendly refrigerants are gaining traction

Actions to phase unsustainable refrigerants down or out made under the Clean Air Act, the Kilgari Amendment and the Montreal Project, among other regulations, have forced industry decision-makers to recognise temporary solutions are not viable.

Food manufacturers that switched from CFCs to HFCs to HCFCs in order to circumvent bans and rising prices quickly found their investments were misguided. They learned a costly lesson about system compatibility issues and diminishing supplies as the government continued progressing its phaseout strategy and changing its requirements.

The general public's rising sustainability awareness will prompt the US government to continue taking steps to tighten refrigerant regulations. Considering climate change-induced severe weather events — which have quintupled in frequency in the past 50 years — account for 74% of global economic losses, inaction would speak volumes.

As such, environmentally friendly and ozone-friendly refrigerants remain the only viable long-term solutions. Many food manufacturers are proactively adopting them



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Eco-friendly refrigerants are gaining traction in the food manufacturing sector.

to prevent the financial fallout related to cheap, temporary solutions.

Eco-friendly refrigerants are gaining traction in the food manufacturing sector partly because they help secure long-term economic stability and also to ensure manufacturers won't have to pay to overhaul their systems after a few years. That being said, they also possess various environmental and operational benefits.

The advantages ozone-friendly refrigerants offer

In food manufacturing, eco-friendly refrigerants are growing increasingly popular because they offer both operational and sustainability-related benefits while remaining cost-effective.

Blended refrigerants

Although blended refrigerants are not nearly as environmentally friendly as their natural counterparts, they're often more cost-effective — which has driven adoption by profit-minded food manufacturers.

R410, commonly known as Puron, is among the most common blended refrigerants. It has an ozone depletion rate of zero. While it has a GWP of 2,088 — and the Kigali Amendment to the Montreal Protocol requires a GWP of 300 to meet phase-down targets — research groups are looking into making it more environmentally friendly.

Natural refrigerants

Natural refrigerants are more cost-effective than synthetic alternatives like CFCs and HCFCs. Since they require less power — some are up to 40% more energy efficient than HFCs — they can even enhance system performance. Notably, low operating costs offset their relatively high installation costs since they require little upkeep and rarely leak.

These refrigerants are also the most climate and

environmentally friendly options available to food manufacturers. Ammonia, carbon dioxide and propane have low global warming potential (GWP) ratings of 0, 1 and 3, respectively — while synthetics commonly have ratings of over 3,000. Even blended alternatives are often rated relatively low in comparison.

The implications of alternatives in food manufacturing

While environmentally friendly and ozone-friendly refrigerants provide a clear path forward for food manufacturing companies, their implementation carries certain system design and maintenance implications. For widespread adoption to be successful, manufacturers must be considerate of them.

The main issue with natural refrigerants — and, to a lesser extent, blended alternatives — is toxicity. Manufacturers will have to contend with heightened safety requirements. Notably, flammability is less of a concern because hydrocarbons are far more flammable than ammonia or propane.

The largest implication of adopting ozone-friendly refrigerants is compatibility. Since many existing units won't be able to perform well — or at all — with drop-in replacements, many manufacturers will have to overhaul their systems. Additionally, factors like their intended operating temperature range or maintenance capabilities may limit their selection.



Servo motors are the favoured option for robotic applications because robots need accurate and effective movement.

The bottom line of eco-friendly refrigerants

While industry decision-makers didn't prompt the surge in popularity of eco-friendly refrigerants, food manufacturers shouldn't see it as a necessary compromise. Instead, they should embrace the change for its financial, operational and environmental benefits. If they're proactive in their adoption or research and development, they may even gain a competitive edge — and protect their investment for years to come.

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About the author:

Emily Newton is a tech and industrial journalist and the Editor-in-Chief of Revolutionized magazine. Subscribe to the Revolutionized newsletter for more content from Emily.



A Real 'Hothead'

Igus offers iglidur i230, its first 3D printing material for polymer components that withstands temperatures of up to 110°C.



A true all-rounder at high temperatures: the new SLS material iglidur i230 can even withstand temperatures of 110°C - and is also particularly bend-resistant and free of PTFE.

3D-printed polymer components will be able to resist much higher temperatures in future – in the engine compartment of a car, for example. While commercially available Selective laser sintering (SLS) printing materials threaten to deform at over 80°C, the new powdery material iglidur i230 from igus can withstand a long-term application temperature of 110°C. Furthermore, it is free of PTFE and around 80% more wear-resistant than the classic PA12.

More and more designers are turning to 3D printers to produce components quickly and cost-effectively, especially for small series and prototypes. Selective laser sintering is particularly popular. In this additive process, a printer melts plastic powder layer by layer to form components, such as a plain bearing. The problem is that components made from standard SLS printing materials such as PA12 are generally only used in applications with temperatures of 80°C or less. Beyond this limit, the material becomes soft and loses its dimensional stability. A no-go for many areas of application, for example for bearings in the engine compartment of a car, industrial plants or various air-conditioning and cooling systems.

"As the demand for 3D-printed plain bearings for applications with high ambient temperatures has increased, we have developed a new SLS printing

material called iglidur i230," said **Paul Gomer**, Material Developer in 3D Printing at igus. Tests in certified external laboratories in accordance with DIN EN ISO 75 HDT-A and HDT-B have proven the heat resistance. Accordingly, the powdery printing material is suitable for long-term application temperatures of up to 110°C. It can even withstand extreme temperatures of up to 170°C for short periods without deforming. The material is also electrostatically dissipative and thus protects machines and systems from electrostatic discharges, which in the worst case can cause fires and explosions. Iglidur i230, like many other igus materials, is also free of PTFE.

80% more wear-resistant than PA12

Iglidur i230 is not only particularly temperature-resistant, but also withstands movement. Tests in the igus in-house laboratory have proven that the printing material is around 80 per cent more wear-resistant than PA12. "3D-printed plain bearings made from iglidur i230 have a significantly longer service life, increase the efficiency of machines, systems and vehicles and reduce the need for maintenance," said Gomer.



More and more designers are turning to 3D printers to produce components quickly and cost-effectively, especially for small series and prototypes.

At the same time, the material has around 50 per cent higher mechanical strength than PA12 at room temperature. In addition, the material withstood a pressure of 94MPa in bending tests. "This makes it possible, for example, to achieve the same component strength in plain bearings with a thinner wall thickness and to save room and weight in compact installation spaces," emphasises Gomer. Last but not least, users of the 3D-printed plain bearings made of iglidur i230 can dispense with time-consuming relubrication work. Solid lubricants are integrated into the SLS printing material to ensure low-friction dry operation.

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Indian Battery Market: All Charged-Up!

Despite active responses from domestic companies and strong interest from overseas manufacturers in the Indian market, issues related to domestic industry protection and the business environment remain obstacles, resulting in relatively slow development of the domestic battery industry chain, says **Yvonne Zhang**.



The rapid expansion of the electric vehicle and energy storage markets in India is driving development of the domestic battery industry. However, insufficient capacity of domestic battery cell production and shortages of raw materials have become key factors limiting its growth. In order to break this deadlock, the Indian government has introduced incentive policies aimed at accelerating the localisation of battery cells, attracting domestic and foreign companies to invest in building battery factories. Despite active responses from domestic companies and strong interest from overseas manufacturers in the Indian market, issues related to domestic industry protection and the business environment remain obstacles, resulting in relatively slow development of the domestic battery industry chain.

India's domestic electric vehicle market is flourishing

In 2019 the Indian government's NITI Aayog policy think tank set a target to increase the proportion of electric passenger vehicles to 30 per cent and electric commercial vehicles to 70 per cent by 2030, and the Indian government began promoting the development of electric vehicles more actively in 2021, after signing the Paris Agreement on climate change. However, despite government support and rising global demand for new energy vehicles, actual progress has been relatively slow.

In order to protect the domestic automotive industry, the Indian government has imposed high tariffs on

imported electric vehicles: tariffs of up to 70 per cent for imported electric vehicles priced below \$ 40,000, and tariffs of 100 per cent for those priced above \$ 40,000. Although this was intended to encourage overseas manufacturers to localize production, the result has been to deter leading electric vehicle manufacturers such as Tesla. This has contributed to a slow development process in the Indian electric vehicle market, particularly given the relative weakness of domestic manufacturers. As of 2023, the penetration rate of electric vehicles in India was only 6.6 per cent, with electric passenger cars accounting for approximately 1.7 per cent of the market, falling significantly short of targets. However, this also implies significant untapped potential in the Indian electric vehicle market.

As shown in the figure below, the electric vehicle market in India is still dominated by electric two-wheelers and three-wheelers, with electric four-wheelers and electric buses accounting for a relatively small proportion. Although from 2019 to 2023 the CAGR of these two categories exceeded that of electric two-wheelers and three-wheelers, reaching 102 per cent, it was not until 2023 that the combined proportion of electric four-wheelers and electric buses surpassed 5 per cent.

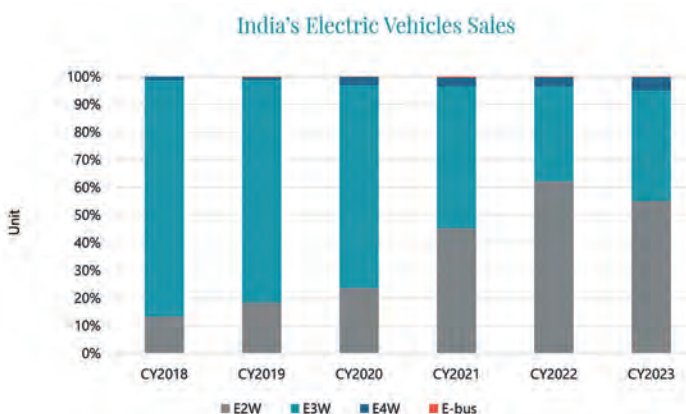


Figure 1: India's electric vehicle sales

Source: SMEV

At the end of 2023 the Indian government stated its intention to gradually implement policies that will reduce import duties on vehicles, but specific details and implementation plans have not yet been released. With the policy still unclear, leading electric vehicle manufacturers like Tesla are still in wait-and-see mode. However, the potential of the Indian electric vehicle market has also attracted some automakers to enter the scene. For instance, in February of this year Vietnamese electric vehicle company Vinfast announced the start of construction on its automotive factory in southern India.

The potential of the energy storage market is enormous

According to a report by the Central Electricity Authority (CEA) of India, it is predicted that by 2030, the demand for energy storage in India will reach 60.63 GW/336.4 GWh, including pumped hydro storage of 18.98 GW/128.15 GWh and electrochemical storage of 41.65 GW/208.25 GWh.

In recent years, the Indian government has introduced a series of incentives aimed at promoting the development of new energy storage technologies. In September 2023, the Indian government approved a scheme called the Viability Gap Funding (VGF) program, which provides a subsidy of 40 per cent of the deployment costs for the winning bidders of energy storage projects through competitive bidding, aiming to reduce the deployment costs of energy storage.

Additionally, the Indian government has allocated funds to support the deployment of approximately 4 GWh of battery energy storage systems, primarily targeting distribution companies, with winning projects required to be operational within 18 to 24 months (for more details, please see Will India achieve its ambitious energy storage goal?).

Interact Analysis' recent report PCS in battery energy storage systems forecasts that by 2030 India is poised to become the world's third-largest electrochemical energy storage market, particularly within large-scale energy storage technologies such as wind-solar hybrid systems.

The lithium-ion battery market in India faces limited production capacity. With the gradual expansion of the electric vehicle and energy storage markets in India, the Indian battery market is facing numerous challenges and is unable to meet the demands of businesses.

Firstly, the domestic market lacks raw materials. India does not possess abundant lithium mining resources. According to data from the Indian Ministry of Commerce, from April to December 2023, India imported lithium ores worth \$25.5 million, with imports from China accounting for 61.8 per cent. It wasn't until 2023 that India discovered lithium deposits domestically for the first time. Simultaneously, India is actively



The electric vehicle market in India is still dominated by electric two-wheelers and three-wheelers, with electric four-wheelers and electric buses accounting for a relatively small proportion.

seeking international cooperation to acquire more mineral resources. In January 2024, the Indian state-owned company KABIL signed a significant lithium exploration agreement worth 2 billion rupees with the Argentine state-owned mining company CAMYEN. Both parties will conduct lithium exploration activities in five blocks in Argentina.

Secondly, while domestic battery pack production has been rapidly expanding, the production capacity for battery cells remains relatively limited. Among the top ten battery companies globally, only Samsung SDI has a cell manufacturing facility in India with a capacity of 2 GWh, primarily catering to the consumer electronics market. In recent years, numerous companies such as Gotion, Sunwoda and Phylion have entered the Indian market and established pack assembly plants. With the widespread application of lithium-ion batteries in automotive propulsion, domestic manufacturers of electric two-wheelers and three-wheelers in India have also begun transitioning from traditional lead-acid batteries to lithium-ion batteries as their power source. However, due to the relatively small domestic battery production capacity, India still relies mainly on imports to meet market demand. According to data from the Indian Ministry of Commerce, from April to December 2023, India imported lithium-ion batteries worth \$22.5 million, with imports from China accounting for 84.5 per cent and imports from South Korea accounting for 10.8 per cent.

The Indian government promotes localisation

To meet the growing market demand and reduce dependence on imports, the Indian government is actively promoting the localization of battery cell production to enhance domestic battery capacity. In 2021, the Indian government officially included the Advanced Chemistry Cell (ACC) project in the Production Linked Incentive (PLI) scheme, allocating 181 billion rupees to incentivize battery companies to localize production in India through subsidies.

The planned production capacity is set to reach 50 GWh.

This incentive policy has proven effective. The first round of bidding for the ACC PLI concluded in March 2022, with three Indian companies securing a total capacity of 30 GWh: Ola Electric Mobility Pvt Ltd, an Indian electric vehicle company, obtained 20 GWh, while Reliance New Energy Ltd and ACC Energy Storage, a subsidiary of Rajesh Exports, each secured 5 GWh. These companies will establish factories in Krishnagiri, Tamil Nadu; Jamnagar, Gujarat; and Dharwad, Karnataka, respectively.

Starting from 2023, more domestic Indian companies and businesses from Korea and Japan have announced plans to build battery gigafactories in India. Panasonic plans to construct a 20 GWh factory, while LG Energy Solution and Indian steel conglomerate JSW plan to jointly build a 20 GWh facility. Tata Group's battery subsidiary, Agravas, announced plans to build a 20 GWh capacity factory in Gujarat. JSW has also announced an investment of nearly \$5 billion in the eastern Indian state of Odisha to build electric vehicle and 50 GWh battery projects.

Moreover, the second round of bidding for the ACC PLI commenced in January 2024, and it is expected that more companies will receive capacity allocations, further driving the development of India's battery industry.

Final thoughts

Countries and regions undoubtedly wish to build domestic supply chains, reduce dependence on imports and avoid falling behind in terms of industrial development. In Southeast Asia, countries like Thailand, Vietnam, and Indonesia have seen numerous electric vehicle and battery manufacturers actively expanding their presence, fostering a vibrant new energy industry. The Indian government announced a reduction in import tariffs for electric vehicles on March 15: vehicles priced above \$35,000 will enjoy a 15 per cent reduction in import duties over five years. Additionally, companies committing to invest over \$800 million will have a total import quota of 40,000 electric vehicles, with 8,000 vehicles permitted annually. This sends a positive signal, creating a more favorable environment for the domestic battery industry.

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About the author:

Yvonne Zhang is the Research Associate at Interact Analysis assisting the research team with organising, interpreting findings, and enhancing product outputs. She has a master's degree in Finance and has research experience in the Industrial Automation sector after her studies in the US.

News Snippet

TDK offers compact SMT transformers for gate driver applications

TDK Corporation (TSE:6762) presents two new types of the EPCOS InsuGate series (B78541A). These compact SMT transformers with high working voltage are suitable for gate driver applications for IGBTs and MOSFETs in e-mobility (qualification according to AEC-Q200 as well as according to AQG vibration profile) and in industrial electronics. The components with a MnZn ferrite core are designed for operating frequencies of 100 kHz to 500 kHz and operating temperatures of -40 °C to +150 °C. Depending on the type, the transformation ratios of the windings are 1:1.08 (B78541A2467A003) or 1:1.07:0.6 (B78541A2492A003). With a low coupling capacitance of only 4 pF, the SMT transformers are also suitable for use with SiC or GaN semiconductors.

Combining the highly resistive plastic material with a CTI ≥ 600 and the special coil design, shorter



clearances and creepage distances are possible compared to conventional insulated or potted components, despite the dimensions of only 13.85 x 10.5 x 9.2 mm (L x W x H). The UI7 platform, for example, offers creepage distances between primary and secondary windings of >9.2 mm. With a partial discharge

extinction voltage of at least 840 V (peak voltage) and AC high voltage testing at 3 kV (50 Hz, 1 s), the 2 g lightweight components meet IEC 61558 for reinforced insulation for working voltages up to 300 V (AC) or 700 V (DC) for basic insulation. This is sufficient for many industrial and automotive applications.

The new UI7 family includes two reference models to allow possible winding configurations for forward and push-pull topologies with the appropriate number of outputs.

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Collaborating to Create Value from Waste

Waste reduction is one of the key steps towards sustainability. Companies opt for recycle, reuse and refurbish waste to create value. Here, **R Jayaraman** explains the concept of waste pooling collaboratives (WPC) for profitable circular economy.

One of the key steps towards sustainability is the reduction of waste. I used my father's bicycle at IIT. It was at least 40 years old. Life cycle of the product would have been much more, but it got stolen one day, when I left it in a parking lot. My father used the umbrella which was handed over to him by my grandfather. The tradition and culture of using a product till its lifecycle is over is not new to Indian mores. Recycle, reuse, refurbish and use, are all a part of our culture. Now, these practices appear to have been prescient, in that, the sustainability movement has rediscovered them. Better late than never.

Reduction of waste can be achieved in many ways. By using the umbrella and the bicycle till their end of lifecycle, the need for new replacements has been postponed. What was used for maybe 50 years, could have been disposed of after 10 years, and a new one bought in its place. The waste here is the 'loss of lifecycle' or a 'shortened lifecycle'. To promote sustainability, citizens should use goods and services to the optimal. The word 'optimal' is used here because, towards the end of the lifecycle, the umbrella and the bicycle could need more maintenance, which would not be needed for the replacements. Thus, there is a 'tradeoff' situation. When productivity is increased – land productivity, labour productivity, capital productivity, etc. – more is being obtained from the use of fewer or lesser levels of resources. This is another way of contributing to sustainability. All these are known in the manufacturing industry and being practised in one way or the other. Reduction in waste leads to higher profit, and hence the impetus to the industry to drive this.

Encouraging circularity

Of late, another aspect of waste reduction has been identified. This is the 'circular economy'. The distinguishing features of this concept are: closed loop sharing of inputs for creating a finished product between consenting producers/ value adders; inputs should be 'wastes' generated in any of the producers; sell the



finished products in secondary markets or primary markets as per the usage of the 'waste'. A good example of a 'circular economy' is the one that can be built between automobile companies, scrap collectors, and steel plants. Steel plants produce the cold rolled sheets for passenger vehicles (PV's). At the end of their lifecycle, PV's are 'purchased' by scrap processors, who separate out the steel metal parts. These are then sold to the steel plants as scrap. The scrap is fed as input to either an electric arc furnace or a blast furnace, for steel making and producing cold rolled sheets. This closed loop system has been in operation for many years. Similarly, car tyre makers also have a tripartite system. It would thus appear that, at the simplest level, there are three players required for the 'circular economy' (CE) to become functional. The producer, the user or end customer and the intermediary, which performs as a bridge between the two.

In another form of CE, computer companies like Dell, Acer, Lenovo, HP sell computers to users. After use, they

sell the same to intermediaries. These intermediaries then either refurbish and sell the products in a secondary market, or they completely dismantle the product and sell the parts to various parts buyers, who then proceed to use them in their production, and sell to either secondary or primary markets.

In yet another form of circular economy, washing machine sellers buy back the used products, refurbish them or dismantle them, and make new products using these, and sell in markets as appropriate.

Thus, there are at least three types of CE's: the tripartite, the bipartite and the single party systems. There could be variants of these as well. The point is, the used product is put back to use, into consumption, or, reconsumption, with a bit of value addition. What are the benefits and problems with these systems? And, of CE itself? Is circular economy a sustainable practice? Does it really lead to reduction in waste? Does it lead to sustainability – if yes, then how?

Let us take an example. Plastic cans are used extensively. Where do they land up? Mostly in the sea. So new demand has to be met by new plastics production, and the same dumping after use will go on. So, in this case, if the used plastic had been given to an intermediary for processing, that party could have processed and sent out at least 60 to 80 percent of the goods received, which would have prevented the production of new plastic. Also saved in the quantity dumped. This CE system results in the reduction of waste to the extent of at least 60 to 70%, depending on the process efficiencies. In the case of cars, there was a time, when, in some countries, the used cars were dumped in the sea. Naturally, the CE in this product will save at least 80 to 90 percent of the waste. One reason for the cars dumping was that technology then prevalent did not allow for producing high quality steel using auto scrap. However, subsequent tech advances have made this possible. Thus, savings in the use of input materials, lower consumption of resources during production due to use of prepared inputs, a lower overall level of transportation due to handling of lower quantity, lower consumption of resources due to a lower level of production quantity are the benefits.

Waste pooling collaboratives

Sustainability is addressed due to all these lower levels of activities. Lesser resources consumption, lesser waste disposal into the sea etc., which help conserve fossil fuels wherever used, reduced consumption of inputs will lead to a lower level of exploitation of inputs sources. However, the one aspect which works against this whole system could possibly be the cost. Wastes are often obtained from retail markets, which means a higher cost of acquisition, costs incurred in



Tata Motors recently opened its vehicle scrapping facility in Delhi to dispose of used cars.

homogenization, separation and aggregation, etc. The additional costs incurred need to be compensated for or reduced as much as possible. One way of doing so is to create 'Waste Pooling Collaboratives' (WPC).

What are WPC? These are the agencies who undertake the work of aggregation of wastes of different types. Such collaboratives ensure adequate volumes of wastes for processing, which will reduce the cost. Using Industry 4.0 tools and techniques, the cost of such volume operations can be brought down, when compared with individual agencies collecting and processing small volumes. The pooling is a method to increase processing volumes, collaborative means the collection of wastes is done by several independent agencies. Such a collaborative has been seen recently in a Tata Motors facility in Delhi, where used cars will be scrapped. This is the fifth of such a facility of Tata Motors, where the scrap generated will be disposed of suitably. This is an instance of creating a method for making circular economy a viable proposition, and devise a system by which such wastes can be dealt with, to contribute to sustainability. It is suggested that more and more such economically viable systems are created speedily, so that CE can flourish.

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About the author:

R Jayaraman is the Head, Capstone Projects, at Bhavan's S P Jain Institute of Management & Research (SPJIMR). He has worked in several capacities, including Tata Steel, for over 30 years. He has authored over 60 papers in academic and techno economic journals in India and abroad. Jayaraman is a qualified and trained Malcolm Baldrige and EFQM

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Connected Cars: Revolutionising Transportation

Connected cars represent a paradigm shift in the auto industry, offering both car manufacturers and consumers a wealth of advantages. **Khalid Wani** lists four ways in which connected cars are revolutionising transportation.

In today's automotive landscape, cars are evolving beyond mere modes of transportation into interconnected hubs of technology. Connected vehicles leverage a variety of digital features and technologies to enhance safety, convenience, and overall driving experience.

Connected cars represent a paradigm shift in the auto industry, offering both car manufacturers and consumers a wealth of advantages. Enhanced safety features through V2X technology enable real-time information sharing, facilitating improved route planning and accident prevention. Advanced Driver Assistance Systems (ADAS) provide crucial alerts and interventions, such as emergency braking and lane-change warnings, enhancing driver safety.

1. Empowering smart cities and governments

The impact of connected vehicles extends beyond individual drivers to benefit entire communities and government entities. Municipalities can leverage data from connected vehicles to optimise traffic management, identify high-risk areas prone to accidents, and even detect road hazards like potholes. This data-driven approach enhances overall urban planning and infrastructure development.

2. Storage solutions for the digital age

The influx of connected features in automobiles necessitates robust storage solutions. With cars becoming data centers on wheels, substantial amounts of digital storage are required to support features like OTA updates and in-vehicle autonomy. Automotive OEMs must adopt thoughtful data strategies to ensure seamless operation across diverse environmental conditions and usage scenarios.

3. Continued innovation and adaptation

As the automotive industry evolves, the demand for connected features will continue to grow. By 2025, a significant proportion of new vehicles sold globally will support advanced autonomy levels. This trajectory



Connected vehicles exemplify the convergence of mobility and data-driven technology.

underscores the critical need for ongoing innovation in storage technologies to meet the evolving requirements of connected cars.

4. The future of mobility and data

Connected vehicles exemplify the convergence of mobility and data-driven technology. As cars evolve into sophisticated digital platforms, the importance of data management and storage will only intensify. The storage industry must remain agile, delivering solutions that align with the dynamic needs of the automotive sector to enable safer, more efficient transportation experiences for everyone.

Shifting gears

In conclusion, the shift towards connected cars signifies a transformative journey within the automotive industry. By embracing connectivity and harnessing data effectively, stakeholders can unlock new levels of safety, efficiency, and innovation in modern transportation. **SME**



About the author:

Khalid Wani is the Senior Director – Sales, India, at Western Digital.

Western Digital is an American computer drive manufacturer and data storage company, headquartered in San Jose, California.



UNNATI 2024: Putting North East on a Growth Path

By incentivising new industrial units and those undergoing substantial expansion, Uttar Poorva Transformative Industrialization Scheme (UNNATI), 2024 paves the way for an economy built on performance and innovation. **Aishwarya Jaju** and **Neha Satte** shed more light on the scheme.

Government of India has approved the Uttar Poorva Transformative Industrialization Scheme (UNNATI), 2024 on 9th March 2024. With a tailored approach, it is designed to boost industrial eco-system in the region and attract new investments. By incentivising new industrial units and those undergoing substantial expansion, UNNATI paves the way for an economy built on performance and innovation. This central government scheme is effective from 09 March 2024 to 08 March 2034 and additional 8 years for committed liabilities. The scheme has proposed a total financial outlay of Rs 10,037 crore. Further, the Scheme is divided into two parts i.e., Part A and Part B. Where Part A caters to the incentives to the eligible units, Part B is for the implementation and institutional arrangements for the scheme.

All 8 North Eastern-States are covered, namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura. The districts in these states are further classified into Zone A (Industrially Advanced Districts) and Zone B (Industrially Backward Districts) for granting the incentives.

The scheme is being launched on the same lines as the Central Scheme for Industrial Development of Union Territory of Jammu & Kashmir which received a particularly good response from the industries.

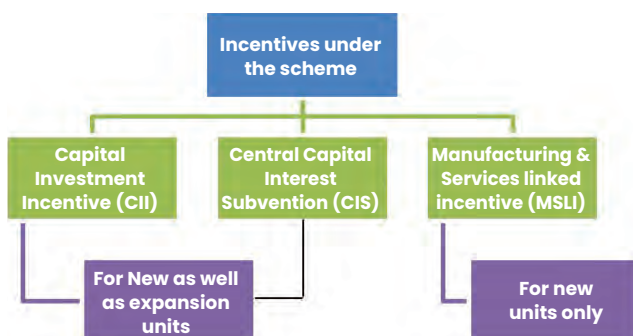


Figure 1: Benefits under the Scheme

Who are the beneficiaries under the scheme?

Units are defined as industrial manufacturing entity or service sector enterprise registered under GST excluding the Industrial Unit in which Government has more than 50 per cent stake/shareholding. In case of manufacturing sector, the scheme mentions a Negative List of Products like cement, plastic, etc. which are not conducive for the environment of the north-eastern region. Whereas for service sector, the scheme shall be applicable only for services listed in the Positive List which majorly includes sectors that generate employment opportunities and tourism.

Following are the minimum investment criteria:

- Manufacturing sector - Rs 1 crore in plant and machinery
- Service sector - Rs 50 lakhs in building and other durable fixed assets
- Micro industries - Rs 50 lakhs for both manufacturing and service sector

Registrations under the scheme have commenced from 9th March 2024 and will continue till 31st March 2026. It is to be noted that merely applying for registration will not entitle any applicant to claim incentives under this scheme. The registration will be granted by the competent authority as laid out in the guidelines, which will, inter alia, consider the prima facie eligibility of the unit and availability of approved funds.

What are the benefits under the scheme?

1. Capital Investment Incentive:

This incentive can be availed by new units, as well as Expanding units in both Zone A and Zone B. Eligible Capital Investment (ECI) is investment made in plant and machinery (for the manufacturing sector) or for construction of building and installation of other durable physical assets (for services sector).

2. Capital Interest Subvention:

Table 1: Quantum of Capital Investment Incentive

Zone	Incentives
Zone A	30% of the ECI with a maximum limit of INR 5.00 crore
Zone B	50% of the ECI with a maximum limit of INR 7.50 crore
<i>Those sectors on which GST is not applicable, the maximum incentive cap would be a higher limit of INR 10 crore.</i>	

This incentive can be availed by new units, as well as Expanding units in both Zone A and Zone B. Interest on loan up to the principal amount of Rs 250 crore for investment in eligible plant and machinery (for manufacturing sector) or building and all other durable physical assets (for service sector) shall be eligible for interest subvention. In cases where the total principal amount of loan is more than Rs 250 crore, then amount exceeding Rs 250 crore would not be eligible.

Quantum of Incentive: All eligible units can avail interest subvention at the annual rate of interest of 3 per cent for Zone A and 5% for Zone B for a maximum of seven consecutive years from any date after the date of application for registration under this scheme.

The eligible amount of incentive will be disbursed only after the commencement of commercial production. Further, this incentive is applicable only on the loans availed from Scheduled Commercial Banks or Financial Institutions registered with Reserve Bank of India.

3. Manufacturing & Services Linked Incentive:

Only new units will be eligible for this GST linked incentive. The upper limit of incentive under this component shall be 75% (for Zone A) and 100% (for Zone B) of the eligible value of investment made in plant and machinery (for manufacturing sector) or construction of building and other durable physical assets (for services sector).

Quantum of Incentive: Incentive will be equal to 100% of the Net payment of GST, i.e., GST Paid less Input Tax Credit, for a maximum of 10 years from the date of commencement of commercial production/operation or till the validity of the scheme whichever is earlier. However, GST paid on exported goods or services will not be counted towards eligible incentive amounts under this component.

Maximum eligible benefit to one unit from all scheme components i.e., capital subsidy, interest subvention and GST linked incentive is INR 250 crore.

Case study

Let us take an example for better understanding of the incentives offered

Let us assume the following parameters (refer Table 2) for a new manufacturing unit set up in Zone B-

Table 2: Parameters for computing incentives

Particulars	Amount
Total Investment	INR 50 crore
Investment in Plant & Machinery	INR 40 crore
Term Loan for 10-year period	INR 30 crore
Annual Turnover (10% growth)	INR 75 crore
Purchases (10% growth)	INR 60 crore
GST rate applicable	18% (on sale and purchases)

In this case, benefits as shown in Table 2 will be available.

Table 3: Calculation of Incentives

Particulars	Calculation	Amount (10 years)
Capital Investment Incentive	50% on 40 crore (max 7.5 crore)	INR 7.5 crore
Interest Subvention	5% annual rate of interest	INR 9.6 crore
GST Linked Incentive	100% of net GST	INR 40 crore
Total		INR 57.10 crore approx.

So, the example (refer Table & 2) highlights that on Rs 50 crore investment, approx. 100 per cent of the investment can be recovered back in the form of incentives.

For all the enterprises including MSMEs, planning to diversify and further expand their operations can look at the north-eastern region as one of the feasible options for investment and especially for industries which are already flourished in these regions like paper, agro and food processing, etc. Units can recover almost 100% of the project cost back over a 10-year period through available incentives.

This is indeed a welcome step by the Government of India for the development of the north-eastern region and the units should reap the benefits of the scheme and maximise their potential.

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(Views expressed above are personal)

About the author:

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HVAC: Green Wave

HVAC systems, crucial for maintaining indoor comfort, have long relied on fossil fuels, raising concerns about environmental impact and energy efficiency. Even so, a transformative moment, aptly called the “Green Wave” is reshaping the HVAC sector, says **Kishore Patil**.

The urgency to tackle climate change and cut down on greenhouse gas emissions has pressed governments, businesses, and individuals to actively pursue sustainable options in many areas, while buildings are being among the most significant contributors to global energy usage and carbon output. The International Energy Agency (IEA) reports that buildings consume a staggering 36 per cent of the planet’s energy and contribute nearly 40 per cent of the total global carbon emissions. This underscores the critical importance of addressing the environmental impact of buildings and their Heating, Ventilation and Air Conditioning (HVAC) systems in our efforts to combat climate change.

HVAC systems, crucial for maintaining indoor comfort, have long relied on fossil fuels, raising concerns about environmental impact and energy efficiency. Even so, a transformative moment, aptly called the “Green Wave” is reshaping the HVAC sector. This movement, driven by the convergence of renewable energy adoption and eco-friendly materials, seeks to enhance efficiency while minimizing the carbon footprint of HVAC systems.

The Green Wave movement represents a fundamental change in the approach to heating, ventilation, and air conditioning systems, emphasizing the integration of renewable energy sources and the utilization of low-carbon materials. It should be asserted here that this is not a fleeting trend but a fundamental reconfiguration of the industry’s foundation.

Shifting to renewable energy integration

At the heart of this evolution lies the integration of renewable energy sources, including solar panels, geothermal heat pumps and wind turbines to fuel HVAC operations. These technologies are reducing dependence on traditional electricity sources, signalling a profound move towards sustainable energy solutions.

- **Solar power integration:** Solar-powered HVAC systems have gained momentum due to the decreasing costs of solar panels and advancements in photovoltaic technology. The Solar Energy Industries



The HVAC sector is transforming the adoption of materials with lower carbon footprints.

Association (SEIA) reports a 70 per cent cost reduction in solar panels over the last decade, rendering solar energy increasingly feasible for powering HVAC systems.

- **Heat pumps:** Heat pumps are a smart alternative to traditional boilers with features which effectively address the needs of hot water for space heating, domestic heating & industrial heating applications. Heat pumps also significantly reduce energy consumption for heating and cooling, providing long-term cost savings and environmental benefits.
- **Wind-powered solutions:** While wind energy is traditionally associated with large-scale power generation, innovative designs are emerging to harness wind power for smaller-scale building HVAC needs.

Advancements in low-carbon materials

Simultaneously, the HVAC sector is transforming the

adoption of materials with lower carbon footprints. Conventional refrigerants like hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which have significantly contributed to global warming, are being replaced with low Global Warming Potential (GWP) alternatives. This shift is essential for reducing the carbon footprint of HVAC systems and aligning them with sustainability goals.

- **Low-GWP refrigerants:**

International agreements, such as the Kigali Amendment to the Montreal Protocol, have prompted the phase-out of high-GWP refrigerants. Hydrofluoroolefins (HFOs) and natural refrigerants like hydrocarbons and CO₂-based refrigerants are gaining prominence due to their significantly lower environmental impact.

- **Sustainable construction materials:**

Innovations in construction materials, such as low-carbon steels, aerogels for insulation, smart glass for improved energy efficiency, and advanced composites for ductwork, are becoming more prevalent, contributing to better overall HVAC performance.

Impact and future outlook

Incorporating renewable energy and eco-friendly materials into HVAC systems not only helps lessen environmental impact but also brings concrete advantages. Research indicates that energy-efficient HVAC setups can slash building energy use by up to 30 per cent, resulting in substantial savings for both property owners and occupants.

The demand for environmentally friendly HVAC technologies is on the rise, with a projected annual growth rate of over 8 per cent for the global green HVAC market from 2021 to 2026. This expansion is being driven by heightened awareness about environmental concerns, supportive

governmental regulations, and the cost-effectiveness of these sustainable alternatives.

Challenges and collaboration

Despite the upward trajectory, challenges such as substantial initial investments, integration of green HVAC tech into existing structures, and proper disposal of outdated systems persist. Collaborative efforts between governments, industries, and consumers are necessary to expedite the adoption of eco-friendly HVAC solutions.

Embracing this Green Wave revolution in HVAC is a strategic and conscientious stride towards nurturing a more sustainable future for future generations. This movement transcends individual actions; it encompasses a collective endeavour to reshape the very foundations of how we approach heating, ventilation, and air conditioning. It's a realization that our built environment plays a pivotal role in the global pursuit of sustainability and that every step towards greener HVAC systems is a step towards a healthier planet.

The prospect of a world powered by highly efficient, eco-friendly HVAC systems is becoming more and more promising as this journey continues, driven by innovation, collaboration and a growing awareness of environmental issues. It is a vision where comfort is not compromised, but rather enhanced, by systems that operate in harmony with nature, contributing to a more sustainable and resilient future for everyone.

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About the author:

Kishor Patil is the country leader of HVAC (heating, ventilation and air conditioning) and Transport of India and SAARC market at Trane Technologies. In this role, he is responsible for driving high efficiency, industry-leading HVAC systems and transportation solutions businesses.

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Avians offers advanced fire rated rolling shutters

This shutter will enhance safety in industrial environments.



fusible links for automatic closing and integrated smoke detectors, Avians' shutters facilitate safe evacuation during fire emergencies. Additionally, our certifications from reputable organizations like Exova Warrington UK guarantee adherence to international standards, ensuring peace of mind for businesses and occupants alike.

Key features of Avians' fire-rated rolling shutters include motorized operation for fire containment, gradual closure in case of fire triggered by the fusible link, and high-quality construction with galvanised steel components and Rockwool insulation. Customisation options allow for tailored solutions, with integration possibilities into Building Management Systems (BMS) for enhanced operational efficiency.

In essence, Avians' fire-



Commercial settings, providing reliable fire protection and thermal insulation benefits. Crafted with precision using high-grade steel, these shutters effectively contain fire and smoke while offering enhanced energy efficiency.

The double-wall insulated construction of Avians' fire rated shutters ensures robust fire containment, preventing the rapid spread of flames and safeguarding property and lives. Engineered with double-wall slats, these shutters compartmentalise fire effectively, meeting industry standards for reliability and effectiveness in critical fire protection applications.

Equipped with advanced safety features such as

rated rolling shutters offer a comprehensive safety solution, combining reliability, customisation, and adherence to industry standards to protect industrial and commercial premises from the threat of fire. With their advanced features and robust construction, these shutters provide businesses with the confidence and assurance they need to mitigate fire risks effectively.

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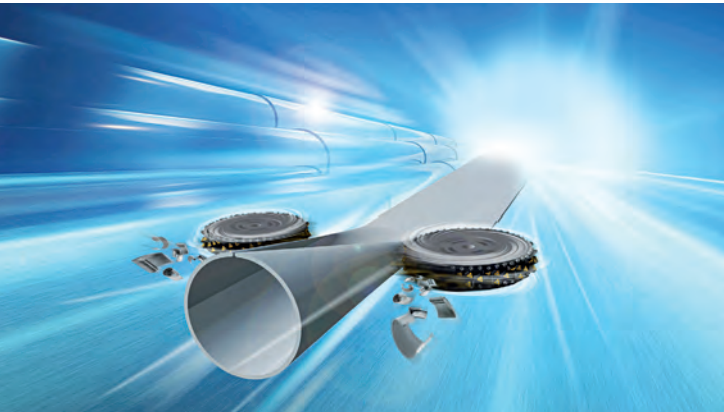
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Boehlerit: Know-how in cutting of tubes

In order to cover the different machining steps, Boehlerit has, over the decades, as the industry's leading tool supplier, created the market's most comprehensive product range, now also including standardised solutions.



Boehlerit offers a uniquely wide variety of products for complete cutting machining solutions for the whole manufacturing process of tubes of all dimensions.

Boehlerit offers a uniquely wide variety of products for complete cutting machining solutions for the whole manufacturing process of tubes of all dimensions. This ranges from the processing of the welded edges and to the outer and inner burrs of the welds to tube-end machining. Other industries also benefit from Boehlerit's decades of experience, such as in sheet edge machining in shipbuilding, for example.

The manufacturing of large tubes, such as those used in, for example, pipelines for transporting liquids such as oil, or natural gas, is the supreme discipline in tube manufacturing, and is now carried out in highly integrated overall concepts with intelligent production lines. Equally demanding is the manufacturing of small tubes for precision applications in the automotive industry. The interlinked production steps from the coil or sheet to the finished tube therefore require a high degree of process reliability. This also applies, of course, to the various cutting machining steps incorporated into the machining operations. Here, extremely robust tool systems with long tool service lives are required in order to prevent interruptions of production caused by downtimes and/or set-up times of the expensive plants.

In addition to this, a much greater machining precision is required than one might suppose at one's first glance at the finished product. All the same, these are tubes with diameters from around 500 millimetres

upwards. With tube diameters well over 3,000 millimetres, the production capabilities of some plants are substantially above even this. The high machining accuracies ultimately stem from the requirements for the weld seams. The smallest irregularities can cause leaks to occur later on. Their quality starts with the preparatory cutting machining and also includes, of course, the deburring of the longitudinal weld seams inside and outside.

In order to cover the different machining steps, Boehlerit has, over the decades, as the industry's leading tool supplier, created the market's most comprehensive product range, now also including standardised solutions. The first cutting machining step in the process sequence is the preparation of the weld edges. In this, the edges of the strip or sheet are synchronously machined on both sides with opposing milling heads. These tools are designed and produced specifically for the respective plants, the materials to be cut, the material thicknesses, and the required edge profiles.

Modular standard components

Boehlerit offers modular profile milling heads as a particularly cost-effective and flexible solution. They consist of a base body with exchangeable milling cutters and indexable inserts. The cut contour that is produced is determined by the shape of the cutters. One advantage over conventional monoblock tools is that in the event of damage it is not necessary to replace the whole tool, but only the affected cutters. Additional adjustment work is not required. On top of this, the cutting profile can be easily and quickly changed when necessary by replacing the cutters, whereas otherwise an entirely new tool would have to be procured. This, of course, represents attractive added value for a pipe factory.

Boehlerit reproduces all edge profiles for which there is demand in the industry, with corresponding milling cutters and indexable inserts. This means that users have the choice between an I-profile, X-profile, Y-profile or tulip profile.

In the case of longitudinally welded tubes, the next cutting operation is the deburring of the weld seam from inside and/or outside using shaving tools. Boehlerit offers the necessary clamp holders, cutters

and cutting inserts and/or cutting rings. These tools are also designed for the specific applications and geometrically adapted to the diameters of the pipes. The special challenge here is that the deburring is carried out very soon after the welding and so the cutting inserts are usually subjected to the still very high temperatures in the weld seam. Special cutting geometries and carbide varieties are used here for this reason.

Above all, large tubes for pipeline construction require machining at the tube ends, to make it possible to weld them together. The accuracy requirements are achieved with turning processes for which Boehlerit supplies complete tool systems, consisting of face-plates, sprung tool slides, cassette holders, copying roll and various spindles for adjustment. There is a comprehensive standard range for cutters and indexable inserts in the catalogue.

Synergy effects

Innovations for tube production mainly take place in the area of cutting materials and tool concepts. In this segment, it is mostly high-strength special steels that are machined. These can withstand the powerful forces from inside and outside. The material range normally goes from X 50 to X 100 sheets. Increasingly,

corrosion-resistant steels are used. The use of wear-resistant coatings and geometries for rust-free steels, for example, shows that the cutting material specialists from Upper Styria are also using their know-how in general cutting technologies synergistically here. This ensures improved chip removal due to a low tendency to stick, thus increasing service lives considerably.

The basic concept of the modular tool systems for sheet edge machining also comes from other machining fields, such as crankshaft production. Similar tool systems are used there, which make it possible to equip a base body flexibly with milling cutters and indexable inserts. All profiles can be covered with base bodies, different cutters, and the comprehensive portfolio of indexable inserts. Especially selectable indexable insert designs and system solutions ensure an optimal chip removal and heat dissipation in the dry machining of a wide variety of materials qualities. Beyond this, the tool systems of Boehlerit can also be found in applications from general plant engineering to shipbuilding to the milling of slabs in steelworks.

The company

As a carbide pioneer, the Boehlerit Group is one of the world's leading manufacturers of wear protection solutions and cutting tools for machining metal and composite materials. With cutting materials, semi-finished products, precision tools and tool systems for milling, turning, grooving and forming, the family-owned company has been ensuring process reliability and efficiency worldwide since 1932. Around 800 employees offer customers comprehensive know-how in all aspects of metallurgy in order to be able to realise process-optimised manufacturing technologies, the highest quality and an edge in tool productivity. With three production sites in Europe and Asia, international subsidiaries and a network of sales partners, the carbide and tool specialist has a global presence. Together with its two legally independent sister companies Leitz and Bilz, the Boehlerit Group forms the globally active Brucklacher Group, in which over 4,000 employees generate an annual turnover of around Euro 450 million.

Bilz has been represented in the Indian market with a production facility for over 35 years. Boehlerit as a group company uses the synergies with Bilz and wants to establish itself in the Indian market in the long term with its high-quality cutting tools.

SME



As a carbide pioneer, the Boehlerit Group is one of the world's leading manufacturers of wear protection solutions and cutting tools for machining metal and composite materials.

For details, contact Otto Bilz India Pvt Ltd, Bengaluru (Karnataka), on Tel: +91 80 2263 8700, Mob: +91 81231 22425, or Email: prabhu@bilztool.com

(Communication provided by the management of the company)



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Gandhi Automations offers versatile and long-lasting high speed doors

Prime High Speed Doors are the ideal solution for internal and external entrances and effectively operate in any situation.

High Speed Doors designed and manufactured by Gandhi Automations are sturdy, dependable, and the ideal solution for medium and large entrances. The doors are manufactured with European collaboration, technology, and innovative and creative engineering.

Fast-moving, functional, and reliable doors are needed in industrial and commercial contexts. Gandhi designed and manufactured High Speed Doors are versatile and solid, ensuring long-lasting reliability. The modular structure of the curtains, assembled and joined by anodized aluminium extrusions, provides for a wide range of polyester sections available in a variety of colours. Wide, full-width window panels ensure safer traffic and allow more light in. Their fast and easy replacement, in case of accidental tearing, saves money and time. The alternating metal tubular structure there inserted ensures high wind resistance.

Prime High Speed Doors are the ideal solution for internal and external entrances and effectively operate in any situation, even when strong winds are blowing and in rooms with high volumes of traffic. Sturdy and dependable, Prime is the intelligent door for medium and large entrances.

High Speed Doors for external entrances are equipped with a spring steel wind lock in the curtain pocket that ensures silent door travel, higher wind loads, and curtain stability.

High Speed Door: Prime reset

It is a unique high speed self-repairing door with the latest technology that prevents downtime of the door system. In the event that the curtain is accidentally impacted, it will cause the curtain to move out of the guides without damage. The movement of the door

is designed in such a way that it can be recovered with a simple opening and closing operation.

Gandhi Automations manufactures doors of the highest quality that meet the issue of greater flexibility desired

by clients. High Speed Self-repairing Door in PVC is the most suitable solution in the field industries; it lowers the time of transition from one facility to another, avoiding any human error that can cause damage to the High Speed Door and all this can be achieved due to the innovative anti-crash system. Gandhi Automations provides a world-class product with great security.

Below are the features of self-repairing high speed doors offered by Gandhi Automations:

- Flexible and self-repairing door
- Functional, safe, quick, and resistant
- Innovative anti-crash system
- Can be equipped with PVC vision windows
- Self-lubricating maintenance free guide
- Smooth and silent opening and closing
- Protects the traction unit, enables rapid wiring, and ensures a safe photocell
- Flexible curtain in self-extinguishing material
- Self-resetting without intervention
- Quickly back to operation
- A control panel designed for intensive continuous service

SME



For details, contact Gandhi Automations Pvt Ltd, Mumbai on
Tel: +91 22 66720200 / 66720300(200 Lines),
Email: sales@geapl.co.in, or visit : www.geapl.co.in

(Communication provided by the management of the company)

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- TOP Challenger Award for outstanding work in the toughest road challenges
- Innovation Award in Project Execution
- Innovation Award in Materials
- Road Max Award (Contractor executing maximum kilometer of roads)
- Best Road Financier Award (Award to Banks/Lending firms to a maximum kilometer of roads)
- Best Road Developer Award (Developer having the maximum kilometer of roads)
- Award for Excellence in Sustainable Road Construction Equipment
- Best Digital Technology Award in road building
- Best Renewable Energy Integration Award
- Award for best use of waste material recycling in road construction
- Awards for Excellence in Bridge Engineering
- Award for Excellence in Tunnel Engineering
- Award for Excellence in Project Management
- Fastest road builder award
- Award for Highest standards of Excellence in Road Engineering & Construction

AUTOMATION STUDIO COPILOT

B&R Industrial Automation offers a wide range of automation studio copilot.

Features:

- In today's industrial landscape, the software is getting more and more powerful to help machine developers. The newly released Automation studio 6 introduces CoPilot which helps with creation of machine software in languages like Structure Text, C and C++. At the click of a button engineers can leverage the power of generative AI to generate and optimize code.
- The system is designed to integrate effortlessly with B&R's existing libraries and conventions, so there's no learning curve.
- The result will have a significant reduction in manual coding that frees up engineers to focus on more creative problem-solving and rapid prototyping.
- Time-to-market is an essential metric for any business, especially in the rapidly evolving machine automation industry. CoPilot empowers developers to manage increasingly complex systems efficiently.
- It simplifies workflows and reduces time to market for new machines, providing a substantial competitive edge to help machine builders lead in competitive markets.
- Code quality is another critical focus area for machine builders, and that's where CoPilot's automated code commenting, and optimization features come into play.
- The software intuitively annotates code, improving both readability and long-term maintainability. With clearly structured, well commented code, CoPilot makes collaboration more efficient, helping teams spend less time troubleshooting and more time innovating.

About the Company: B&R Industrial Automation GmbH is a manufacturer of automation technology and ABB's global center for machine and factory automation. B&R was founded in 1979 by Erwin Bernecker and Josef Rainer and has its headquarters in Eggelsberg, Upper Austria. B&R is a leading global solution provider for automating machines and factories and is responsible for machine automation in ABB's Robotics & Discrete Automation division.

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Contact:

B&R Industrial Automation (A member of the ABB Group), Pune
Tel: 020-41478999
Email: marketing.in@br-automation.com



NON-DIRECTIONAL, INVERSE TIME, 2 POLE O/C RELAY WITH INSTANTANEOUS HIGHEST ELEMENTS

JVS Electronics Pvt Ltd offers non-directional, inverse time, 2 pole O/C relay with instantaneous highest elements- JRC 064.

Features:

- The relay measures the line current from each of the phases and if it exceeds the set threshold, then relay extends a trip signal after an operating time.
- The relay's operating time is determined by selecting one of the four inverse time characteristics.
- The relay output contacts are self-reset /hand reset type. Relay operation without any fault current is determined by trip test facility.

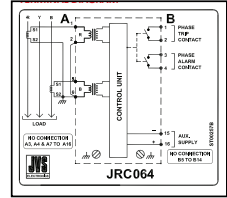
About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

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Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in



POLIFLEX GRINDING POINTS

PFERD offers a wide range of poliflex grinding points.

Features:

- Poliflex® fine grinding tools are manufactured with high shape accuracy, outstandingly consistent quality and tight dimensional tolerances.
- They are ideally suited to fine grinding, structuring and preparations for polishing work, and are very frequently used for tool and die-making applications.
- Poliflex® finishing points with the rubber bond are manufactured with pink aluminum oxide. The rubber (GR) bond is an elastomer-based soft bond. Ideal for use on surfaces.
- Finishing point in conical shape for fine grinding inner radii, contours and transitions.

About the Company: PFERD engages in development, production and support and distribution of tool solutions on jobs for surfaces and material cutting.

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Contact:

PFERD, Bengaluru
Tel: 080-42187117
Mobile: 09880665415, 09741481117
Email: sales@swit.in



HIWIN COOL TYPE I BALLSCREW

IBK Engineers Pvt Ltd offers a wide range of Hiwin cool type ballscrew.

Features:

- Optimized design for high reliability: Through use of computer simulation and FE Manalysis, the cool type ball screw features excellent thermal protection and high reliability.
- Promote higher speed rotation and extra high Dm-N value (up to 200,000) Cool type balls crews will eliminate high-speed rotation aftereffect, i. e., thermal problems, and promote higher speed rotation.
- Prevent thermal distortion: Optimized heat transfer design minimizes heat generation and prevents thermal distortion.



About the Company: Established in 2014, IBK Engineers Pvt Ltd, is engaged in the wholesaling, supplying, distributing and trading of deep groove ball bearing, mechanical bearing, roller chain, steel rear sprocket, automotive components, electric equipment, etc.

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Contact:

IBK Engineers Pvt Ltd, Bengaluru
Tel: 080-26321112 Mobile: 09880566644
Email: raju.kn@ibizkart.com

MILLING APPLICATIONS

Schunk Intec India Pvt Ltd offers a wide range of milling applications.

Features:

- It is extremely high holding forces for machining on machining centers.
- Magnos from Schunk offers extremely high holding forces for milling applications with very high machining parameters. Magnos mfrs magnetic chucks with square poles are especially suited for the deformation-free clamping in general milling applications.
- 5-sided workpiece machining with pole extensions. Very high holding forces for milling machining. Deformation-free and low-vibration clamping. Only single power supply needed for MAG/DEMAG. Secure and fast clamping of the work pieces.



About the Company: Schunk Intec India is engaged in products distribution and supply of industrial automation systems, automation work holding, tool holding, heat shrink tool holder, etc.

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Contact:

Schunk Intec India Pvt Ltd, Bangalore
Tel: 080-40538999
Email: rakhi.singh@in.schunk.com,
info@in.schunk.com

AMPRO SIEVE STATION CONNECT

Russell Finex is pleased to announce the new AMPro® Sieve Station Connect, setting a new standard for automated powder handling.



Features:

- The AMPro® Sieve Station Connect, is designed to provide optimum powder convey times and sieving efficiency, ensuring your powder is always ready for use when you need it.
- The AMPro Sieve Station has been completely redesigned, offering advanced system monitoring and control, enhanced ergonomics, maintenance efficiency and performance.”
- This innovative new solution has undergone numerous changes to meet the demands and requirements of the additive manufacturing industry.
- The innovative ‘connect’ design of the new system significantly enhances its functionality and user experience. Firstly, its plug-and-play functionality enables you to seamlessly expand your printer fleet or increase powder consumption without operational disruptions.
- Secondly, the system now allows remote optimization and monitoring. This empowers users to optimize powder usage and achieve comprehensive end-to-end powder traceability.
- The AMPro® Sieve Station Connect has been re-engineered to improve efficiency, user experience, and performance. The hygienic and robust sieving system, uses the industry-proven Russell Compact Sieve® technology. The patented Smart Flow™ automates feed control and integrates an intelligent weighing system, enabling complete automation of the sieving process.
- The AMPro® Sieve Station Connect is also designed with the user in mind. It features a user-friendly, larger HMI touchscreen to simplify navigation and monitoring. The system has been re-engineered to improve mobility, accessibility and for simplified maintenance.

About the Company: Established in 1934, we lead the world in fine mesh separation technology. Russell Finex is a customer centric, solution based company. We design and manufacture market-leading vibratory sieves, separators, ultrasonic mesh deblinding systems and liquid filters. We do this for virtually every industry around the world.

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Contact:

Russell Finex Sieves & Filters Pvt Ltd, New Delhi
Mobile: 08800558656, 08800558687
Email: sales.rfsf@russellfinex.com

WRIST TYPE HIGH VOLTAGE ALARM - MODEL - KM-HVW-289

'KUSAM-MECO' has introduced a new wrist Type High Voltage Alarm Detector - Model KM-HVW-289 having a wide sensing range from 1kV-220 kV AC.



Features:

- This detector provides a safe, practical & convenient new type high voltage alarm device for close-electric operator. During live electric working, the safe distance between operator & live body should not be closer than the requirement of relevant working regulations.
- After the operator wearing this alarm, when close to the high voltage charged body for a certain distance, according to the corresponding safe distance of voltage level, the alarm will make out the sound & light alarm to remind the electrical workers to pay attention to safety & avoid high voltage electric shock accidents.

About the Company: Established in 1983, Kusam-Meco, an ISO 9001:2008 certified company, introduced and pioneered the use of digital multimeters and clamp meters in Indian industry.

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Contact:

Kusam Electrical Industries Ltd, Mumbai
Tel: 022-27754546, 27750662, 27750292
Email: sales@kusam-meco.co.in

FLOW HOUR COUNTERS

HTM Hydraulics Pvt Ltd offers a wide range of flow hour counters.

Features:

- Ideal for recording the operational time of equipments in the hire market.
- Monitoring the service interval of attachments. Recording the time use of shared hydraulic tools between many users. This battery life is: 10+years.
- Max flow capacity: 200 lpm; max, working pressure: upto 420 bar.



About the Company: HTM Group has been in the field of hydraulics since 1995. Their expertise in the industry makes us one of the leading competitive companies in the field of trading, marketing & servicing and straining for customers in India and abroad. HTM group has headquarters in Bangalore, India.

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Contact:

HTM Hydraulics Pvt Ltd, Bangalore
Tel: 080-41572101 Mobile: 09741165877
Email: info@htmhydraulics.co.in, sales@htmhydraulics.co.in

AC SERVO MOTORUM 3048TG WITH 8-STATION TAPPING

Meiban Engineering Technologies Pvt Ltd offers AC servo motorum 3048TG with 8-station tapping.



Features:

- Muratec M-3048TG, the new 30-ton machine comes with 2 piece design wherein the press frame is isolated from the table base, resulting in higher quality parts and longer life of Ball screws.
- This machine comes with In-Line punch drive, where the servo motor is parallel to press frame resulting in greater rigidity, less stress and long tool life.
- A wide table base which has twin ball screws on Y axis is controlled by synchronized servo motors results in accuracy and stability during high-speed movements such as scheduling function, processing graphic function, expanded "Tool Library", tool management, machine control functions, turret monitor function and tool replacement which assists the operator and increases machine productivity.

About the Company: Meiban Engineering Technologies Pvt Ltd is a solution provider in the field of automation and turn key projects for manufacturing automobile and sheet metal components.

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Contact:

Meiban Engineering Technologies Pvt Ltd, Bangalore
Tel: 080-26860600
Email: office@meibanengg.com

EARTH LEAKAGE RELAY - JRC 173

JVS Electronics Pvt Ltd offers a wide range of earth leakage relay - (setting range 0.5 To 8.0A) - JRC 173.

Features:

- The relay used for protection of LV/MV distribution systems requiring very high sensitivity for earth faults.
- The relay measures the earth leakage current from the CBCT and if it exceeds the threshold, it extends a trip signal after the operating time.
- Its features include: solid state reliability; built in test facility; very low primary current sensing; core balance current transformer supplied along with the unit.

About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

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Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in

MAGNET-SCHULTZ AC VIBRATORS

Magnets India offers a wide range of Magnet-Schultz AC vibrators.

Features:

- Offered open and encapsulated designs, devices for direct connection to the AC network or devices for connection to the AC network via one-way rectifier.
- Vibrators are components consisting of solenoid body and armature which are installed as electromagnetic drives in vibratory drives of the customer.
- The armature is kept by means of a suitable spring-mass-system so that there is always a nominal air gap.
- By applying the AC power supply, the system is put into vibration by the alternating voltage curve. frequency.

About the Company: Established in the year, 1997, 'Magnets India', are one of the leading trader, distributor & suppliers of an extensive range of electromagnetic actuators and electromagnetic products.

Scan the QR Code for instant product enquiry



Contact:

Magnets India, Chennai
Tel: 044-42833346
Mobile: 09840091969
Email: info@magnetsindia.net



AUTOMATIC DRAIN

Siemag Industries offers a wide range of automatic drain.

Features:

- Siemag auto drain are the most economic & efficient method of discharging unwanted condensate from compressed air systems. Failure to carry out regular draining results in serious disruption to production schedules, deterioration in product quality, damage to sensitive pneumatic equipment, etc.
- The auto drain eliminates the risk of human error & a possible costly aftermath by providing regular system drainage.
- These auto drains reliably discharge accumulated fluids from filters, air receivers, moisture separators, Inter/after coolers, dryers, pipeline drains, etc & other collection points to keep downstream operations free of liquid contaminants.

About the Company: Siemag Industries a certified ISO 9001:2000 company was established in the year 1959 primarily for the manufacture and supply of field power accessories especially in the field of pneumatics.

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Contact:

Siemag Industries, Mumbai
Tel: 08478847821/31/91
Mobile: 07718875757, 07710920909
Email: info@siemag.net



METERING CHAMBER

Excel Power Switchgear Pvt Ltd offers a wide range of metering chamber.

Features:

- Metering chamber is equipped on top of the breaker chamber and encased separately from the high voltage section.
- Based on customer's specification, protective relays, meters, control switches, indicating lamps and other pilot devices are flush mounted on the hinged and lockable front door.
- Sufficient space is available inside the chamber to arrange all the secondary control equipment, fuses, MCB's, auxiliary relays, terminal blocks, etc.

About the Company: Excel Power Switchgear, a high tech manufacturing unit established in 1998, is engaged in R&D, production, and manufacturing of low & medium voltage switchgear. Since then, Our company has displayed a rapid growth in the switchgear industry by attaching primary importance to customer oriented approach and by producing quality products.

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Contact:

Excel Power Switchgear Pvt Ltd, Chennai
Tel: 044-22254870
Email: sales@excelpower.co.in



PRECISIONS TURBO HYDRO MACHINE VICE

B R Precisions offers precisions turbo hydro machine vice.

Features:

- This type of Hydraulic vice achieves a clamping force up to 5000kgs using the simple turn of the handle without any effort.
- This hydraulic vice is made out of high tensile casting. machined and surface flame hardened and ground to ensure maximum accuracy.
- Different stations given that is Pin changing for clamping the work pieces at different levels for shortening the time lapse of rotating the handle Tenon slots are grounded Longitudinal and cross squareness and Parallelism accuracy at 0.02 Micron High deflection.

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About the Company: B R Precisions is dedicated to the manufacturing of clamping solutions.

Contact:

B R Precisions, Bangalore
Mobile: 09845208854, 09449648171
Email: brprecisions@gmail.com



PRECISION SERIES FILTER REGULATOR

Siemag Industries offers a wide range of precision series filter regulator.

Features:

- Siemag Precision Series Filter Regulator are specifically designed for use in the process Instrument & Fluid power Field.
- It has high instrumental accuracy & large flow capacity. It has accurate flow & precise regulation characteristics.
- These high capacity industrial combinations are compact & economical to provide clean, dry & regulated air for process instruments, diaphragm actuated control valve, valve positioners transmitters, air cylinders and I to P Convertors etc. All PRS Models have a large outlet volume for greater stability & built in aspirating characteristics to maintain controlled pressure over wide range of flows.



About the Company: Siemag Industries a certified ISO 9001:2000 company was established in the year 1959 primarily for the manufacture and supply of field power accessories especially in the field of pneumatics.

Scan the QR Code for instant product enquiry



Contact:

Siemag Industries, Mumbai
Tel: 08478847821/31/91
Mobile: 07718875757, 07710920909
Email: info@siemag.net

BREATHER VALVE

Caliber Valves Pvt Ltd offers a wide range of breather valve.

Features:

- Caliber - carbon steel/stainless steel body and housing stand alone and all internals are AISI 304/316, Co-axial type Breather valve with bias spring settings for pressure relief device with integral Flame arrester construction and with manual testing provision and relieving provision and external sand and dust protection suitable for outdoor installations. End connection - Flanged and drilled to ANSI 16.5, Class 150.



About the Company: Caliber Valves Private Limited is a Company to recon with and has a vision to its products with a cost effective one and at an affordable price with fullest satisfaction in terms of products and quality to its esteemed Customers.

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Contact:

Caliber Valves Pvt Ltd, Chennai
Tel: 044-43500192, 43500193
Mobile: 08939734853
Email: info@calibervalves.com

LASER CONTROL MICRO COMPACT NT

Blum-Novotest Measuring & Testing Technology Pvt Ltd offers a wide range of laser control micro compact NT.



Features:

- Laser measuring system for CNC machining centres for non-contact tool measurement and tool monitoring under the harshest conditions.
- Micro Compact NT – Laser measuring system for CNC machining centres proven in thousands of applications worldwide.
- Its applications include: support systems provide highest precision; laser diodes and lenses of the highest quality; Intelligent NT-Technology; maximum absolute accuracy with focused laser beam; programmable by integrated microprocessor; pre-aligned laser for easy mounting; tool measurement in real clamping condition and at nominal speed; compensation of spindle drift and concentricity errors of the tool cutting edges; reliable measurement of sensitive and very small tools; measurement of multi-staged tools and special tools.

About the Company: Blum Novotest Measuring & Testing Technology Pvt Ltd has made a name for itself in the list of top suppliers of bore gauge, radio receiver in India.

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Contact:

Blum-Novotest Measuring & Testing Technology Pvt Ltd, Bangalore
Tel: 080-23185468 Mobile: 09075004435
Email: info@blumnovotestindia.in,

EARTH LEAKAGE RELAY - JRC 173

JVS Electronics Pvt Ltd offers a wide range of earth leakage relay - (setting range 0.5 To 8.0A) - JRC 173.

Features:

- The relay used for protection of LV/MV distribution systems requiring very high sensitivity for earth faults.
- The relay measures the earth leakage current from the CBCT and if it exceeds the threshold, it extends a trip signal after the operating time.
- Its features include: solid state reliability; built in test facility; very low primary current sensing; core balance current transformer supplied along with the unit.

About the Company: JVS Electronics Pvt Ltd is an exporter, manufacturer and supplier of audio indicating instruments, visual indicating instruments, electrical indicating instruments, etc.

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Contact:

JVS Electronics Pvt Ltd, Bangalore
Mobile: 09448288863
Email: bangalore@jvselectronics.in

EXTRACTOR ARM

Powertech Pollution Controls Pvt Ltd offers a wide range of extractor arm.

Features:

- The Extractor Arm is device which allows the user to position a suction hood to capture fumes.
- This highly useful accessory may be used with the Fumekiller(R) and DustBag(R) units maintenance and running costs are low as all components are built for continuous, reliable, safe.
- The Extractor Arm consists of 2 ducts made of aluminium or stainless steel, connected by PVC flexible hoses and mounted on interconnected support rods with friction-loaded pivots. This allows the suction hood to be positioned by hand at any point with a reach of 2 meters to & fro an 2 meters up & down with complete ease & flexibility with minimum effort.
- The arm can also be fitted to overhead ducting to provide suction points close to the flow level for the capture of fumes or dust from pollution generation spots.



About the Company: Powertech Pollution Controls Pvt Ltd was established in the year 1996, for the design and manufacture of a wide range of air pollution control equipment. **Contact:** Powertech Pollution Controls Pvt Ltd, Bangalore
Tel: 080-23452156, 23452256
Email: powertech@airtelmail.in, philipthomas@powertechindia.com

Scan the QR Code for instant product enquiry



CNC TILTING ROTARY TABLE - URH-153-TN

UCAM Pvt Ltd offers a wide range of CNC tilting rotary table - URH-153-TN.

Features:

- UCAM's CNC tilting rotary tables grants two additional axes of rotation (the 4th and 5th axes) to the XYZ axes in basic CNC units.
- This allows the VMC to access faces of components not available to standard CNCs. Such tilting tables easily interpolate with machine axes, allowing you to create complex profiles such as impellers.



About the Company: UCAM deploys technology to deliver high-performance rotary tables with distinctive features, high-quality refinement, and customised equipment.

Contact:

UCAM Pvt Ltd, Bengaluru
Tel: 080-40744712
Email: sales@ucamind.com

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CBN AND DIAMOND TOOLS

Krebs & Riedel Abrasives India Pvt Ltd offers a wide range of CBN and diamond tools.

Features:

- Top high-precision grinding of hard iron and steel alloys or hard and brittle materials, the best removal rates and the longest service life are still provided by the hardest materials in the world: CBN and diamond.
- Cubic boron nitride, CBN for short, is particularly suited to difficult to machine or high-alloyed hardened steels with a hardness of 54 HRC or more such as high-speed steel, tool or chrome steel, nickel-based alloys, powder metallurgy steels or white cast iron.

About the Company: More than 125 years of experience in manufacturing of high performance grinding wheels. The cornerstone of the Krebs & Riedel grinding wheel factory in Bad Karlshafen was laid some 125 years ago.

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Contact:

Krebs & Riedel Abrasives India Pvt Ltd, Bangalore
Tel: 08495926527
Email: sales@krebs-riedel.in



WIRE HARNESS

Miracle Electronic Devices Pvt Ltd offers a wide range of wire harness.

Features:

- As a leading looms manufacturer in India, we exemplify the commitment to excellence in providing cutting-edge wire harness solutions that meet the highest industry standards.
- These harnesses cater to various applications such as single & discrete EMI cables, EMI-shielded cable harnesses, wiring harness multiwire, flat cable harness assembly, RF cable assembly, airborne looms, ribbon cable harness assembly, power cable, and military looms assembly.

About the Company: Miracle Electronics is a renowned transformer manufacturer in India, engaged in manufacturing power transformers, toroidal transformers, EI transformers, SMPS transformers, medical isolation transformers. Also manufacture the finest quality wire & cable harness, electronic box assemblies, etc.

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Contact:

Miracle Electronic Devices Pvt Ltd
Bangalore
Tel: 080-28362750
Email: sales@miracle.net.in



POWER CONVERSION SYSTEMS

POM Systems & Services Pvt Ltd offers a wide range of PCS power conversion systems energy storage.

Features:

- PCS power conversion system energy storage is a multi-functional AC-DC converter by offering both basic bidirectional power converters factions of PCS power and several optional modules which could offer on/off grid switch and renewable energy access.
- Ranging from 50kW to 250kW, the PCS converter well fits the requirement of battery energy storage in commercial and industrial applications. Both energy storage PCS power conversion system and Lithium-ion battery system are made by POM Power in house.

About the Company: POM Systems & Services Pvt Ltd, is a reputed and leading company with over 25 years of experience in the field of Power Electronics.

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Contact:

POM Systems & Services Pvt Ltd
Bangalore

Tel: 080-28372296 Mobile: 09844034106
Email: pompower@pompower.in



CNC POLYGON TURNING MACHINE - 2A

Brisk Tech Engineers offers a wide range of CNC polygon turning machine - 2A.

Features:

- Brisk machines are rigid in construction and high precision to provide a wide variety of machining needs.
- Gaining expertise over the decade it developed CNC Polygon turning machines and special-purpose machines that cater to the needs of various segments of the manufacturing industry.

About the Company: Brisk Tech Engineers was established in 2003, a design consulting firm developing products designed for various machine tools.

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Contact:

Brisk Tech Engineers, Bengaluru
Tel: 080-28364403

Mobile: 09448479855, 07892743816
Email: info@brisktechengineers.com
briskanand500@gmail.com



COMBINATION TIMERS

Electronic Automation Pvt Ltd offers a wide range of combination timers.

Features:

- It is independently programmable - 8 relays, 8 On-Off timings programmable for each relays (overall 64 combination).
- Hold/restart, single/repeat cycle, time inhibit/pause -user selectable.
- Non potential pulse start signal for timer initiation.
- Its application used in: air dryers, nitrogen and other gas plants, process industries and many more.

About the Company: EAPL is one of the earliest establishments in Bangalore to be certified under ISO 9001:2008 by UL (Underwriters Laboratory, USA) and has currently upgraded to ISO 9001:2015. The organization has also adopted the SAP B1 as a part of enterprise resource management and fact-based decision making.

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Contact:

Electronic Automation Pvt Ltd
Bangalore

Tel: 080-42802345
Email: info@eaplindiamail.com



CONNECTORS

G R Enterprises offers a wide range of connectors.

Features:

- These flexible aluminum connectors available with us assure the clients of longer working life.
- Durable quality and available in superior finish, these aluminum connectors & electrical connectors manufactured by us ensure 100% leak proof functioning. As far as the application areas are concerned these aluminum connectors are further catered to automobile and engineering industries.
- The customization facility is also made accessible. Before the final dispatch we test the entire range on varied parameters to make sure that the offered range are as per the international standards.

About the Company: G R Enterprises are leading aluminum connectors supplier & electrical connectors manufacturer, where our wide gamut of is manufactured & exported from high quality aluminum.

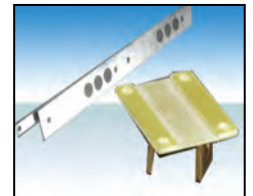
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Contact:

G R Enterprises, Bangalore

Tel: 080-23146701 Mobile: 09845338178
Email: info@grenterprisesindia.com



FLUORESCENT PIGMENTS FOR TRAFFIC CONE

Aron Universal Limited offers a wide range of fluorescent pigments for traffic cone.



Features:

- This Rubber Paint is extensively used for colouring steel structural and concrete surfaces of chemical & fertilizer industries.
- These products are available in various colours and shades to suit varied client's requirement.
- Its features include: safe to use; non-toxic nature; long shelf life.

About the Company: Aron Universal Limited was established in the year 1974 and is headquartered at Bengaluru, India. It is India's leading manufacturer and exporter of vivid daylight Fluorescent pigments, Fluorescent Toners, Fluorescent ink bases, Fluorescent dispersions and pigment dispersions through relentless research and development.

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Contact:

Aron Universal Limited, Bangalore
Tel: 080-27825331
Mobile: 09791427847
Email: enquiry@aronuniversal.in

QUICK RELEASE COUPLERS

Vijay Air Control offers a wide range of quick release couplers -New Generation = ST Series.



Features:

- Its valve less construction drastically saves pressure loss and achieves high flow rate.
- It is suitable for high viscosity fluids (such as grease).
- Available in various standard body materials, sizes and end configurations to cope with diversified and operating situations.

About the Company: Vijay Air Control is a one large workplace where work is done and then put on the market in the form of products and services. This work must be benefit if it is to hold its own in the face of competition. Only company based on sound economic, technical and organisation principles and which is in a position to have a say in future developments is a match for the challenges presented by the market and competition.

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Contact:

Vijay Air Control, Bengaluru
Tel: 080-23148871, 23141136
Mobile: 08951101436, 09880652082
Email: saivacblr@vacpneumatic.co.in

PROJECTILE TRANSFER ARM MOTOR

Iyappan Engineering Industries Private Limited offers a wide range of projectile transfer arm motor.



Features:

- Application across industries. Primary functionality being loading and unloading.
- Power industries to open or close the valves.
- Industries/Automation - Material handling, to turn or Oscillate, for loading and unloading.
- Automobiles - Cement mixer & Garbage trucks - loading, and unloading. In food industries Mix or stir.
- To load and unload the arms into the firing barrel
- Capability to develop and manufacture as per customer drawing & samples or with required spec.

About the Company: Iyappan Engineering Industries Pvt Ltd is a 50 year old precision manufacturing company in Chennai, India . With expertise in manufacturing world-class precision components and assemblies from drawing ,through Reverse engineering, as a new development for various industry verticals across India.

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Contact:

Iyappan Engineering Industries Pvt Ltd
Ambattur, Chennai
Tel: 044-42189424 Mobile: 09840359690
Email: uma@iyappanengg.com

GROUND SPIRAL BEVEL GEAR

Bevel Gears (India) Pvt Ltd offers a wide range of ground spiral bevel gear.



Features:

- Ground spiral bevel gears are used for demanding applications with the highest accuracies.
- Its benefits include lower noise, higher rpm capabilities, improved surface finish, and lower vibrations.
- It provides solutions for users of ground spiral bevels, spiral bevels, spiral, straight, zerol, angular and hypoid gears. Contact us with your requirements. Its range is: 25 – 800 mm (1"-32").

About the Company: Bevel Gears (India) Pvt Ltd is a part of the Jamal Group of Companies. Their manufacturing facilities comprise of Bevel Gears India (BGI) for industrial gears and Karnataka Machine Tools (KMT) for their exports. They are an active AGMA member and have been exporting for decades to several countries.

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Contact:

Bevel Gears (India) Pvt Ltd, Bangalore
Mobile: 09606023391, 09606023392
Email: jamalgrp@bevelgearsindia.com, akthar.s@bevelgearsindia.com

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Hansel : Hansel.R@ASAPPinfoGlobal.com : 8433828995

TRANSMISSION CHAIN COUPLING

Hasmukhlal & Brothers offers a wide range of chain coupling. These offered products are used to join two pieces of rotating equipment while permitting

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the various degree of misalignment or end movement or both.

Contact:

*Hasmukhlal & Brothers, Rajkot
Mobile: 09825340600, 9879760004
Email: bonnaflex@gmail.com*



PLANT SMSR GEARBOX

Micro Precision Works offers a wide range of coal plant SMSR gearbox. Being a foremost organization in this industry, they are actively engaged in offering the finest quality range of coal plant SMSR gearbox.

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Contact:

*Micro Precision Works, Ahmedabad
Tel: 079-25893824
Mobile: 09924304636, 09824001570
Email: microgearbox@gmail.com, info@microprecisionworks.com*



INDUSTRIAL EYELINK BELTS

A G Belting Pvt Ltd offers a wide range of eyelink belts. Eyelink belts combine a flat, stable surface with the dimensional stability and

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robustness of metal and are well suited to heavy loads.

Contact:

*A G Belting Pvt Ltd, Ghaziabad
Mobile: 09810979977, 08800466515
Email: info@agengineers.net*



ELEVATOR CHAIN

Tripcon Engineering Pvt Ltd offers a wide range of conveyor elevator chain. Offered this range in different styles of attachments such as K2, K24, K3, K44, K443, to meet the distinctive requirements of their clients.

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Contact:

*Tripcon Engineering Pvt Ltd, Anand
Tel: 02692-236031
Mobile: 09825089070, 08347556104
Email: response@elevatorchains.com*



CHAIN SPROCKET & TRAILING WHEEL

National Engineering Works offers a wide range of link chain sprocket & trailing wheel. These chain wheels with projecting teeth replaceable rim type, with pocket teeth one piece casting suitable for calibrated round link steel chains.

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Contact:

*National Engineering Works, Kolkata
Mobile: 092318-20839
Email: nationalengg@bsnl.in*



DEEP HOLE GRINDING SPINDLES

Capital Engineering Corporation offers a wide range of motorized deep hole grinding spindles. These motorized deep hole grinding spindles are used in various grinding spindles.

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Contact:

*Capital Engineering Corporation, New Delhi
Mobile: 09810056849
Email: yogesh@capitalspindles.com*



PREMIUM ANILOX ROLLER

Anar Rub Tech Pvt Ltd offers a wide range of anilox roller. These are fabricated with premium grade material. These products are abrasion resistant and are long lasting in nature as well. Ceramic anilox

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rollers provided by us are well known for their quality and durability.

Contact:

*Anar Rub Tech Pvt Ltd, Ahmedabad
Tel: 079-22743428, 22773428
Mobile: 09825405265, 09825047390
Email: sales@anarrubber.com*



METAL EXPANSION JOINTS

RMS Corporation offers a wide range of metal expansion joints with fixed flanges. This metal expansion joints with fixed flanges are elastic pipe elements designed to provide compensation for expansion

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movements and vibrations in the pipelines.

Contact:

*RMS Corporation, Mumbai
Mobile: 09323804063, 09167245537
Email: rms_corp@vsnl.net, rms.corpn@gmail.com*



SS WIRE ROPE SLING

A M Jeewajee & Sons offers a wide range of stainless steel wire rope sling. The offered range of sling is also used to transmit force in mechanisms, such as to control surfaces of an airplane connected to levers and pedals in the cockpit.



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Contact:

A M Jeewajee & Sons, Kolkata
Tel: 033-22300957, 39855836
Mobile: 09830059710, 09830270753
Email: amjs_52@hotmail.com

SPEED REDUCER

MGM-Varvel Power Transmission Pvt Ltd offers a wide range of bevel speed reducer. These bevel speed reducer has wide applications in various automobile parts and in other machinery. This speed reducers are available in various specifications and sizes.



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Contact:

MGM-Varvel Power Transmission Pvt Ltd, Chennai
Mobile: 08754470747
Email: info@mgmvarvelindia.com

SHOCK ABSORBER

Stellent Technologies is offering hydraulic shock absorber for moving loads with deceleration over the full stroke. The product has the lowest braking force and shortest braking time.



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Contact:

Stellent Technologies Pvt Ltd, Gandhinagar
Mobile: 09909949297, 09924602804
Email: info@stellenttech.com

CRANKSHAFTS

ORM Engineering has a wide assortment of crankshafts. These crankshafts are expertly manufactured using premium grade raw material and pioneering techniques in keeping with set industry standards.



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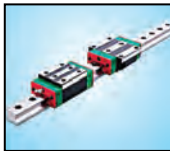


Contact:

ORM Engineering Pvt Ltd, Faridabad
Tel: 0129-4070114
Mobile: 09811596516, 09899724752
Email: rajesh@orm.co.in

RAIL SYSTEMS

Jinisha Electrolites offers a wide assortment of ball rail systems, These rail systems are made with extensive knowledge of contemporary trends and client requirements. A wide assortment of ball rail systems is offered in different specifications at market leading rates.



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Contact:

Jinisha Electrolites, Mumbai
Mobile: 09820096668, 09969872315
Email: jinishaelectrolites@gmail.com

FLEXIBLE SHAFT

A M Associates is offering flexible shaft grinding machines. These products are widely used in fabrication workshops, foundries and heavy industries. They are suitable for heavy jobs and/or jobs where it is not possible.



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Contact:

A M Associates, Chennai
Tel: 044-42165253, 25240682
Mobile: 09789881464, 09789881872
Email: aic.loyal@gmail.com

QUALITY TORQUE LIMITERS

Pethe Industrial Marketing Co Pvt Ltd offers a range of quality torque limiters. These limiters are precisely engineered based on the industry parameters using good quality material obtained from authentic vendors.



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Contact:

Pethe Industrial Marketing Company Pvt Ltd, Mumbai
Tel: 022-24223976, 24303460
Mobile: 09821936459
Email: response@petheind.com

TIMING BELTS

Global Sales & Engineering Company manufactures synchronous timing belts. These belts are best be described as belts with integrally moulded teeth on the inside which makes positive engagement with axially grooved pulley. Synchronous belts are also known as timing belts.



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Contact:

Global Sales & Engineering Services, Nagpur
Mobile: 07767817732, 07767817731
Email: globalsalesengineering@gmail.com

JAMSHEDJI SOIL COMPACTOR

Jamshedji Constro Equip Pvt Ltd offers a wide range of jamshedji soil compactor. The comprehensive range of Rammer offered by us is appreciated by our valued clients for light weight and can be available in various models.



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Contact:

*Jamshedji Constro Equip Pvt Ltd, Pune
Mobile: 09172222137, 09850153305
Email: info@jamshedji.com*

AUTOMATIC PAVER BLOCK MAKING MACHINE

Mortek Machinery Pvt Ltd offers a wide range of automatic paver block making machine. These automatic paver block making machine offered is based on advanced Hydro+Vibro technology.



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Contact:

*Mortek Machinery Pvt Ltd, Ahmedabad
Tel: 079-25840960
Mobile: 07624011874, 09427011874
Email: mail.mortek@gmail.com*

HYDRAULIC HOPPER CONCRETE MIXER

Esquire Machines offers a wide range of concrete mixer – hydraulic hopper. It is built on the same robust design principles as the ever-reliable Esquire hand fed



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mixer, giving it the same dependable features.

Contact:

*Esquire Machines Pvt Ltd, Vadodara
Mobile: 07069727357, 08758895096
Email: getintouch@esquiremachines.com*

CONSTRUCTION CONE CRUSHER

Creative Enterprises offers a wide range of construction cone crushers. These crushers have reliable construction, high productivity, easy adjustment and lower operational costs.



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Contact:

*Creative Enterprises, Jaipur
Mobile: 09352174343, 09829601578
Email: construetbetter@yahoo.com*

QUALITY CUTTER-CRUSHERS

Rajat Equipments is a manufacturer, supplier and distributor of an extensive range of superior quality cutter crushers. These are available in various models and can be customised as per specifications; they are stringently tested on several parameters to eliminate defects.



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Contact:

*Rajat Equipments Pvt Ltd, Raipur
Mobile: 09826421900, 09926936300
Email: info@rajat-group.com*

ROCK DRILL

Suretech Infrastructure offers hydraulic craw rock drill. These rock drills are developed with the finest components and modern techniques in accordance with industry norms. The products are inspected on numerous parameters before delivery.



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Contact:

*Suretech Infrastructure Pvt Ltd, Panvel
Tel: 022-27431868
Mobile: 07021139961, 09967987913
Email: sunil@suretech.co.in*

DOUBLE TOGGLE JAW CRUSHER

Precious Mineral Processing Systems offers double toggle jaw crusher. The range of double toggle jaw crushers is manufactured with innovative techniques, high-grade raw material and strictly complies with international quality norms.



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Contact:

*Precious Mineral Processing Systems Pvt Ltd, Ahmedabad
Mobile: 09974088696
Email: info@preciousfabcast.com*

HEAVY DUTY LAND LEVELLERS

Punjab Agro Sales (India) manufactures and supplies heavy duty land levellers. Offered is a wide range of soil levellers that find application for land levelling and for facilitating uniform irrigation.



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These rugged implements can be directly fitted to the tractors.

Contact:

*Punjab Agro Sales (India), Karnal
Mobile: 09255411474, 09034083063
Email: punjab_agro_india@yahoo.co.in*

RIVETING HAMMER

Hardware & Pneumatics offers a wide range of pneumatic riveting hammers. A rivet gun, also known as a pneumatic hammer, is a type of tool used to drive rivets; nearly all rivet guns are pneumatically powered. Those rivet guns



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used to drive rivets in structural steel are quite large.

Contact:

Hardware & Pneumatics, Kolkata
Mobile: 09831063719, 09874044351
Email: sales@hardwarepneumatics.in

SCAFFOLDING PLANKS

Aegis Scaffolding Services is a service provider and manufacturer of a range of scaffolding planks. These scaffolding board are made using superior quality raw material and latest methods of production.



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Contact:

Aegis Scaffolding Services Pvt Ltd,
Mumbai
Mobile: 09930450958, 08600376735
Email: aegisscaffolding@gmail.com

BATCHING PLANT

Nilkanth Engineering Works offers stationary concrete batching plants. The plant comprises of adequate capacity gravel and sand hoppers, weighing conveyor suspended on electronic load cells, pan type mixer unit, and additive tank.



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Contact:

Nilkanth Engineering Works, Ahmedabad
Tel: 079-25835553, 40085485
Mobile: 09825073105, 09904242413
Email: info@nilkanthengg.com

CONE CRUSHER

Laxmi En-Fab offers a wide range of gyratory cone crusher. Gyratory cone crushers are designated in size either by the gape and mantle diameter or by the size of the receiving opening, and are used for primary or secondary crushing.



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Contact:

Laxmi En-Fab Pvt Ltd, Ahmedabad
Mobile: 09725012749, 08980800839
Email: laxmienfab@gmail.com

JAW CRUSHERS

Buildmate Projects offers a wide range of jaw crushers. These jaw crushers are single toggle type and have been designed after studying the day-to-day problems of crusher owners. They are made for more production, tough and large feed conditions.



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Contact:

Buildmate Projects Pvt Ltd, Hyderabad
Mobile: 07675989911, 09849019012
Email: mvr@buildmate.in, marketing@buildmate.in

SINGLE DRUM ROLLER

Topall Impex offers a wide range of walk behind single drum rollers - CYLO6. These hi-tech rollers are known for their smooth performance, durability, sturdiness and easy handling, and are widely used for construction and repairing of roads and also to maintain edges of highways.



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Contact:

Topall Impex, New Delhi
Mobile: 09716467843, 09350288831
Email: sales.topallimpex@gmail.com

BULKER CEMENT UNLOADING SYSTEMS

Shreeji Technology offers a wide range of bulker cement unloading systems. Through this system, you can arrange to unload the bulkier into cement silo. It offers pneumatic conveying systems for cement bulker unloading.



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Contact:

Shreeji Technology, Ahmedabad
Tel: 079-25840511
Mobile: 09725310611, 09825012858
Email: info@factory.com

BAR CUTTER MACHINE

Sona Construction Technologies Pvt Ltd offers a wide range of bar cutter machine. Reckoned as leaders in this industry, they are providing their esteemed clients with excellent quality bar cutter machine.



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Contact:

Sona Construction Technologies Pvt Ltd, New Delhi
Tel: 011-42430909, 27105123
Mobile: 09810034741, 09312908830
Email: sales@sonavibrators.com



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LOGMAT - CHENNAI	May 31- June 02, 2024 Chennai Trade Center Poonamali High Road, Chennai	Smart Expos & Fairs India Pvt Ltd, Chennai Tel: 044-22501987 Email: info@smartexpos.in
INTEC - COIMBATORE	June 06-10, 2024 Codissia Trade Fair Complex Coimbatore	Codissia, Coimbatore Tel: 0422-2221582 Email: info@codissia.com
INDOMACH - HYDERABAD	June 21-23, 2024. Hitex Exhibition Center Hyderabad	Indomach Business Solutions Nagpur Mobile: 07666303625, 07987941374 Email: info.indomach@gmail.com
EXPO PAINT & COATINGS - NEW DELHI	June 26-28, 2024 Pragati Maidan Exhibition Center New Delhi	Toredo Fairs India PVT Ltd. Bangalore Mobile: 09845363225, 09986436557 Email: info@toredoofairsindia.com
FASTENER FAIR INDIA - NEW DELHI	July 26-28, 2024 Pragati Maidan Exhibition Center New Delhi	RX India, Gurugram Email: Chandan.Kumar@rxglobal.com
AUTOROBOT - COIMBATORE	August 01-03, 2024 Codissia Trade Fair Complex Coimbatore	Midaas Touch Events & Trade Fairs LLP Ramapuram, Chennai Email: vivek@midaastouch.in
ELEKTROTEC - COIMBATORE	August 09-12, 2024 Codissia Trade Fair Complex, Coimbatore	Codissia Huzur Road, Coimbatore Tel: 0422-2221582 Email: info@codissia.com
ADEX INDIA BOND EXPO - GREATER NOIDA	September 19-21, 2024 India Expo Centre & Mart Greater Noida	ADEX India India Expo Center & Mart Greater Noida Tel: +91 8177053335 Email: sales@theadexindia.com
INTERNATIONAL		
CHINA GUANGZHOU INTERNATIONAL FORGING INDUSTRY EXHIBITION GUANGZHOU	May 11-13, 2024 China Import & Export Fair Canton Fair Complex, Guangzhou, Guangdong, China	Julang Exhibition Co. Ltd 510623 Guangzhou, China Tel: +86 (0)20 38620792 Email: julang@julang.com.cn
TECHSPO CHICAGO TECHNOLOGY EXPO CHICAGO	May 22-23, 2024, Soldier Field Stadion, Chicago, Illinois, USA	TECHSPO, LLC 10036 New York City, USA Tel: +1 (800) 805-5385 Email: info@techspo.co
INTERNATIONAL METAL TECHNOLOGY - TAIWAN IMT TAIPEI	October 16-18, 2024 Taipei Nangang Exhibition Center, Taipei, Taiwan	Kaigo Co., Ltd. Taipei, Taiwan Tel: +886-2-2595-4212 Email: info@kaigo.com.tw

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Indian Cement Review	5400	810	4590	Titan Duffle Bag MRP ₹2150 Century Laptop Backpack MRP ₹2,450
Industrial Products Finder (Smart Manufacturing & Enterprises)	5400	810	4590	Titan Duffle Bag MRP ₹2150 Century Laptop Backpack MRP ₹2,450
The Indian Textile Journal	5400	810	4590	Titan Duffle Bag MRP ₹2150 Century Laptop Backpack MRP ₹2,450
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Equipment India	9000	2700	6300	Titan Duffle Trolley MRP ₹3980 Titan Duffle Bag MRP ₹2150
Indian Cement Review	9000	2700	6300	Titan Duffle Trolley MRP ₹3980 Titan Duffle Bag MRP ₹2150
Industrial Products Finder (Smart Manufacturing & Enterprises)	9000	2700	6300	Titan Duffle Trolley MRP ₹3980 Titan Duffle Bag MRP ₹2150
The Indian Textile Journal	9000	2700	6300	Titan Duffle Trolley MRP ₹3980 Titan Duffle Bag MRP ₹2150
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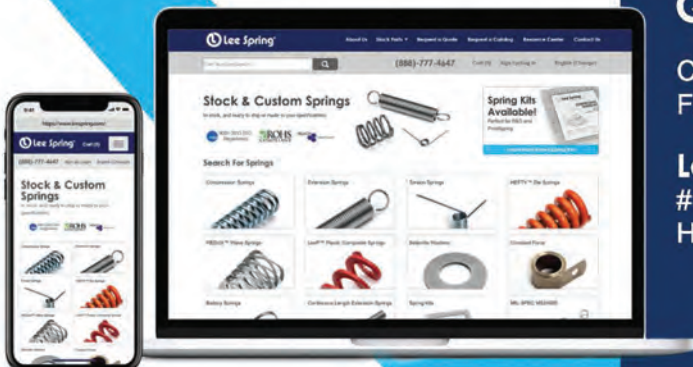
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