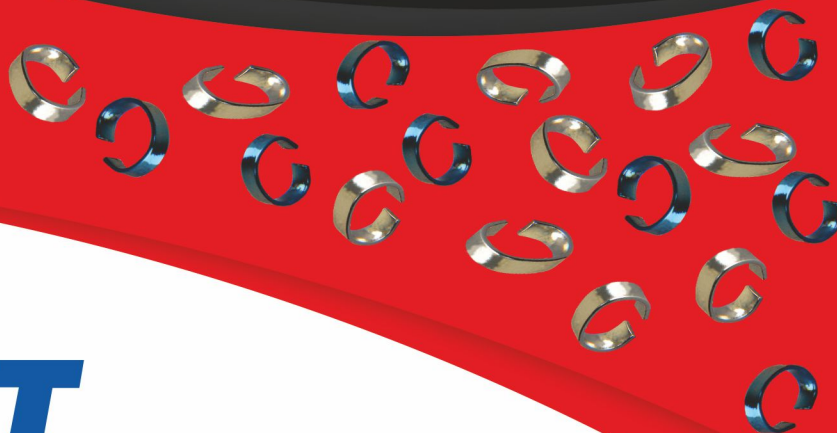




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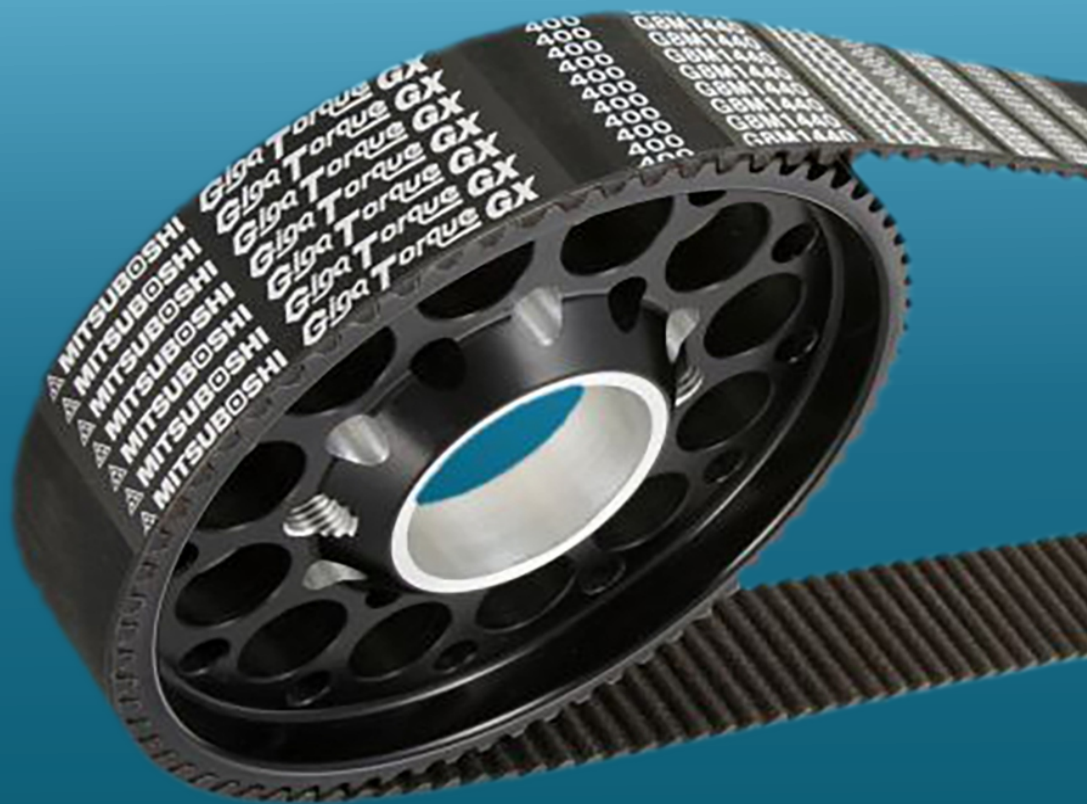
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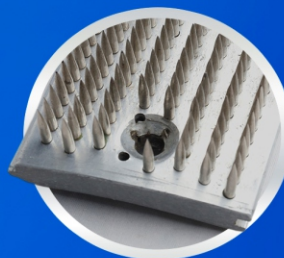
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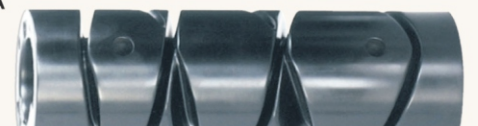
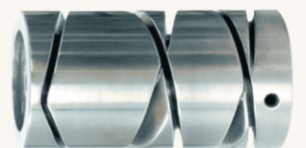
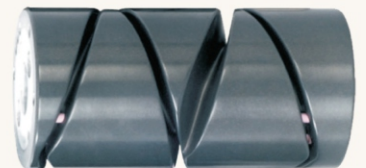
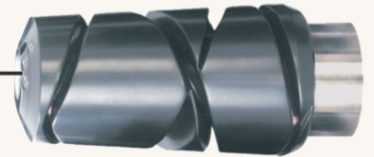
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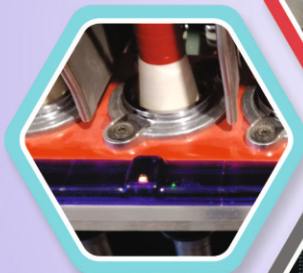
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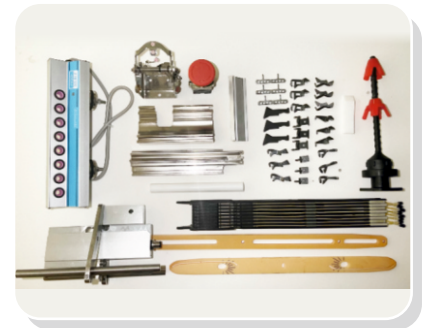
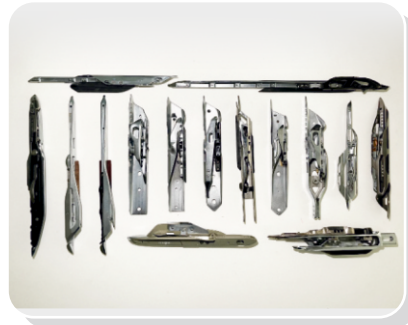
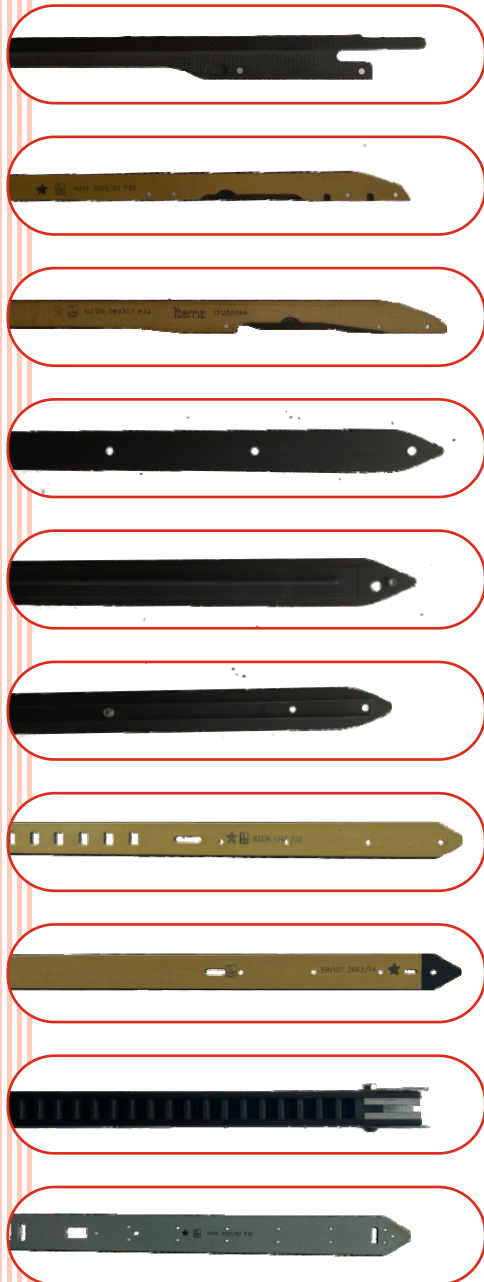
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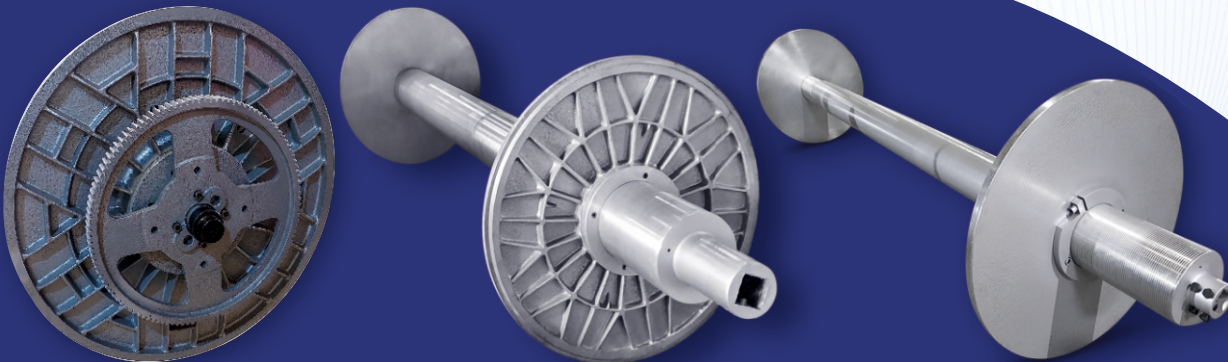
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Vol. LXIX

No. 04

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Published Monthly by

Eastland Publications Private Limited

44, Chittaranjan Avenue, Kolkata - 700 012, India

Phone : 91-33-2212-2233, 91-33-2212-1096, Fax : 91-33-2212-1096

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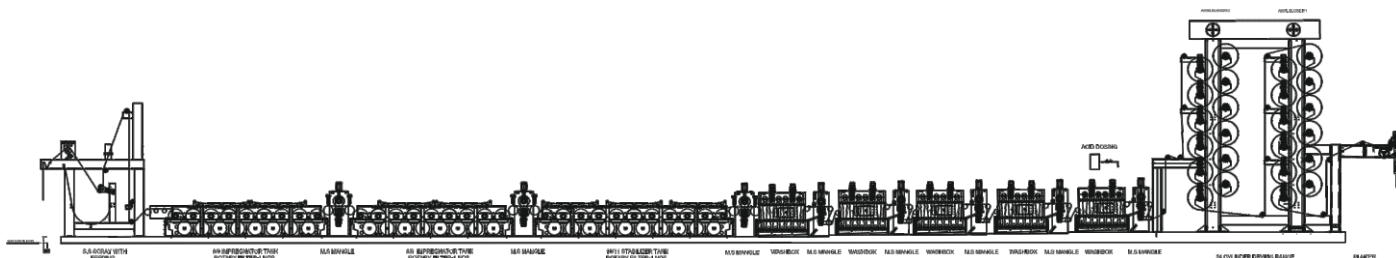
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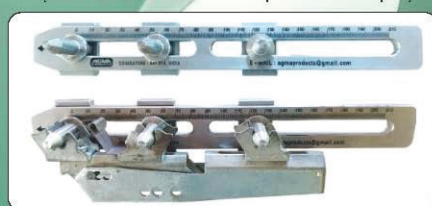


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India's textile industry has opportunity to combat the challenges out of tariff-hike

Indian textile industry currently is passing through a critical juncture. Textile sector is under reel of eccentric tariff shock. The whimsical decision in regard to the tariff escalation brings a great deal of uncertainty before Indian garment exporters. We know textile industry in India is the second largest job provider after agriculture and in foreign currency earning textile garment exporters play a key role. For India's apparel industry where in US remains a vital market, the development of the tariff-hike has brought uncertainty and concern in textile and garment export to US. The Indian textile engineering industry faces great disadvantages; the US market is already dominated by European nations and China. Indian manufacturers will be far harder to penetrate US market fueled by tariff hike.

Though garment manufacturers face high cost, eroding competitiveness, and shrinking opportunities, but this tariff raise has also positive aspects. Indian manufacturers will feel of being more disciplined and need for careful planning. They have to evaluate their existing strength to combat the challenges out of the tariff hike. Time has come up for Indian textile exporters to explore unconventional markets like Africa, Latin America, Scandinavian countries and Russia. Recently Russia is broadening opportunities for Indian textile engineering manufactures and garment exporters. Many Indian workers in Russia have been working in construction of textile firms.

India has a strong textile manufacturing base in spinning, weaving and garment production. Indian textile firms can partner with the firms in African countries specially Kenya, South Africa setting up manufacturing lines as India has world class expertise and labour advantages.

Despite the promising outlook there are certain challenges before India's textile industry. The high cost of automated machine can deter small and medium sized enterprises from investing in advanced systems. Opportunities in the market are abundant particularly in AI-driven solution. Manufacturers are focusing on sustainability and adopting AI-driven technology. Emerging markets in Latin America and Africa have huge growth potential for India's textile exporters which can compensate some extent of losses due to US's tariff hike.

➡ China to introduce new quotas for investing abroad

China plans to increase the amount of money that approved investors can channel into overseas assets as Beijing loosens its control over capital outflows. Authorities are preparing a new round of quotas under the qualified domestic institutional investor program, which allows select institutions in the mainland to invest abroad. The quota caps investors' ability to purchase assets like US Treasuries and overseas equities and was last increased in the summer. The move is intended to "better meet the cross-border investment needs of domestic institutions," Zhu Hexin, head of China's top currency regulator, told the China Development Forum in Beijing recently. Zhu said China has been pushing toward progress on capital account convertibility — or the free flow of capital across borders — saying that more than 90% of capital-account items are now at least partially open. "In the next five years, China will continue to promote opening up of capital accounts and coordinate the course with financial reforms and yuan internationalization," he added. Despite volatility in global financial markets, Zhu said that cross-border capital flows were "basically balanced." That stability has given Beijing breathing room to loosen capital controls and revive a longer-term push to expand the yuan's global role. The dollar's influence, though, appears to be waning given the US share of global output. □

➡ China factory activity slows down in May

China's factory activity slowed in May as disruptions from a five-day break added to pressures on global demand and input costs from the continuing conflict in the Middle East. The official manufacturing purchasing managers' index fell to 50 from 50.3 in April, the National Bureau of Statistics said of late. The median estimate of economies surveyed by Bloomberg was 50. The non-manufacturing measure of activity in construction and services rose more than forecast to 50.1 from 49.4, the statistics office said. A reading below 50 indicates contraction. China's economy is

showing signs of faltering after a strong first quarter. Growth slowed across the board in April, with industrial production and retail sales posting their weakest gains in years, prompting economists to call for stronger policy support. In a sign Beijing is heeding the call, China's central bank let the interest rate on a one-year policy loan to banks decline to a record in May. China also issued a plan to open up public services like schools and health care in cities, potentially expanding access for migrant workers as part of a broader effort to boost living standards and consumer spending. Chinese exports have continued to surge this year despite the war in Iran, after reporting an unprecedented trade surplus of \$1.2 trillion in 2025. □

➡ Japan carries out multi-year budget reform plan

Japan will create a new multi-year framework to finance policies aimed at boosting its growth potential as part of Prime Minister Sanae Takaichi's overhaul of the country's budgeting process. The new mechanism is expected to start next fiscal year and will be used to fund measures including investments in economic security, crisis preparedness and other growth areas, according to a document submitted by Finance Minister Satsuki Katayama to a government panel. Unlike conventional annual budgets, spending under the new framework will be planned and managed on a multi-year basis. Funding for the programme will be secured under the same principles as the annual budget, drawing on tax revenues, savings from spending cuts elsewhere, and government bond issuance. "The government will assess the scale of fiscal spending that can be sustained while steadily reducing the debt-to-GDP ratio, and consider bond issuance on a full-year basis," the paper said. The proposal may be incorporated into the government's annual economic and fiscal policy blueprint in July. It comes a day after the administration unveiled a roadmap to mobilise more than ¥370 trillion (\$2.3 trillion) in public and private investment through fiscal 2040 in artificial intelligence and semiconductors. Takaichi has argued that reliance on large supplementary budgets should be reduced and that spending should be incorporated into initial budgets. □

WORLD ECONOMY AND TRADE TRENDS

➡ US GDP growth scaled down to 1.6% in Q1

US economic growth was not as strong as initially thought in the first quarter, and momentum is set to slow this quarter, with the war with Iran stoking inflation and squeezing households' finances. Gross domestic product (GDP) increased at a 1.6% annualised rate last quarter, the Commerce Department's Bureau of Economic Analysis said in its second estimate of first-quarter GDP. Growth was previously reported to have advanced at a 2.0% pace. Economists polled by reporters had expected that GDP growth would be unrevised at a 2.0% rate. The economy grew at a 0.5% pace in the fourth quarter. The downgrade to the first-quarter GDP estimate reflected downward revisions to inventory investment and consumer spending. Growth in consumer spending, which accounts for more than two-thirds of the economy, was revised down to a 1.4% rate from the previously reported 1.6% pace. Business spending on equipment increased at an unrevised 17.2% growth pace. Final sales to private domestic purchasers rose at a 2.4% pace. The number of Americans filing claims for unemployment benefits increased marginally recently amid relatively low layoffs, despite the dragging war with Iran. Initial claims for state unemployment benefits rose 5,000 to a seasonally adjusted 215,000 for the week ended May 23, government data said. □

➡ BRICS nations to emphasize on energy ties

BRICS nations recently adopted a consensus on strengthening cooperation in the areas of energy security, sustainability, innovation, resilient infrastructure and capacity building. At the 11th BRICS Energy Ministers' Meeting in Gurugram, ministers reaffirmed the importance of respecting national circumstances, development priorities and energy pathways, an official statement said recently. The meeting concluded with the adoption of the 11th BRICS Energy Minister's Joint Communique, reflecting the collective vision and consensus of BRICS countries on strengthening cooperation in the areas of energy security, sustainability, innovation,

resilient infrastructure and capacity building, the Ministry of Power said. Addressing the meeting, Union Minister of Power and Housing & Urban Affairs Manohar Lal highlighted that energy remains fundamental to economic growth, social progress and human development. He emphasised that developing countries require adequate time, resources and policy space to pursue sustainable development while meeting the legitimate aspirations of their people. He underlined India's commitment to building resilient, future-ready and people-centric energy systems guided by the principle of Energy for All. The minister showcased India's energy transformation over the last decade, noting that the country has emerged as the world's third-largest producer and consumer of electricity, with installed power capacity reaching nearly 540 GW and non-fossil sources accounting for more than half of the installed capacity. Iran's Petroleum Minister Mohsen Paknejad recently met with Union Petroleum and Natural Gas Minister Hardeep Singh Puri, and the two leaders discussed ways to enhance cooperation in the hydrocarbon sector. □

➡ US trade deficit in April reduced to \$55.9 billion

The US trade deficit narrowed in April as exports jumped to a record high, a trend that if sustained, puts trade on course to contribute to economic growth this quarter. The smaller trade gap, which was reported by the Commerce Department recently, partly reflected higher energy prices because of the US-backed war with Iran, which has disrupted shipping in the Strait of Hormuz. Petroleum exports hit a record high in April. The trade gap contracted 1.2% to \$55.9 billion, the Commerce Department's Bureau of Economic Analysis and Census Bureau said. Data for March were revised lower to show the deficit at \$56.6 billion instead of the previously reported \$60.3 billion. Economists polled by reporters forecast the trade deficit would shrink to \$56.1 billion in April. Exports increased 2.6% to \$327.1 billion, an all-time high. Goods exports surged 4.1% to a record \$221.3 billion. Exports of capital goods increased \$4.0 billion, boosted

by computers and civilian aircraft. Exports of industrial supplies and materials, which include petroleum, also set an all-time high. Petroleum exports were the highest on record, boosted by higher volumes and oil prices amid the West Asia conflict. The US is a net oil exporter. Consumer goods exports increased \$1.7 billion. Imports rose 2.0% to \$383.0 billion in April, Goods imports advanced 2.1% to \$304.9 billion. □

➡ China's May exports to US grew 35% on yr, total jump 19.4%

China's exports picked up pace in May, rising 19.4% from a year earlier, its customs agency said recently, as technology-related shipments remained robust despite impacts from the Iran war. The stronger than expected performance was an improvement from April's 14.1% year-on-year (Y-o-Y) increase. Imports in May jumped 27.4%, also at a faster pace compared with April's 25.3% Y-o-Y expansion. Exports to the US in May surged more than 35% from the year before, after an 11% increase in April. China's shipments to the US had fallen sharply for most of the months since US President Donald Trump returned to the White House last year, as shipments to regions like Southeast Asia and Europe surged. The strength in exports has been supported by shipments of autos and technology and artificial intelligence-related products such as semiconductors and computing equipment. For autos, China's biggest electric vehicle maker BYD said it sold more than 160,600 vehicles abroad in May, up 80% from a year earlier. Chinese leaders have set a 4.5% to 5% annual economic growth target for 2026, slightly below the "around 5%" goal for 2025, and the slowest expansion goal since 1991. □

➡ Trump poses threat of 100% tariff over digital taxes

US President Donald Trump recently threatened to impose a 100% tariff on all goods from any country that imposes a digital services tax on American companies. "Numerous European Countries have been discussing the imminent implementation of a Digital Services Tax on American Companies," Trump said in a social media post. "Some of

these countries are close to actually doing this. "Please let this statement serve to represent that any country that imposes such a Tax will immediately be met with a 100% tariff on any and all Goods sent to the United States of America." Trump said the new tariff would supersede any trade deals with the United States, "whether implemented, signed or not." Recently, hours before the two met at the G7 summit, French President Emmanuel Macron said France would not bow to pressure from Trump and scrap its digital tax on US tech giants. Before setting off for the summit in France, Trump had warned that the US would "have no choice" but to apply 100% tariffs on French wine unless Paris eliminated its digital tax. □

➡ US inflation in May hits to 3-yr high

US consumer spending accelerated in May even as prices rose at the fastest pace in more than three years, suggesting Americans are powering through the fallout from the Iran war. The personal consumption expenditures price index rose 4.1% from a year earlier, the most since April 2023, Bureau of Economic Analysis data out recently showed. Excluding food and energy, prices were up 3.4% from a year earlier. Inflation-adjusted consumer spending rose 0.3% in May after stalling in April. The numbers are likely to keep pressure on the Federal Reserve to raise interest rates this year. Despite the recent peace negotiations between the US and Iran that have sent oil prices tumbling, economists expect the costs of an array of products to continue rising as the initial energy shock works its way through supply chains. Looking ahead, the recent pullback in gasoline prices could offer consumers some reprieve, though prices at the pump are still almost \$1 a gallon higher on average than before the war started. Given the sharp drop in oil prices, "it is highly likely that inflation peaked in May," Joe Erusuelas, the chief economist at RSM US, said in a note. Underlying inflation, however, "will not retreat to easily" given price pressures that remain in the pipeline. Higher-than-usual tax refunds have helped bolster consumers in recent months, while a reaccelerating labour market and rising stock prices are also supporting spending. ■

INDIAN ECONOMY AND TRADE TRENDS

⇒ 7.8% growth expanded in Q4FY26 despite West Asia turmoil

India's economy expanded 7.8 per cent in the March quarter of 2025-26, comfortably surpassing expectations and suggesting that the West Asia crisis had only a limited effect on economic activity, according to provisional national accounts data released recently. Economists, however, cautioned that the fallout from the ongoing crisis and the potential impact of El Nino could pose risks to growth in 2026-27. The March-quarter growth rate was above the Reserve Bank of India's estimate of 7 per cent. It also exceeded the 7.2 per cent forecast by economists surveyed by reporters. The statistics office also revised FY26 growth upwards by 10 basis points to 7.7 per cent from its February estimate. Prime Minister Narendra Modi said India's strong growth momentum reflected the economy's underlying resilience, the success of structural reforms and the efforts of 1.4 billion Indians. "We shall leave no stone unturned to further 'Ease of Living', 'Ease of Doing Business' and increase opportunities for our youth," he said. Finance Minister Nirmala Sitharaman said the government remained "committed to further drive the 'Reform Express' with decisive policy measures to ensure positive economic momentum amid the global challenges". Growth in the fourth quarter was underpinned by double-digit expansion in the trade, hotels and transport sector, which grew 12.5 per cent, its fastest pace in 12 quarters. Financial, real estate and professional services also recorded double-digit growth of 10.4 per cent for a third consecutive quarter. Agricultural growth accelerated to 3.6 per cent in the March quarter, supported by a stronger rabi harvest. Mining expanded 5.4 per cent, electricity 4.1 per cent and construction 8.4 per cent, all marking an improvement from the previous quarter. Manufacturing, however, acted as a drag on overall growth. The sector expanded 7.3 per cent, slipping back into single-digit territory after posting double-digit growth for five consecutive quarters. On the demand side, the economy was driven by a sharp rise in investment. Gross fixed capital formation grew 10.8 per cent, registering double-digit growth for the first time in at least 12 quarters. Private final consumption expenditure remained robust at 7.1 per cent, although growth moderated sequentially.

Government final consumption expenditure rose a modest 4.9 per cent during the quarter as both the Centre and the states focused on adhering to fiscal deficit targets. □

⇒ Global uncertainty led marginal dip in overseas remittances under LRS in FY26

Heightened global uncertainty and the geopolitical climate led to a marginal dip in India's outward remittances under the Liberalised Remittance Scheme (LRS) in FY26. As per RBI Bulletin data, the total outward remittances under LRS slipped 2 per cent year-on-year (y-o-y) to \$28.9 billion in FY26. In FY25, total LRS remittances stood at \$29.6 billion. In an indication of tougher conditions for education abroad, the decline was led by a steep drop of over 20 per cent in remittances towards studies abroad at \$2.3 billion compared to \$2.9 billion. Remittances towards international travel dropped about 3 per cent to \$16.5 billion. However, the reduction in these segments was offset by a large increase in the remittances towards investment in foreign equity/debt, which grew 56 per cent y-o-y to \$2.7 billion in FY26. In March, travel remittances fell to \$1.09 billion from \$1.13 billion in March 2025. Indicating a growing need to track outward foreign remittances by purpose, in its May Bulletin, the RBI also provided a break up of the travel remittances based on the purpose of the travel. Out of \$1.09 billion, the spends for holidays and settlement of credit card transactions abroad together made up \$0.62 billion. Travel for education (including fees, hostel expenses, etc.) made up \$0.45 billion. Analysts had told reporters earlier that a fall in spends for overseas education was because of tightening visa regulations in the US, coupled with weak job markets globally, especially for STEM roles. This meant that students were opting for new, lower-cost destinations, they added. Similarly, in case of travel, the depreciation of the rupee had been nudging Indians to travel to less expensive locations abroad. □

⇒ India's service sector grew at its fastest pace in six months

India's service sector expanded at its fastest in six months in May, supported by healthy

demand, client wins and improvements in new business intakes, according to a private survey released recently. The HSBC India Services Business Activity Index rose to 59.8 in May from 58.8 in April. A reading above 50 indicates expansion, while one below that signals contraction. "India's services PMI signalled an expansion in business activity in May, supported by a continued rise in new business," said Pranjul Bhandari, chief India economist at HSBC. External demand for India-provided services also grew at a faster pace, rebounding after a sharp decline in April, she added. Manufacturing activity also improved, with the manufacturing PMI rising to 55 in May from 54.7 in April. As a result, India's composite PMI, which combines manufacturing and services activity, increased to 59.3 in May from 58.2 in April, driven by a rise in new orders and sales. Looking ahead, services firms remained optimistic, citing favourable demand conditions which in turn are expected to support output. However, overall confidence slipped to a three-month low and remained below its long-term average. Export orders also rose, although at a slower pace than the average recorded in 2025. Firms cited gains from Australia, Canada, France, Germany, Hong Kong, Malaysia, the UAE and the UK. On the cost front, input prices across the services sector continued to rise at an above-trend rate in May but eased from April. Survey respondents mentioned higher spending on food, fuel, gas, labour and materials compared with April. "Input cost inflation eased, which in turn reduced pressure on selling prices," said Bhandari. Demand for Indian services improved despite another increase in selling prices. The pace of charge inflation eased to a four-month low and broadly aligned with its long run average. Firms that raised fees, only 5% of panellists, attributed the increase to the pass-through of higher operating costs. Employment growth remained strong, recording its second-fastest pace in nearly a year after April. ■

External factor creating challenges before India's economy : FM

High and fluctuating global crude oil prices, an unimaginable increase in fertilizer prices and high gold prices amid the West Asia conflict are creating challenges on the

external front as payments for all these commodities have to be made in foreign exchange, said Union Minister for Finance & Corporate Affairs Nirmala Sitharaman. "To just put it in context, all these three payments have to be in foreign exchange. There is no rupee trading there," she said at an event to celebrate SIDBI's 37th foundation day. Sitharaman urged the audience, which included Special Secretary in the Department of Financial Services Sanjay Lohiya, chiefs of public sector banks and SIDBI top brass, to understand the context of the three Fs — fuel, fertilizer and foreign exchange — and the foreign exchange is, in this context, purchase of gold. "So, we need to understand this and we also should appreciate that the challenges are more externally driven," she said. She made the aforementioned statement in the context of Prime Minister Narendra Modi on May 11 giving a call to conserve foreign exchange as far as possible in the backdrop of the West Asia conflict leading to a spike in crude oil prices, which, in turn, had weakened the rupee. Sitharaman underscored that India's domestic economic situation remains positive and resilient even today. But there are naysayers who jump into the scenario as it were and say, everything is crumbling. There is a section which very quickly wants to decry the achievements of our own people, she said. "It's not right is one thing, but it is wrong because it is fear-mongering. India cannot afford fear-mongering. We need to give confidence to the people with our words and with our action, and that's what you're seeing at various levels and today you're seeing it through SIDBI as well," Sitharaman said. Referring to delayed payments (including State PSUs and commercial enterprises) continuing to be a critical challenge for MSMEs, with an estimated ₹8.1 lakh crore in delayed payments affecting working capital and growth, the Minister emphasised that the periodically reviews the public sector undertakings under the government to make sure that they don't exceed the 45-day limit by which they have to pay dues to the MSMEs, and they shall not be sitting over their dues. Sitharaman emphasised that to shield citizens and businesses from the steep rise in global crude prices, Central excise duty on petrol and diesel was reduced by ₹10 per litre. The government is estimated to take a revenue impact of over ₹1 lakh crore on this score in the year 2026-27 because of this decision. ■

Textiles PLI gives manufacturing push in high-value exports and curbs imports

A raincoat, a pair of men's briefs, a packet of clinical diapers and airbags have little in common, but together possibly offer some of the clearest green shoots yet of the country's manufacturing push in the textiles sector.

The production-linked incentive (PLI) scheme for textiles, launched in September 2021, is slowly aiding a shift away from imports of niche products, official data show, building on the success of the government's manufacturing incentive programme in electronics.

Imports declined to almost zero in certain product categories, while the exports of high-value textile products nearly tripled, according to latest data from the government.

India did not import synthetic raincoats and overcoats during 2022-25, compared with imports of \$2.9 million in 2019-21.

In men's outerwear, imports dropped 99% to \$0.1 million from \$23.2 million, while imports of non-woven man-made fibre (MMF) declined 77% to \$10.6 million from \$46.9 million in this period.

Imports of dyed knit fabrics and women's synthetic jackets both fell: to around \$8.8 million from \$26.5 million for dyed knit fabrics and to \$2.9 million from \$8.9 million for women's synthetic jackets. Exports of several value-added products, meanwhile, rose.

Clinical diapers recorded export growth of 193% to \$7.7 million in the post-PLI period from \$2.6 million before the scheme.

Exports of narrow woven MMF fabrics increased 157% to \$31.5 million from \$12.2 million, while men's synthetic briefs rose two-and-a-half times to \$66.4 million from \$26.4 million.

"There are some green shoots in some niche areas..." a government source said, adding that these initial trends were very encouraging.

The five-year, ₹10,683 crore, PLI scheme is aimed at boosting local production of MMF apparel, MMF fabrics and technical textiles.

The government has approved 170 applicants under three rounds so far, with Gujarat leading with 46 approved applicants, followed by Maharashtra (27) and Madhya Pradesh (23).

These applicants have projected investments of ₹41,500 crore, more than double the original Cabinet estimate of ₹19,000 crore.

The latest third round of the scheme attracted interest from a diverse range of companies, including Amrutanjan Health Care Ltd in Telangana, Future Electronics in Uttar Pradesh and Avsar HR Services private LTD in Bihar.

South Korea's HS Hyosung Advanced Materials Corporation has also been approved under the third round of the scheme. ■

Rising temperature and humidity affect garment factory output up to 10%

Rising temperatures and humidity are affecting workers' health and disrupting productivity as much as 10 per cent in garment factories supplying apparels to brands like Primark, D-Mart, Target, Marks & Spencer, Tesco, Tommy Hilfiger, and NEXT, according to a report released recently by the NYU Stern Centre for Business and Human Rights.

The report, "Too Hot to Ignore: Extreme Heat in Garment Supply Chains", is based on visits to 10 garment factories across Tamil Nadu, Haryana, Odisha, Maharashtra, and Karnataka in September 2025.

The findings come after the International Labour Organization (ILO) stated that 70 per cent of the global working population, 2.41 billion workers, are likely to be exposed to extreme heat every year. This leads to 23 million non-fatal injuries and 19,000 deaths annually.

India is the world's sixth-largest garment exporter. The report estimates that heat-related expenses are

costing workers ₹500-1,000 a month, a major portion of the average monthly wage of ₹11,500-18,000. Suppliers said they would be willing to invest more in heat-mitigation measures if brands required such steps, provided technical support, or shared the costs.

It said that brands recognise the risk but lack the data to manage it. While 94.1 per cent of surveyed apparel and footwear brands said extreme heat poses a moderate or significant risk to production, only 35.3 per cent require suppliers to measure temperature or humidity inside production areas, and none collect such data continuously.

"Managers across the nine operating factories visited reported productivity reductions of approximately 3 per cent to 10 per cent and absenteeism increases of approximately 2 per cent to 5 per cent during peak summer months," he said. ■

Cotton area getting reduced in North as farmers eye paddy

Cotton acreage in North India has shrunk by about 22 per cent this kharif season as a section of farmers is seen preferring to plant paddy due to assured procurement and better returns.

Cotton has been planted on about 9 lakh hectares (lh) this year in Punjab, Haryana and Rajasthan against 11.56 lh a year ago. Per Agriculture Ministry data, total cotton acreage across the country was 9.53 lh as of June 12, down 28 per cent from 13.19 lh a year ago, with planting going on in parts of Karnataka, Gujarat and Rajasthan among others.

This khariff season, the cotton area has dropped to less than one lh in Punjab to 0.80 lh against last year's 1.19 lh as of June 11.

Similarly, the area has reduced in Haryana to 2.92 lh compared with 3.94 lh a year ago. In Rajasthan, the area is down to 5.28 lh this year from 6.43 lh a year ago.

Atul Ganatra, Chairman, Crop Committee of Cotton Association of India (CAI), said that though the area had reduced in Punjab and Haryana, sowing is going on in Rajasthan.

High risk crop

With parts of Rajasthan receiving rain, the area will be maintained or may even see an increase of 3-4 per cent, the CAI Crop Committee head said.

"Farmers across North cotton zone are increasingly shifting to paddy because it offers greater income security through assured procurement and better returns, particularly after last year's favourable rice harvest. In contrast, cotton is now perceived as a high-risk crop due to severe pink bollworm infestation, weather-related uncertainties and prolonged market prices below the MSP," said Bhagirath Chaudhary, Founder-Director, South Asia Biotechnology Centre in Jodhpur.

"Additionally, delayed paddy transplantation has provided an additional advantage by creating a window for short-duration *zaid* (summer) crops, such as maize and moong, enabling farmers to generate supplementary income before rice planting. Cotton faces heat stress during April and May, with many late-sown fields experiencing wilting, rot root and poor crop establishment," he added.

Weather vagaries

Dilip Monga, former head of the Central Institute of Cotton Research's regional research station in Sirsa, said besides the problem of pink bollworm, growers have faced issues with erratic weather such as excess rain and high temperature during the planting season. ■

Cotton body expects 7% rise in acreage in next crop year

Trade body Cotton Association of India (CAI) expects the area under the fibre crop in the upcoming 2026 sowing season to rise by 7 per cent, based on the reports received from various States.

Farmers, encouraged by the remunerative prices and better income realised during the current season, are expected to bring larger area under cotton cultivation during the next (crop) year (July-June), said Vinay N Kotak, President, CAI, and Atul S. Ganatra, Chairman, CAI Crop Committee, in a statement.

Cotton was planted on about 114.82 lakh hectares during 2025-26, according to data from the Agriculture Ministry.

For the 2026-27 marketing season, the Centre increased minimum support price by ₹557 per quintal to ₹8,267 for medium staple and ₹8,667 for long staple.

The National Crop Committee of CAI, which held a meeting with the stakeholders recently in Mumbai, deliberated on the Statewise cotton sowing prospects for the forthcoming season.

The committee estimated total pressings/crop for the 2025-26 season at 334 lakh bales of 170 kg each, based on

the inputs received from various state associations and stakeholders.

CAI sees imports for the 2025-26 season at 47 lakh bales of 170 kg each, an increase of around 15 per cent over previous year's 41 lakh bales. Exports of cotton are seen flat at 18 lakh bales.

High demand

Domestic demand is pegged higher at 338 lakh bales, an increase of 7.6 per cent, while the surplus is estimated higher at 103.59 lakh bales over previous year's 78.59 lakh bales.

The closing stocks for the 2025-26 season ending September are estimated at 85.59 lakh bales, about 41 percent higher than previous year's 60.59 lakh bales.

Further, the committee proposed conducting a survey through an independent agency to ascertain the total cotton consumption in India. It was decided that this matter would be discussed at the ensuing meeting of the CAI Board of Directors, the statement said.

CAI said that during the discussions, differing views emerged regarding the carryover stock numbers. Accordingly, a seven-member Committee has been constituted to reconcile the stock figures. ■

Indian textile sector sees revival of investments

For the textile and clothing industry, the last quarter of FY26 and the first quarter of the current financial year have seen growth in demand, triggering investment, according to industry officials.

“After 2022, the industry saw demand picking up across the textile value chain from January to mid-May. There is a slowdown in demand now after withdrawal of the import duty on cotton. We hope the situation will stabilise in a month or so,” said K. Selvaraju, secretary general, the Southern India Mills Association.

“All the good performers are investing now, expanding capacities. Investments are not decided based on the performance of two or three months. For larger industries, the investments were planned at least seven or eight months before. They are looking at long-term growth,” added Chandrima Chatterjee, Secretary General, Confederation of Indian Textile Industry.

Higher yarn exports

Yarn exports from October 2025 to March 2026 were higher compared with the same period the previous year in quantity. Export of fabrics picked up and then saw a slow down. Similarly, yarn price spike did have an impact on garments and made-

ups for a few weeks. Now, fall in cotton prices again led to demand drop, Mr. Selvaraju said.

“When the market revives, it takes about three months for the entire supply chain to benefit. Cotton imports have crossed 40 lakh bales between October 2025 and May 2026. Another 15-20 lakh bales are expected to come in by the end of September. Cotton prices crossed ₹75,000 a candy and are dropping now. This has led to demand slowdown. Everyone is waiting to see how much the prices will fall. The situation will be clear soon,” added Mr. Selvaraju.

Meanwhile, textile mills are said to be investing in both modernisation and expansion projects though the exact investment data is not available.

More automation

Some of the mills are investing to make value added yarns and some others modernising adopting more automation, said industry sources.

Implementation of the Free Trade Agreement with the U.K. is expected to bring in more orders for garments and made-ups. Another \$10 billion increase in exports will support the entire textile value chain. However, the West Asia war and uncertainties in the U.S. tariff are of concern, sources said. ■

UP to build 6 textile park, it may bring in ₹10K cr investment

The Uttar Pradesh government is developing textile parks spanning almost 1,500 acres to make the state a leading textile and garment hub in South Asia.

As part of this, six textile projects are expected to entail investments of more than ₹10,000 crore, generate large-scale jobs, and bolster the state's \$1 trillion economy goal.

A mega textile park is proposed over 1,162 acres on the borders of Lucknow and Hardoi districts under the PM Mega Integrated Textile and Apparel (PM Mitra) scheme.

Five other smaller textile parks will be set up over 326 acres under the state's Sant Kabir Textile and Apparel Park Scheme in Varanasi, Amroha, Bareilly, Sant Kabir Nagar, and Bijnor districts. “All these five projects will be established under the public-private partnership (PPP) model. The Yogi Adityanath government aims to attract big-ticket investments and create employment opportunities,” a senior official said.

About 400 big and small textile manufacturing and processing plants are likely to come up in the Lucknow-

Hardoi textile project, with marquee companies such as Reliance Industries, Arvind Mills, Vardhman, Ahuja Textile, etc expected to set up their units. Moreover, the Northern India Textile Research Association (NITRA) has submitted the pre-feasibility report for the Varanasi textile park, while reports for the remaining four parks are being prepared. These reports will be finalised after incorporating suggestions from industry stakeholders.

The government is giving due emphasis on developing these projects in compliance with environmental standards.

PPP tender documents are being drafted for the selection of ‘master developers’ for these projects.

“The Sant Kabir Textile and Apparel Park Scheme will provide Uttar Pradesh with a new identity in textile manufacturing, ready-made garments, technical textiles, and exports,” the official noted.

Recently, the Centre approved 96 companies under round-III of the Textile PLI scheme. This is estimated to garner investment of ₹12,822 crore and a projected turnover of more than ₹58,000 crore. ■

In Handloom sector convergence needs to be enhanced

Chairman of the Economic Advisory Council to the Prime Minister (EAC-PM) S Mahendra Dev recently noted several problems plaguing the handloom and handicrafts sector, such as raw material supply, marketing constraints and low wages, and called for convergence of departments across the government.

"There are several schemes running across several ministries including the Ministry of Textiles, Ministry of Skill Development, as well as the Ministry of Culture. There may need to be a convergence of these departments and awareness on schemes needs to be enhanced," Dev said at the launch of a survey by the Institute for Human Development (IHD) and the Crafts Council of India (CCI).

The sector requires removal of middlemen, better enhancement of design technology, increased use of institutional credit and the promotion of cluster development, he said.

A survey by the IHD and the CCI estimated that India's handloom and handicraft sector supported nearly 11.3 million workers and 6.5 million establishments nationwide, highlighting its role in manufacturing employment.

Across five surveyed states, the sector employed an estimated 6.1 million people through 3.4 million units and contributed around ₹51,445 crore annually in gross value added (GVA). The report also found widespread informality, with most units operating

on a small, home-based scale and reporting declining production over the past decade.

The findings were based on a primary survey across Assam, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal, selected for geographical spread and concentration of handloom and handicraft activity. Researchers surveyed 4,659 manufacturing units across rural and urban areas, covering three districts in each state. Units engaged solely in trading were excluded.

Union textile minister Giriraj Singh acknowledged the concerns raised in the report and said the gradual rise in income of handloom and handicraft workers is important. He noted that it is not just the government but also the society's responsibility to help the handicrafts industry.

Singh pointed out that there were 29 weaving service centres across India and currently the textile ministry is focusing on upskilling workers in the Guwahati centre. Weavers' Service Centres (WSCs) are government-run technical institutes across India, designed to support the handloom and textile sectors. They provide skill development, technological upgrades, design assistance, and market linkages.

The ministry is running an initiative through its survey division and its research coincides with the IHD-CCI survey, he said.

"In the first phase, we have selected six weaving service centres across five states," said Singh. ■

Govt approved 22 new applicant under round 3 of PLI scheme for textiles

The government has approved 22 new applicants under Round-3 of the production linked incentive (PLI) scheme for textiles, taking the total number of companies to 96.

The newly-approved companies are expected to bring in a total investment of ₹2,339.14 crore, generate a projected turnover of ₹15,561.34 crore in notified products and create 36,217 employment opportunities across the textile value chain, the Textile Ministry said.

"A total of 96 companies has been selected under Round-3 of the scheme with a total committed investment of ₹12,822.67 crore and a projected turnover of ₹58,294.18 crore," the Ministry said in a statement recently.

The approved companies under the PLI scheme are from man-made fibre (MMF) apparel, MMF fabrics and technical textile segments, which will further strengthen India's position as a global hub for value-added textile manufacturing.

Sunrise segments

The addition of these companies reflects the continued industry response to the government's efforts to promote investments in sunrise segments of the textile sector, it said, adding that the investments are expected to support

the development of globally competitive textile ecosystem aligned with the vision of Aatmanirbhar Bharat.

In November last, the Ministry had approved 17 new applicants in the third round of selection with a total investment commitment of ₹2,374 crore.

In the first two rounds of selections, a total of 74 applicants had been approved under the scheme. In October 2025, the government had notified major amendments to the scheme to further enhance industry participation.

These included expanding the list of eligible products that can benefit from the scheme in the given categories, doing away with the requirement of setting up new companies, reducing by half the minimum investment threshold and also lowering the incremental turnover criteria.

The PLI scheme for textiles was notified on September 24, 2021, with an approved outlay of ₹10,683 crore to promote the production of MMF apparel and fabrics, and products of technical textiles.

The scheme aims to enable the textile industry to achieve the necessary size and scale, become globally competitive, and create substantial employment opportunities. ■

Govt defies US claims of excess capacity in steel and textiles

The government has rejected claims by the United States Trade Representative (USTR) that India has excess capacity in the steel and textile sectors, arguing that low per capita consumption of these products undermines any such assertion, Additional Secretary in the Ministry of Commerce and Director General of Trade Remedies (DGTR) Amitabh Kumar said recently.

"We do not think we have overcapacity. Our per capita consumption of textiles is abysmal. Ours is a hot, tropical climate; we wear cotton. How to we have overcapacity?" Kumar told reporters at a press conference.

The remarks assume significance against the backdrop of investigations launched by the Office of the USTR against India under Section 301 of the US Trade Act, alleging overcapacity. The commerce ministry has rejected the claims and has already submitted its position to the USTR. "In steel too, our per capita consumption is among the lowest, even though we are the second-largest producer," Kumar said. "Compared to our population and our economic and growth imperatives, per capita steel consumption remains among the lowest."

India's per capita steel consumption is around 100 kg, well below the global average of over 200 kg. Similarly, annual per capita textile consumption in India stands at 5.5 kg, compared with the global average of around 15 kg.

"In any case, overcapacity is not covered under the trade remedy laws of the World Trade Organization (WTO). This is a new narrative aimed at targeting one specific country. There are other collateral objectives as well, which I do not want to mention here," Kumar said.

The US probe against India under Section 301 is being viewed as a substitute for the reciprocal tariffs imposed by the Donald Trump administration under the International Emergency Economic Powers Act in April 2025. Those tariffs were struck down by the US Supreme Court in February. Section 301 of the US Trade Act of 1974 allows Washington to probe and act against trade practices it considers harmful to US commerce.

Overcapacity-related concerns have also surfaced in India's trade engagement with the UK. The implementation of the India-UK free trade agreement remains stalled over safeguard measures imposed by London on steel imports. The UK has reduced tariff-free steel import quotas by 60 per cent, citing concerns over dumping linked to overcapacity elsewhere. From July, steel shipments exceeding quota limits will attract a 50 per cent duty.

Responding to questions about a recent report highlighting a rise in the finance ministry's rejection of the commerce ministry's recommendations on anti-dumping duties, Kumar said the two ministries have held extensive discussions. "They (the finance ministry) usually do not provide reasons, except in one or two cases in the past. We try to give them as much information as possible beyond the formal findings," Kumar said. "But once a view is taken, it's taken. We try our best at all levels."

A report released in May by the Centre for Domestic Economy Policy Research and the Centre for WTO Studies found that the finance ministry historically implemented nearly 99.5 per cent of the commerce ministry's anti-dumping duty recommendations until 2020. However, rejection and non-implementation rates have risen sharply in recent years.

The process to impose anti-dumping duties begins with representations from domestic industry to the commerce ministry's DGTR which then probes whether domestic firms have suffered due to cheaper imports of the product. Based on its final findings, the DGTR recommends to the finance ministry whether an anti-dumping duty should be imposed. ■

Dubai-based Apparel Group considering IPO for its Indian Unit

Dubai-based fashion and life-style retailer Apparel Group is considering an initial public offering for its Indian unit in Mumbai, according to people familiar with the matter.

The company, which operates brands such as Victoria's Secret, Aldo and Crocs in India, has held preliminary discussions with bankers to gauge market sentiment for Apparel Group India Pvt's potential share sale, the people said, asking not to be identified because the information is private.

While the valuation and the IPO size are yet to be decided, banker appointments are expected soon, the people said. The offering could take place later this year or in early 2027, they added. Deliberations are ongoing and details, including the timing of the offering, could still change, the people said.

A representative for the Apparel Group did not immediately respond to a request for comment.

India Operation

Apparel Group India operates over 300 stores in more than 50-cities in the country and manages more than 20 brands, according to its website.

Its portfolio includes Charles & Keith, Dolce & Gabbana Beauty, Levi's Kids, Tim Hortons, Inglot, Call It Spring, Nike Littles and Jordan Kids. ■

Handloom, handicraft sector's production decline

India's handloom and handicraft sector, often celebrated as the backbone of the country's cultural identity and rural enterprise, is facing a prolonged economic slowdown, with a majority of artisan establishments reporting stagnation or decline in production over the past decade, says a report released by the Institute for Human Development (IHD) and Crafts Council of India (CCI) recently.

The report, *Economics of Indian Craft: Estimating Employment and Value Added in the Handicraft and Handloom Sector*, surveyed over 4,600 household units across five states: Assam, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. While the findings underline the sector's massive economic footprint, they also reveal deep structural vulnerabilities threatening its sustainability.

The study estimates that the handloom and handicraft ecosystem in the five surveyed states alone employs more than 6 million workers — nearly 26% of the manufacturing workforce in these states. The sector comprises around 3.4 million establishments, of which 1.8 million are handloom units and 1.6 million are handicraft enterprises. Nearly 42% of manufacturing establishments in these states are linked to handicrafts or handlooms, highlighting the sector's importance in India's informal manufacturing economy.

However, over the last ten years, more than half of handloom units in Assam (50.4%), Tamil Nadu (66.3%) and Uttar Pradesh (51.4%) reported a decline in production scale. Handicraft units in Assam also recorded a sharp contraction, with 53.7% reporting reduced operations. Growth has remained scarce, particularly in Tamil Nadu and Uttar Pradesh, where less than 10% of units reported expansion during the decade.

The report notes that the post-pandemic recovery has remained uneven, with a significant proportion of establishments still operating below pre-Covid levels. The sector has also absorbed successive shocks from demonetisation, GST-related disruptions and volatile market demand.

Financial fragility remains a central concern. Tamil Nadu recorded the highest share of establishments burdened with outstanding loans — 16.8% in handloom and 10.8% in handicrafts. Record-keeping and formal financial management remain extremely weak across the sector, limiting access to institutional credit and government support schemes.

Most enterprises continue to function as tiny proprietary units with limited bargaining power. ■

India's ethnic wear market sees silver line

The Indian ethnic wear market is evolving, and saris are seeing a resurgence in popularity. Direct-to-consumer (D2C) fashion brands are increasingly looking to tap into this trend, betting on a growing number of women embracing drapes as part of their everyday and occasion wear wardrobes. Backed by digital-first strategies, contemporary designs, artisan storytelling, and customised offerings, these brands are attracting younger consumers while expanding their reach and operations.

While established brands continue to command recall value among customers, the market remains highly fragmented. Emerging brands are betting on niche positioning and direct consumer engagement to build loyalty.

Bengaluru-based Ethnic Elements, founded in 2022, focuses on making saris a part of everyday wardrobes rather than restricting them to occasions. Founder Bharati Sadhwani said the company has built its business around lightweight and affordable saris that appeal to modern consumers while preserving traditional weaving techniques. "We want Indian-wear to be viewed as practical, stylish, and comfortable for everyday use," Sadhwani said. Demand is strongest among women aged 25 to 45, particularly in Tier-I and Tier-II cities.

Ethnic Elements has grown into a ₹7 crore business and is now exploring a ₹3-5 crore fundraise over the next 12-18 months. The company plans to use the capital to expand inventory, invest in technology, attract new customers, and strengthen online and offline presence.

Retail consultant firm Redseer observed in its July 2025 report that the sari market in India was valued at \$12 billion in 2024. However, it remains highly fragmented. With over 100 million stock-keeping units and vast regional diversity, about 65 per cent of the market is still unbranded, while regional brands account for the other 25-30 per cent. "The sari market spans fabrics, motifs and regional identity. Saris represent a

unique opportunity, one that the modern retail ecosystem is yet to fully unlock," said Kushal Bhatnagar, partner, Redseer Strategy Consultants.

Ahmedabad-based luxury label Raedh Amdavad, founded in 2024, is taking a different route. The brand caters primarily to brides and occasionwear customers through heavily embroidered saris and heritage weaves such as Patola.

Founder and designer of Raedh Amdavad, Jaahal Gadhvi, said, "Personalisation has emerged as a key growth driver, with customers commissioning custom pieces and even having their names embroidered into garments intended to become family heirlooms."

The label remains self-funded and is focusing on steady, organic growth. The company has reported a 15 per cent increase in sales between its first and second years of operation and aims to reach annual revenue of ₹1 crore-1.5 crore by 2028.

Shilpsutra, a luxury label from the Delhi-National Capital Region, is focusing on premium craftsmanship and contemporary styling. Having raised ₹75 lakh in funding last year, the company says it does not expect requiring additional capital for the next two to three years.

One of the latest and most prominent brands on the D2C scene is Suta, which operates 22 stores across India, including its newest outlet in Jaipur, and has also expanded to Mauritius. Founded in 2016 by sisters Sujata Biswas and Taniya Biswas, Mumbai-based Suta works with over 17,000 artisans and weavers.

Shilpa Agarwalla, founder and chief executive officer, Shilpsutra, said that the company is seeing rising demand for contemporary blouse silhouettes that can be styled across multiple occasions. Its hand-painted silk and organza saris are among its best-performing categories. This reflects growing consumer interest in artisanal products with modern aesthetics. ■

RECENT ADVANCES IN ENZYMATIC PRETREATMENT OF LINEN FABRIC DYED WITH TEAK LEAVES (WITH XYLANASE)

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Introduction

The demand for natural dyes has been growing over the years with the increasing awareness of sustainable textile materials, the teak leaves have received much attention not only because they are abundant, renewable and biodegradable, but also in regards to their capacity of imparting functional properties to the textile materials. Teak leaves are used in the production of textiles, which helps to make efficient use of plant resources and contributes to sustainable textile production. Apart from giving the wood attractive colours, teak leaves also have some bioactive compounds which can be used as antimicrobial and antioxidant agents in dyed fabrics.

Korać and Khambholja (2011) had reported that teak leaves (*Tectona grandis*) are one of the valuable sources of natural dyes which can give attractive reddish-brown to maroon color to the textile materials. The authors said that teak leaves consist of anthocyanins, tannins, flavonoids, and phenolic compounds which impart colour and functional properties.

Rather et al., 2016 noted that in the past, the growth of environmental concerns surrounding synthetic dyes and chemical-heavy methods of textile dyeing and processing has spurred the search for sustainable alternatives to these traditional methods in the colouring of textiles. The authors explained that they have become an appropriate alternative due to the fact that they are biodegradable, eco-friendly and non-toxic. Natural dyes can also be used to give textile materials antimicrobial, antioxidant and UV protection properties as well as colouration.

Samanta and Agarwal (2009) reported that increased consumer demand for the environment friendly textile products has pushed plant based natural dyes into the spotlight. The authors emphasized that teak leaves are one of the important natural dye sources as they contain a large amount of anthocyanins, tannins, flavonoids, and phenolic compounds. **Bechtold and Mussak (2009)** also mentioned that natural dyes containing high levels of bioactive substances are not only attractive dyes but also give functional characteristics to textile fibres.

Gulrajani (2010) noted that linen is a natural bast fibre extracted from the stem of flax plant

(*Linum usitatissimum*). The author concluded that Linen has good strength, durability, moisture absorbency, breathability and biodegradability properties, and is suitable to be used in textile apparel, home textiles and technical textiles. Linen, however, is a very crystalline fibre and contains non-cellulosic components that frequently limit the penetration of the dye and its absorption.

Akin et al. (2007) noted that the non-cellulosic components in flax fibres serve as barriers and restrict the interaction between dye molecules and fibre surface. Enzymatic pretreatment is a green alternative to conventional chemical methods to offset these limitations.

Shukla and Reddy (2012) reported that xylanase is a hemicellulolytic enzyme which can break down xylan from plant fibres. The authors noted that xylanase treatment enhances fibre accessibility due to the hemicellulosic barrier removal from the fibre as well as increasing fibre porosity. **Kamel et al. (2011)** also reported that enzymatic pretreatment is also beneficial in terms of dye penetration and colour development without significantly degrading the fibre structure. Hence, xylanase treatment has attracted much interest as a sustainable method for enhancing the dyeability of linen fabrics.

Ganesan et al. (2013) reported that natural dyes with phenolic compounds have antimicrobial activity and antioxidants, which are beneficial for the functional properties of the textile products. **Yusuf et al. (2017)** also mentioned that natural sources of flavonoids and anthocyanins are important constituents for the formulation of multifunctional textiles for healthcare, hygiene and apparel applications. The colour as well as the antimicrobial property obtained in the dyed fabric can be attributed to the bioactive compounds in teak leaves. The aim of the study entitled, "Recent Advances in Enzymatic Pretreatment of Linen Fabric Dyed with Teak Leaves" is as follows:

1. To treat linen fabric using enzymes.
2. To use the natural dye treatment to dye the treated fabric and evaluate the colour properties.
3. To study the antimicrobial activity of the enzyme treated natural dyed samples.

The utilization of xylanase on natural dyes has been proven to be beneficial in sustainable textile processing in recent studies. Xylanase treatment has been found to enhance the accessibility of

fibres and improve dye uptake, and the natural colour and functional properties of teak leaves. Hence, the xylanase-assisted dyeing of linen fabric using teak leaves is emerged as an eco-friendly, versatile approach to achieve eco-friendly and multifunctional textile materials.

The impact of xylanase pretreatment on the dyeing behaviour of linen fabric dyed with teak leaf extract has been the focus of the present review. The previous studies are also reviewed in terms of characteristics related to the colouration, antimicrobial activity, functional properties and sustainability aspects of the dyed fabric..

2.0 Materials and Methods

Materials

Materials and Collection of Fabric

Plain woven 100% linen (*Linum usitatissimum*) fabric (greige) was used as the base substrate. The fabric sample was procured from The Design Cart, a B2B wholesale platform known for its diverse supply of handloom and textile products. The fabric sample of 1.5 metre with 1.2 metre width weighed 270gms specifications of the linen fabric as below:

Thickness: 0.35 mm, GSM: 68 g/m², Yarn count: 40s (warp) and 42.6s (weft), EPI & PPI: 60 ends per inch & 54 picks per inch, Weave: Plain, Colour: White.

Selection of Enzymes

Three different enzymes were selected for pre-treatment of the linen fabric: Beta Glucanase, Xylanase & Pepsin

Sl. No.	Enzyme Name	Enzyme Class	Source	Role in the Research
1	Beta Glucanase	Carbohydrase (Hydrolase)	Microbial (Commercial preparation)	Used to partially hydrolyze β -glucans found in the non-cellulose regions of linen, increasing surface availability and dye uptake.
2	Xylanase	Hemicellulase	Microbial (e.g., <i>Aspergillus</i> spp.)	Applied to degrade hemicellulose (xylan), assisting in the removal of matrix substances and improving fabric porosity for efficient dyeing.
3	Pepsin	Protease	Animal (Porcine gastric mucosa)	Utilized to hydrolyze proteinaceous impurities and modify the fiber surface, aiding in better fixation of natural dyes and enhancing antimicrobial interactions.

2.1.2. Selection of Natural Dyes

One plant-based natural dye used for coloring the linen fabrics was: Pomegranate rind (*Punica granatum*)

Sl. No	Local Name	English Name	Scientific Name	Family	Parts Used	Sources
1.	Sagwan	Teak leaves	<i>Tectona grandis</i>	Lamiaceae	Leaf	

2.1.4. Selection of Microbes

To evaluate the antimicrobial efficacy of the dyed fabric, the following bacterial strains were used: *Pseudomonas aeruginosa* (Gram-negative) & *Bacillus subtilis* (Gram-positive).

Sl. No.	Microorganism	Gram Reaction	Biological Classification	Source	Purpose in the Present Study
1	<i>Pseudomonas aeruginosa</i>	Gram-negative	Bacteria (Proteobacteria)	Department of Microbiology, RPCAU	Used to evaluate the antibacterial efficacy of the treated and dyed linen fabric against common Gram-negative pathogens.
2	<i>Bacillus subtilis</i>	Gram-positive	Bacteria (Firmicutes)	Department of Microbiology, RPCAU	Selected to assess the antimicrobial activity of treated linen samples against Gram-positive organisms.

Selection of Microbial Strains Used in the Study

Methods

Preparation of fabric before dyeing

As a preparatory step, the fabric was destarched by washing it with a neutral soap solution prior to the application of enzymatic and dyeing treatments. This ensured removal of surface starch and processing residues, thereby enhancing dye penetration and enzyme efficacy.

Recipe for Destarching of Linen Fabric

Process	Details
Objective	To remove starch, surface impurities, and processing aids from the linen fabric prior to enzymatic treatment and dyeing.
Fabric Used	100% Linen (Greige) — plain weave, lightweight
Fabric Weight	Approx. 270 g (1.5 m length × 1.2 m width)

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Solution Type	Neutral soap solution
Soap Concentration	5 g/L (neutral/non-ionic detergent)
Liquor Ratio	1:30 (Fabric: Water)
Temperature	60°C
Time	30 minutes
Apparatus	Water bath with temperature control and mild agitation
Post-treatment	Rinsed thoroughly with distilled water and air-dried in shade

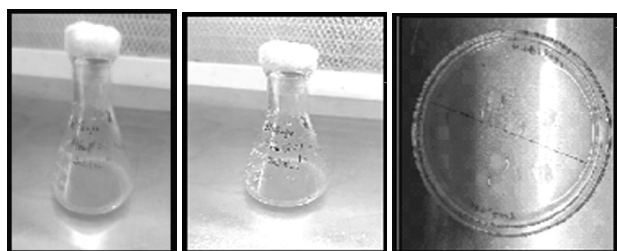
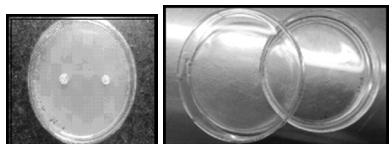
Dye uptake

After destarching and deactivation linen samples were washed, dried and then dyed with natural dyes -, onion peels, pomegranate rind and teak leaves at predetermined optimum condition.

Percentage dye uptake was calculated by measuring absorbance before and after dyeing.

$$\% \text{ of dye uptake} = \frac{\text{Absorbance before dyeing} - \text{Absorbance after dyeing}}{\text{Absorbance before dyeing}} \times 100$$

Evaluation of Antimicrobial resistance



The antimicrobial activity of enzyme-treated linen fabrics was evaluated using the agar diffusion method. Nutrient agar was prepared by dissolving specific quantities of agar and nutrient components in distilled water, followed by sterilization at 121°C for one hour. The medium was poured into

sterile petri dishes and allowed to solidify. The agar surface was then inoculated with microbial cultures to create a uniform lawn. Fabric samples were placed carefully on the inoculated agar and incubated at 37°C for 72 hours. After incubation, the diameter of the zone of inhibition around each fabric sample was measured in millimeters, indicating the effectiveness of antimicrobial activity imparted by the treatments.

Results

Standardization of Xylanase

This section presents the findings on the impact of Xylanase enzyme treatment on linen fabric at concentrations of 1%, 2%, and 3%. The treated fabrics were evaluated for visual and physical characteristics, including color, texture, luster, odour, weight loss, and tensile strength.

Effect of Xylanase Enzyme Treatment on Linen Fabric at varying Concentrations

The Effect of Xylanase Enzyme Treatment in varying concentrations were presented in Table and Fig 3.1, Fig 3.2

Table 3.1.1.1 Effect of Xylanase Enzyme Treatment on Linen Fabric at Different Concentrations (35°C, 10 minutes)

Parameter	1%	2%	3%	Mean	SD	CV (%)	SEm	SEd	CD (5%)
Colour	3	4	5	4.00	1.00	25.00	0.58	0.82	2.27
Weight	6.6	6.3	6.0	6.30	0.30	4.76	0.17	0.24	0.67
Texture	2	2	3	2.33	0.58	24.94	0.33	0.47	1.31
Lustre	2	2	3	2.33	0.58	24.94	0.33	0.47	1.31
Odour	1	1	1	1.00	0.00	0.00	0.00	0.00	0.00
No. of Warp	41.5	47.0	52.0	46.83	5.27	11.26	3.04	4.30	11.94
No. of Weft	48.5	46.0	44.0	46.17	2.27	4.91	1.31	1.85	5.13

Note: Color was rated on a 1–5 scale (1 = Poor, 5 = Excellent), while texture and lustre were evaluated on a 1–3 scale. Odour was consistently rated as 1, indicating no detectable smell.

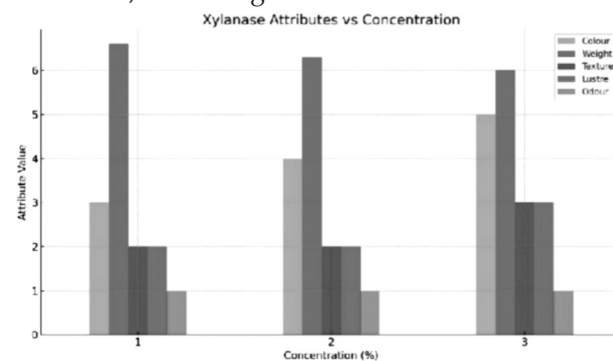


Fig 3.1: Bar chart illustrating the variation of Colour, Weight, Texture, Lustre, and Odour with increasing concentration levels (1%, 2%, and 3%)

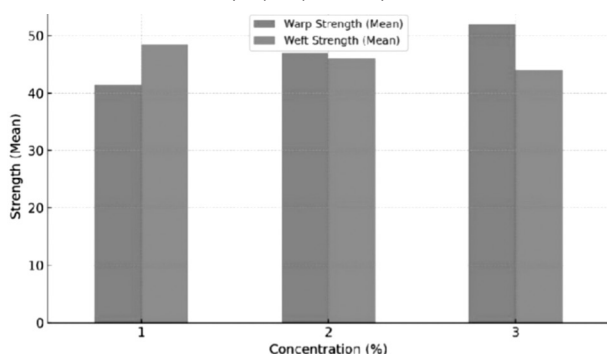


Fig 3.2: Bar chart showing the mean Warp and No. of Weft at different concentration levels (1%, 2%, and 3%).

Table 3.1.3.1 and Fig. 3.5, Fig. 3.6 illustrate that, building upon the established optimum of 3% Xylanase for 30 minutes, further optimization was conducted by varying treatment temperatures (30°C, 50°C, and 70°C) for linen fabric dyed with teak leaves. At 30°C, limited improvements were observed, with lower colour development, higher fabric weight, and minimal enhancement in surface characteristics and tensile strength. Moderate results were obtained at 50°C, showing improved colour intensity, reduced fabric weight, and slight improvements in fabric properties. The most favourable results were achieved at 70°C, with deeper colouration, enhanced texture and lustre, reduced fabric weight, and improved warp strength. These findings confirmed 70°C as the optimal temperature for achieving superior aesthetic and mechanical properties in Xylanase-treated linen fabric dyed with teak leaves.

3.5.3.1. Spectrophotometric Evaluation of Natural Dyed Linen Fabrics Treated with Different Enzymes

The Spectrophotometric Absorbance at 320 nm of Dyed Linen Fabrics were presented in Table 3.5.3.1 and Fig. 3.21

Table 3.5.3.1:

Sample	Teak Leaves
Control	0.85
Without Enzyme	0.88
Beta Glucanase	1.40
Xylanase	1.65
Pepsin	1.78

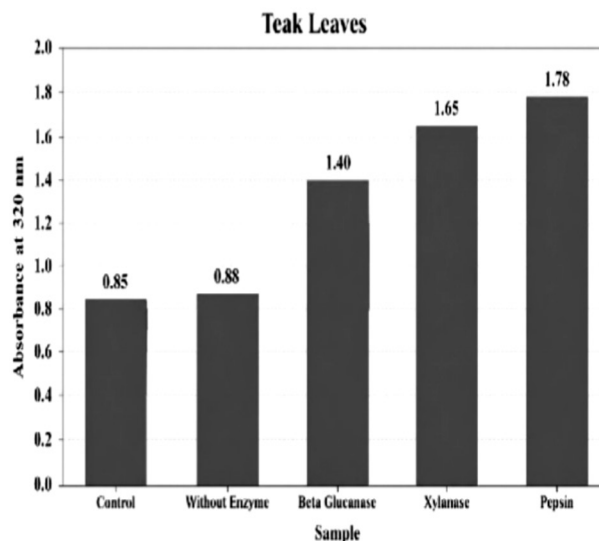


Fig 3.21: Spectrophotometric Absorbance at 320 nm for Dyed Linen Fabrics

Table 3.5.3.1 and Fig. 3.21 illustrate the spectrophotometric absorbance at 320 nm of linen fabric dyed with teak leaves following Xylanase treatment. The Xylanase-treated sample exhibited an absorbance value of 1.65, which was considerably higher than the control (0.85) and without-enzyme sample (0.88). The increase in absorbance indicates improved dye uptake and fixation of teak leaf dye within the fibre structure. The enhanced colour strength may be attributed to the action of Xylanase in removing hemicellulosic substances from the fibre surface, thereby increasing fibre accessibility and dye penetration. These findings suggest that enzymatic pretreatment with Xylanase effectively improves the dyeability of linen fabric and enhances the overall performance of teak leaf dyeing.

3.5.4. Determination for Tensile Strength Property

The tensile strength of dyed linen fabrics was recorded and presented in Table 3.5.4.1 and Fig. 3.22

Table 3.5.4.1: Tensile Strength of Dyed Linen Fabrics

Treatment	Natural Dye
Sample	Teak Leaves
Control (without enzyme)	42 N
Beta Glucanase	42 N
Xylanase	44 N
Pepsin	47 N

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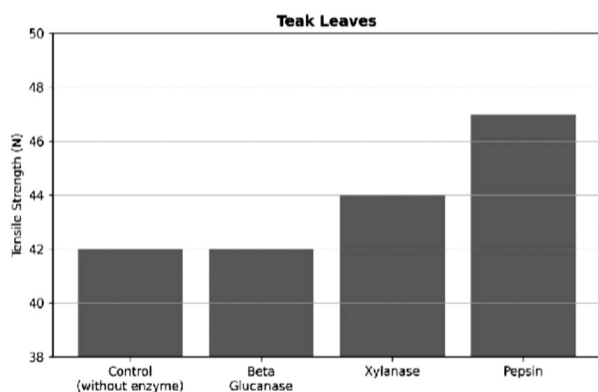


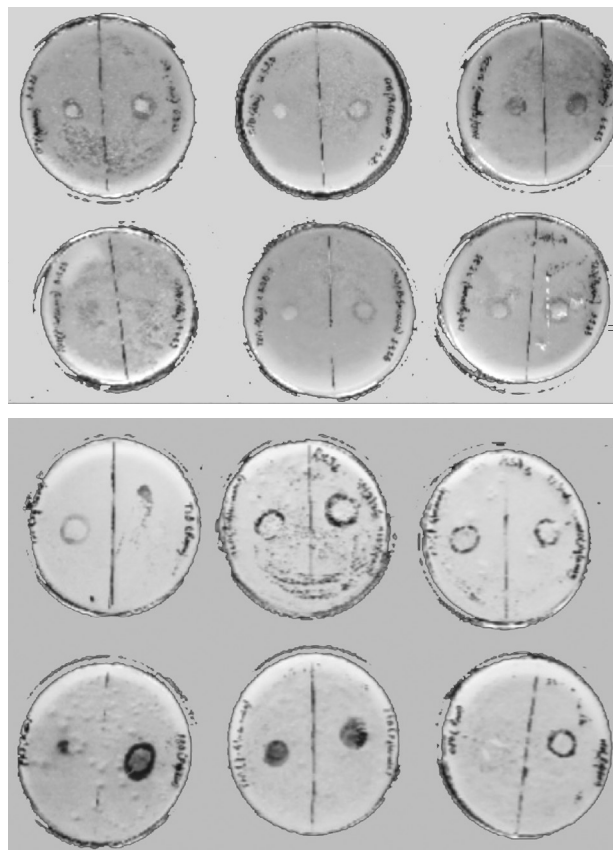
Fig 3.22: Tensile Strength of Linen Fabric Dyed with Natural Dyes under Different Enzymatic Treatments.

Table 3.5.4.1 and Fig. 3.22 illustrate the tensile strength of linen fabric dyed with teak leaves following different enzymatic treatments. The results revealed that enzymatic pretreatment improved the tensile strength of the dyed fabrics compared to the untreated control sample. Among all the treatments, Xylanase-treated fabric exhibited the highest tensile strength (44 N), indicating improved fabric strength and structural integrity. The control fabric without enzymatic treatment showed the lowest tensile strength value (42 N), while the Beta Glucanase-treated fabric recorded a similar tensile strength value. The improvement in tensile strength may be attributed to the effective removal of hemicellulosic impurities by Xylanase, resulting in better fibre accessibility and improved fabric structure. These findings suggest that Xylanase pretreatment enhances the mechanical performance of teak leaf dyed linen fabric and contributes to improved fabric strength and durability.

3. 7. Evaluation of Antimicrobial Activity in Enzyme-Treated Linen Fabrics

This study assessed the antimicrobial activity of enzyme-treated linen fabrics against *Pseudomonas aeruginosa* and *Bacillus subtilis*. Four samples—control, β -glucanase-, xylanase, and pepsin-treated—were evaluated using the agar diffusion method. Samples were incubated at 37°C for 24–48 hours, and inhibition zones were measured in millimetres. The results aimed to determine the effectiveness of enzymatic treatments in enhancing bacterial resistance, supporting the development of functionally improved linen textiles. Gulrajani (2010) highlighted that linen's dyeing behavior is influenced by fiber morphology,

polymerization, and non-cellulosic content, which can hinder absorption. Kamel et al. (2011) found that enzymatic pre-treatments like β -glucanase, xylanase, and pepsin improved dye penetration and removed non-cellulosic layers without damaging fibers.



Antimicrobial Activity of Dyed Linen Fabric against *Bacillus subtilis* and *Pseudomonas aeruginosa*

Inhibitory Zone Diameter (mm) for Teak leaves –Dyed Fabrics

The Inhibitory Zone Diameter (mm) for Teak leaves –Dyed Fabrics was presented in Table and Fig 3.23.

Table 3.7.1.1: Zone of Inhibition (mm) of Teak leaves –Dyed Fabrics

Sample	<i>Pseudomonas aeruginosa</i>	<i>Bacillus subtilis</i>	Mean	SD	CV (%)	SEm	SEd	CD (5%)
Control	0	0	0.00	0.00	0.00	0.00	0.00	0.00
Beta glucanase	7	9	8.00	1.41	17.68	1.00	1.41	3.92
Xylanase	9	12	10.50	2.12	20.19	1.50	2.12	5.90
Pepsin	11	13	12.00	1.41	11.79	1.00	1.41	3.92

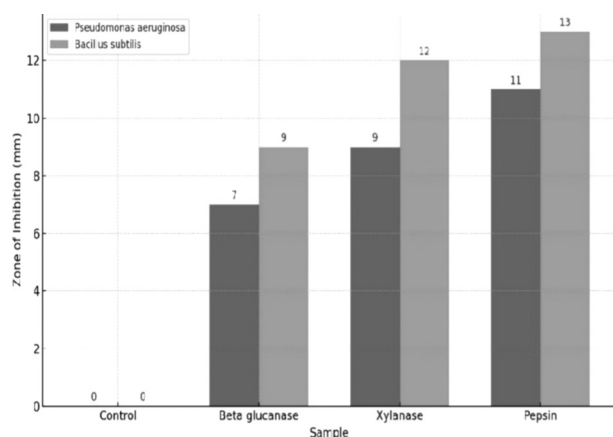


Fig 3.23: Antibacterial Activity of Teak leaves-Dyed Linen Fabric

Table 3.7.2.1 and Fig 3.23 illustrates that enzymatic pretreatment significantly enhanced the antimicrobial activity of teak leaves-dyed linen fabrics. While control samples showed no inhibition, pepsin-treated fabrics exhibited the highest zones (13 mm for *Pseudomonas aeruginosa*, 11 mm for *Bacillus subtilis*), followed by xylanase (9-12 mm) and β -glucanase (7-9 mm). The results highlight the role of enzymes in strengthening dye-fiber interactions and activating antimicrobial components, supporting the development of sustainable, multifunctional textiles for hygiene and healthcare use.

FINAL RESULTS

Table 3.7.3.2 Showing the best combined Enzyme-dye-Microbes treated fabric

Dye source	Beta glucanase (%)	Xylanase (%)	Pepsin (%)	Bacillus subtilis (ZOI)	Pseudomonas aeruginosa (ZOI)
Teak	7.48	9.94	13	13	11

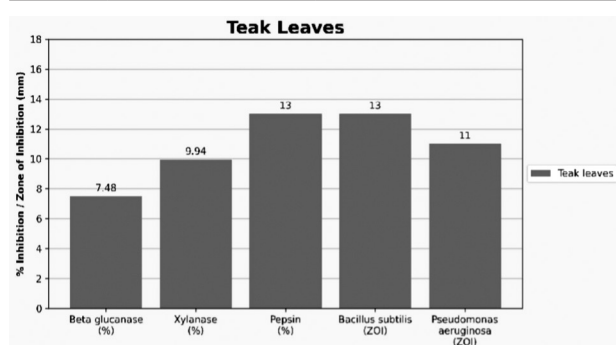


Figure 3.24: Showing the best combined Enzyme-dye-Microbes treated fabric

Table 3.7.3.2 and Fig. 3.24 illustrate the antimicrobial activity of Xylanase-treated linen

fabric dyed with teak leaves. The results showed that the treated fabric exhibited measurable antimicrobial effectiveness against both *Bacillus subtilis* and *Pseudomonas aeruginosa*, indicating the functional potential of the natural dye-enzyme combination. The percentage inhibition recorded for the Xylanase-treated sample was 9.94%, demonstrating its ability to suppress microbial growth. The zone of inhibition values observed against *Bacillus subtilis* and *Pseudomonas aeruginosa* were 13 mm and 11 mm, respectively, confirming the antibacterial properties of the treated fabric.

The antimicrobial activity may be attributed to the presence of flavonoids, tannins, anthocyanins, and other phenolic compounds naturally present in teak leaves, which are known for their antimicrobial properties. The Xylanase pretreatment likely enhanced dye absorption and fixation on the linen fibres, resulting in greater retention of these bioactive compounds. These findings indicate that Xylanase-treated linen dyed with teak leaves possesses effective antibacterial characteristics and can be considered a promising eco-friendly textile material with functional antimicrobial performance.

Discussion

Zone of Inhibition (mm) of Teak Leaf-Dyed Fabrics

The study revealed that Xylanase pre-treatment enhanced the antimicrobial activity of linen fabrics dyed with teak leaf extract. The treated fabric exhibited notable inhibition against *Bacillus subtilis* and *Pseudomonas aeruginosa*, indicating the effective retention of bioactive compounds present in teak leaves. Shahid and Mohammad (2013) reported that natural dyes rich in phenolic compounds, tannins, and flavonoids possess inherent antimicrobial properties against a wide range of microorganisms. Similarly, Yusuf et al. (2017) stated that plant-based natural dyes containing bioactive constituents can impart functional properties such as antimicrobial activity to textile materials.

The antimicrobial activity observed in the present study may be attributed to the tannins, flavonoids, anthocyanins, and phenolic compounds naturally present in teak leaves. Ali et al. (2023) reported that enzyme-assisted dyeing enhances the absorption and fixation of natural dyes on textile fibres, thereby improving their functional performance. The inhibition zones recorded against *Bacillus subtilis* (13 mm) and *Pseudomonas aeruginosa* (11

RECENT ADVANCES IN ENZYMATIC PRETREATMENT OF LINEN FABRIC DYED WITH TEAK LEAVES (WITH XYLANASE)

mm) suggest that Xylanase treatment improved the interaction between teak leaf dye and linen fibres, resulting in enhanced antibacterial effectiveness. These findings support the potential application of Xylanase-treated teak leaf dyed linen fabrics in sustainable, antimicrobial, and value-added textile products.

FINAL RESULTS

Teak leaves exhibited considerable antimicrobial activity, particularly against *Bacillus subtilis* (13 mm) and *Pseudomonas aeruginosa* (11 mm). Shahid and Mohammad (2013) reported that tannins, flavonoids, anthocyanins, and phenolic compounds present in natural dyes contribute significantly to their antibacterial properties.

Antimicrobial analysis revealed that Xylanase-treated and teak leaf dyed fabrics effectively inhibited the growth of *Pseudomonas aeruginosa* and *Bacillus subtilis*. Ali et al. (2023) reported that enzyme-assisted dyeing enhances the functional performance of naturally dyed textiles through improved dye absorption and fixation. The present findings support this observation and demonstrate that Xylanase pretreatment can improve the antimicrobial performance of teak leaf dyed linen fabrics, making them suitable for sustainable and functional textile applications.

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CM lays foundation stone for ₹600-cr. garment hub in Bengal

West Bengal Chief Minister Suwendu Adhikari laid the foundation stone for a ₹600-crore Lux Cozi garment hub in Dankuni recently. The company officials said that the plant will be one of the largest garment manufacturing hubs in Asia.

Mr. Adhikari said the State will soon get foreign investments and industries to help it grow and retain its young talent. “You will get the benefit of ‘double-engine’ sarkar... We must end the extortion and syndicate racket in Bengal.

Ministers Tapas Roy, Arjun Singh, Sharadwat Mukherjee and Bharatiya Janata Party State president Samik Bhattacharya were also present at the event.

He added that West Bengal has all the right resources to become an industrial hub in the coming days.

“The Dankuni facility will not only strengthen our production capabilities but will also create meaningful employment, accelerate regional industrial development and contribute to India’s emergence as a global textile and apparel manufacturing powerhouse,” Lux Industries Ltd. chairman Ashok Todi said during the event.

The project is likely to generate 3,000 direct and 6,000 indirect employment opportunities. This automated facility will consolidated manufacturing, eliminate regional processing bottlenecks, and reduce wastage. ■

COMFORT CLOTHING FOR CONSCIOUS CONSUMERS

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INTRODUCTION

Today consumers are increasingly looking for everyday garments offering greater comfort than ever before. In an era where comfort and sustainability are paramount, the demand for skin-friendly and sustainable clothing is on the rise. Intimate apparel is the most important clothing layer since it acts as human's second skin. As intimate apparel contacts with the skin directly, its comfort characteristics are more important than that of outerwear. The current intimate apparel and retail environments are challenging and there is a clear indication of consumer demand for extraordinary comfort and performance using fabrics that have special properties.

Moreover the space emptied by formals has been taken over by an increase in demand in athleisure and loungewear. Athleisure is casual comfortable clothing fit for exercise and everyday wear. One of the primary aspects driving this trend is a rise in consumer fitness and health consciousness, which is generating the demand for comfortable and fashionable clothes. The major brands are eyeing the casual apparel category as the consumer's focus is shifted to athleisure. Sustainability, a long-standing fashion trend, has made its way into the intimate apparel and athleisure sector. Hence, big brands have shifted their focus on the same. This article reviews the latest technological developments in fibers used in the manufacturing of intimate apparel products and casual wear and its impact on clothing comfort.

MOBILON

MOBILON is a polyurethane product developed by Nissinbo Textile's proprietary polymer technology. High-quality, high-performance MOBILON products are made in Japan. They have excellent functionality and popular for their soft texture. Mobilon spandex offers comfort fit with soft power but firm grip.

Advantages:

- ❖ Its unique features are its soft elasticity and gentle recovery.
- ❖ MOBILON has a higher anti-slip effect than normal spandex and has excellent chlorine and light resistance.
- ❖ Compared to conventional dry type spandex, the soft stretch and tightness of this fabric

makes it easy to move and comfortable to wear for long periods of time without feeling stress.

- ❖ Fabrics using MOBILON have superior anti-slip effect than dry spun spandex, because the contact area to skin is larger as the yarn is spun side by side.
- ❖ MOBILON fabrics can be heat set at lower temperatures, allowing acrylics, wools, and other fabrics that are sensitive to heat to retain their softness.
- ❖ They are also dimensionally stable and shrink less after washing.
- ❖ MOBILON has acquired OEKO-TEX certification, which is Class1 for babies. The CO2 emissions from the manufacturing process of MOBILON are significantly reduced compared to dry spandex.
- ❖ In addition, MOBILON has less impact on the environment because it does not use organic solvents.

End Uses:

- ❖ It is available in yarn, tape, band, film, and other forms. It caters to a wide range of products for apparel, medical, skin care, household products and other materials.
- ❖ MOBILON is effective in preventing fraying by heat-fusing spandex to each other. MOBILON has excellent anti-fraying effect and is ideal for non-run stockings and seamless inner wear.
- ❖ Its high strength retention rate makes it suitable for use in swimwear and other applications.

Nissinbo Textile Inc. assures that they will contribute to the solution of environmental issue as 'Environment and Energy Company Group'.

DEOCELL

Consumers' awareness of hygiene and active lifestyle has created an increasing demand for anti-odor textiles. Deocell is a newly invented product whose main characteristic is to instantly neutralize surrounding odors. It also has a bacteriostatic function. It maintains its effect after washing, does not release harmful substances and is soft on the skin. Deocell is deodorant Modal natural cellulosic fibre. As Deocell is not a post processing fibre, its deodorant effect will be maintained even after several washes.

COMFORT CLOTHING FOR CONSCIOUS CONSUMERS

Technology:

- ❖ Deocell eliminates the alkaline odour by neutralizing ammonia or trimethylamine compounds.
- ❖ Deocell neutralises only the bad odours and does not kill the bacteria. It keeps the wearer all day fresh and the wearer does not have to spend additional money on perfumes.
- ❖ Deocell is nano treated at Japan on base of Lenzing micromodal fibre.
- ❖ This fibre basically eliminates three odours and the fabric can be very well termed as anti-acetic acid, anti-ammonia and anti-isovaleric acid.
- ❖ Also pH controlling is yet another important feature and the fibre retains pH in weak acidity and is friendly to the skin.
- ❖ By mixture of Lenzing Modal Microair into the fibre, the feel becomes much more softer.
- ❖ Deocell Dry is composed of polyester made from recycled plastic bottles and Deocell.
- ❖ Deocell Eco consists of Deocell, organic cotton and recycled polyester and is used to make eco-friendly yarn.

Processing guidelines:

- ❖ The content of Deocell fibre required is about 5-10 % for fabric materials with 100-200 gsm.
- ❖ While processing the yarns or fabrics with Deocell, the customers are advised to follow the process guidelines strictly.
- ❖ Hardness of water used for dyeing, bleaching and washing should be less than 30 ppm.
- ❖ Hydrogen peroxide bleaching is only recommended.
- ❖ pH has to be maintained between 5 and 5.5. anionic or non-ionic softener is only preferred.

PRELEAL – WarmCel yarn

WARMCEL yarn is an intimate blended spun yarn with 70% Acrylic Micro PRELEAL fibre from TOYOKA, Japan and 30% Viscose LIVA ECO fibre from Birla Cellulose, India. The Preleal offers a very soft pleasant feel acrylic microfibre of fineness 0.10 dtex or less using low-specific-gravity material resulting in light weight feel using EXLAN technology.

Advantages:

- ❖ Its unique features are its silky touch, soft texture, warmth and it doesn't get clammy as the gathering of microfibres that have capillary action can reduce clinging.

- ❖ Liva Eco Viscose is sustainable, bio-degradable and cellulosic origin.
- ❖ Ring Compact spun yarn delivers yarn of intimate fibre blending and even yarn and higher strength.
- ❖ Preleal Acrylic fibre offers superb heat retention. The heat retention ratio is double that of cotton when compared for similar fabric structure.
- ❖ Liva ECO Viscose absorbs moisture efficiently and micro acrylic supports in transporting the moisture thus keeping the skin dry.
- ❖ Sheen of the fabric and depth of colour are good with viscose blend and also the warmth is ensured due to better hygroscopic nature of the viscose cellulose.

ZINC + CEL

Zinc+Cel yarn is an intimate blended spun yarn with 60% Bamboo Viscose fibre and 40% Nano Zinc Oxide Polyester, Perma. Nano Zinc Oxide ($n\text{ZnO}$) is added into the polyester fibre producing solution thus it is embedded into the fibre. Nano Zinc Oxide Polyester helps to eliminate the growth of *Staphylococcus aureus* and *Klebsiella pneumoniae*. These two bacteriae cause malodour, skin diseases, allergies, and other respiratory diseases. This functionality has been proven by international lab testing. Bamboo Viscose is produced from the wood pulp sourced out of bamboo which has anti-bacterial function. Ring SIRO Compact spun yarn delivers yarn of low hairiness and hence better pilling resistance, even yarn and higher strength.

Advantages

Anti-Bacterial and Anti-Odour:

Nano Zinc Oxide Polyester Perma offers microbial resistant textile. Reusable - 150 wash cycle test data shows that Zinc Polyester fibre helps in eliminating prominent bacterial growth. Mal odour causing bacteriae are eliminated by nano Zinc oxide polyester and the wearer stays fresh.

Moisture Management:

Bamboo viscose with good hygroscopic nature absorbs moisture rapidly and keeps the skin dry.

Skin Care Function:

Prevents acne, reduces infection rate and less odor. Bamboo viscose is soft to the skin with 60% constituent of the yarn. Bio Compatible/Skin irritation free fabric. Cytotoxicity Proof - Tested by Department of Bio Medical Engineering under ISO

10993:5-2009 has proved that Perma fibre is non-toxic / Cyto-toxicity proven.

UV- Protection:

Ultraviolet protection UPF 40+

Environmentally Friendly:

- » Toxic chemical free
 - i) The Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) or the EU Chemical Regulations shows that there is no 201 toxic chemical leak to the environment through the Perma, Nano Zinc Oxide Polyester product. And Perma key element (Zinc Oxide) has international FDA approval.
 - ii) Oeko-Tex standard 100 - Annex 6, product class I, have shown that the PERMA goods meet the human-ecological requirements of the STANDARD 100 by OEKO-TEX for baby article. It means, the product made from Perma fibre are eligible to use even for baby wear due to no harm.
- » Non- Coated / Not Dilute – This is the key concept of nZnO polyester fibre, Perma. Perma does not follow any finishing treatment or coating method. Nano zinc oxide is mixed into the polyester polymers in the extrusion of fibre forming cycle.

EKS FIBRE

The movement of heat, moisture, and air through a fabric are key factors impacting the comfort of clothing. Through various technologies, fabrics can keep the body cool, warm, or thermo regulate in response to changes in environmental conditions including the wearer's body temperature and perspiration rate. Wear comfort can be divided into four main aspects such as thermal comfort, sensorial comfort, body movement comfort, and aesthetic comfort. Thermal comfort is the satisfaction of a person with the thermal environment, and to do so there is a thermal balance between the human body and the environment and the proper balance between body heat production and heat loss. Thus, the person feels neither too cold nor too warm.

EKS fibre is a high function acrylic fibre that creates a pleasant micro climate continuously in between your body and daily wear. Human body while idling at rest releases perspiration in the form of invisible vapour. It absorbs 'insensible perspiration' which is invisible in the form of vapour to keep the body dry and comfortable. It

generates heat by absorbing moisture from human body

Properties:

- » It is light weight with easy care properties.
- » 7-20% EKS Acrylate can be added for thermal inner wear as per the requirement of cold weather in consumer's environment.
- » It is economical than woollen blended garments.
- » It cannot be dyed and only dope dyed / fibre dyed cellulosic fibres can be blended with EKS fibres.
- » This is a hygroscopic heat generating material. The fibre also converts the kinetic energy of the absorbed water vapour into heat energy.
- » Maintains a comfortably warm temperature inside the garment even in cold winter environment.
- » It generates heat by absorbing moisture from human body.
- » It has excellent deodorizing effect.
- » Generally accumulation of moisture results in alkalization of salt and reproduction of unwanted bacteria creating unpleasant odour. The fibre has ability to neutralize the alkali and breakdown perspiration and odour.
- » The fibre also has excellent insulation ability and locks in the generated heat and prevents it from dissipating.
- » The speed with which it dries after washing is 3 times better than cotton

CONCLUSION

Sustainable clothing is characterized by its focus on durability, quality, and eco-friendliness. Brands embrace the ethos of comfort, quality, and eco-consciousness. In a world where comfort and sustainability are increasingly valued, skin-friendly and sustainable clothing has carved its niche. The garments not only prioritize comfort and style but also make a positive impact on the environment. It's a shift towards a more sustainable, responsible, comfortable clothing approach, enhancing our well-being while caring for the planet. As the industry examines areas of growth, brands are seeking partners with strong technical knowledge, ability to translate trends into consumers' favourite products, and global capabilities that leverage the opportunities that come with change. ■

AIPAN ART OF UTTARAKHAND: JOURNEY OF FOLK TO CONTEMPORARY TEXTILE DESIGN

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ABSTRACT

India is a country rich in crafts and the arts, and folk art is the art of daily life. Folk art, in contrast to high art, is purely decorative and functional rather than entirely artistic. The printing and embroidery techniques used in Indian folk art are crucial in the development of new designs. The fashion business must adapt to the growing demands of consumers in terms of design, color, style, and technique. This offers the chance to conserve the exquisite traditional folk art and employ the modified traditional designs on textiles. The buti, border, and center designs of saris were created using adapted Aipan motifs, which were also used to create a design pool for applique work. This study is based on a thorough analysis of the resurgence of Aipan art, incorporating the motifs into textiles, as a growing number of designers are motivated by the allure of traditional folk art and craft styles from other states. This art came into being as a means of empowering women. It would be accurate to state that Aipan art has greatly aided in the empowerment of women. Comprehensive data regarding Aipan design, themes, and applications was gathered. This study focus on the Aipan art with special emphasis to the present scenario of the Aipan art and to study its evolution from the past to present and application of folk art on home textile and apparel, wall hangings as well as craft items and more.

Key words: Folk art, Aipan, Aripa, Contemporary textile design, Home textile, Apparel design.

INTRODUCTION

Uttarakhand is a state endowed with snow-capped peaks, elusive glaciers, winding rivers, mist-filled valleys, and unusual plant and animal life. Uttarakhandis have long produced and nurtured a variety of arts and crafts, many of which have been influenced by this unspoiled natural beauty.

The traditional (folk) art forms that are inspired by the lush green trees and plants of the Kumauni division in Uttarakhand, the mountains covered in white snow, the blue sky, the melodic vibrations of the music of bells, and the vibrations of the religious sentiments of the people also include crafts, which are typically utility items like doors, windows, rugs, carpets, baskets, copper utensils, or "Aipan". People

from Uttarakhand have a distinct touch of nature in their design. Aipan, a traditional painting style used by Kumaonis, especially women, to decorate their homes in preparation for auspicious occasions like Diwali or other events like marriage ceremonies, is now used outside of the Kumaon region. The floor painting art form is the most ancient and exquisite traditional folk-art form that has managed to withstand many influences while preserving the essence of Indian culture. One of the most evocative forms of art is the ancient ceremonial art of floor paintings. The first known printing technique is said to be hand printing. Aipan's traditional designs have expanded beyond the floor and are now painted on greeting cards, wall hangings, and different textile products. Aipan also has the potential to become a popular new textile design. Every single Aipan design is created with a specific intention in mind and has a significance associated with it. It is very important from a social, cultural, and religious standpoint. In Uttarakhand, tourism is the main source of foreign exchange earnings. Its enormous potential for tourism might result in revolutionary economic growth in less than ten years, but first it needs to manage its natural, cultural, and man-made resources properly. In the current context, Uttarakhand ought to welcome tourists and urge individuals to engage with their culture.

ORIGIN AND HISTORY OF FOLK ART

Art is anything that uses the senses to arouse a person's thoughts, feelings, beliefs, or ideas. Although these are particular patterns, the Sanskrit term "Alepan," which literally means "to smear," is where the name "Aipan" originates. District Almora in Uttarakhand, which was established under the Chand dynasty, is where the art of Aipan developed. It was at its height in the Kumaon region under the Chand dynasty. The community's beliefs and other elements of nature serve as inspiration for the patterns and themes.

Aipans are unique in their cultural, religious, and spiritual significance as well as in the method they are made. Traditionally, Aipan paintings—symbols of fertility and fortune—are painted on the ground and on blank walls. The women of Kumauni first adorn their homes by painting Aipan on the floor and front door in honor of all regional holidays and customs.

AIPAN ART OF UTTARAKHAND: JOURNEY OF FOLK TO CONTEMPORARY TEXTILE DESIGN

CLASSIFICATION OF AIPAN (FOLK ART)

According to Chattopadhyay (1981) there are three styles of Aipan namely; which are as given following –

Type of Aipan Description –

1. Siddha Aipan: This type of Aipan is drawn on the ground and in chokies.
2. Davia Aipan: It is the form of patta. It features hand-drawn patterns, dwar pattas, and astrological symbols.
3. Loukika Aipan: This is a wall-drawn style of bar boonds.

Following Chattopadhyay's classification, V. N. Sah again divided Aipan into several styles in 2006. His reasoning was that the primary basis for their classification should be the variation in the medium used to make Aipan, as well as any differences in their purpose, pattern, method, or occasion of combination.

Classification of Aipan on the basis of painting-sites

This type of Aipan folk art from Uttarakhand is produced for particular occasions and at various locations chosen for their practicality. These occasions are listed in the following order:

- » **Aipan on the Floor:** It is created on the floor and divided into the following two sub-divisions:
 - a) An awning with a filling and creeper pattern At the door, patterns are created.
 - b) Aipan traveling to a place of devotion, such Shiv Peeth, Lakshmi Peeth, or Aasan.
- » **Aipan on the Wall:** This type of Aipan is performed on a wall and is categorized into two traditional types, like these:
 - a) The first type is for the kitchen, where Lakshmi Narayan and Nata are employed.
 - b) The second type is for the ritual ceremony, which is where Pata is performed.
- » **Aipan on the Fabric:** Aipan patterns are sometimes created on textiles. For instance, the shiv peeth in the yellow linen used for rituals and the khodia chauki in pichhora.
- » **Wooden Chaukies:** Aipan art is made on these deity asanas or chairs that are made for worship or ceremonial purposes at festivals or other special events.

Classification on the Basis of Forms and Shapes Used in Aipan

- » **Nav Durga Chauki:** Devi pujas follow the ceremony of Nav Durga Ckauki. Drawing three horizontal and vertical lines with a Swastik in the middle creates a more straightforward variation. The nine dots in this Chauki, which stand for the Nav Durgas, are its key points.
- » **Asan Chauki:** This refers to the several chaukies that are utilized for different types of pujas. The devotee and his spouse can use this ornamented seat for a customary puja. The devotee and his spouse might use this ornamented seat for a ceremonial puja.
- » **Chamunda Hast Chauki:** Chauki for "yoga" or "havans" is the Chamunda Hast Chauki. The central element of this Chauki consists of two triangles separated by two diagonal lines that cross each other, with a five-pointed star situated in the middle and encircled by a circle. Lakshmi's feet or flower patterns fill in the spaces. Eight lotus petals are frequently used to embellish the circle itself.
- » **Saraswati Chauki:** Saraswati is the Goddess of learning, and a puja is performed to bestow auspicious beginnings upon a child starting formal school. This Chauki's primary feature is a five-pointed star with a diya or swastika flower in the center.
- » **Janue Chauki:** This Chauki is specifically designed for the ceremony using the sacred thread. The main component consists of a six-sided drawing with seven stars inside. The Sapt Rishis are symbolized by the seven stars. Dotted floral motifs are drawn all around this.
- » **Shiv or Shivarchan Peeth:** Shiva, also known as Shivarchan Peeth, is particularly revered during the months of Magh or Savan. The dominant deity among the Himalayan people is called Shiv. Especially during the months of Savan or Magh, he is adored. This design has eight corners and twelve dots connected by twelve lines.

Practice of folk art

Visually, distinctiveness of Aipan comes from its dual colour-scheme. An Aipan is made with 'Geru' or red vermillion(wet ochre clay) paste as a base and rice paste patterns on top . The rice paste is made by soaking any rice for about 16 hours and

AIPAN ART OF UTTARAKHAND: JOURNEY OF FOLK TO CONTEMPORARY TEXTILE DESIGN

then grinding it into a fine paste with a medium to runny consistency. In local parlance rice paste is known as “Bisvar”; which is used to create design patterns on the surface. This pristine white on deep red gives out a beautiful contrast emphasizing the designs. It is usually made on a smooth surface. Women use their forefinger, ring finger and middle finger to create the pattern with help of cotton balls or cloth. In some houses in the state of Uttarakhand, it is a daily custom to construct basic designs for ordinary days and intricate and unique designs for rituals and celebratory occasions, including the following:

1. Near the Tulsi pot/platform, this folk art is performed.
2. This is done to greet guests with dignity and majesty at the front door of the home.
3. employed to adorn the walls of the residence.
4. These patterns are seen to be a symbol of good omen, which awakens divine power and provides good luck to the family.
5. Aipan of Kumaun is one such practice that involves drawing a particular design on the floor of the worship space, the entry to the house, the wooden chaukies, etc. during every event.

Impact of Modernity on Aipan Art Form

This folk art is a skill which is passed from one generation to other like from grandmother to mother and mother to daughter, but due to the modernization and need of good life style, people migrated from their native places and live in nuclear family, where all traditions are not followed by them. Consequently, this traditional art is facing challenges and losing its significance continuously.

Presently, the local population of Kumaun is not much aware about significance of the Aipan. They are using Aipan in modified way like stickers and paint in place of bisvar and geru. In the modern era, this folk art can also be seen on many commercial products such as tea coasters, photo frames or trays, in addition to religious rituals.

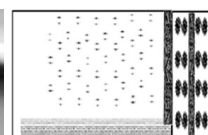
Nowadays this traditional art is used for cards, wall hangings, cushion covers, table cloths, even T-Shirts, sari's borders. The decorative patterns used to adorn doorways have been adapted for gift tags, bookmarks, clay items, wooden boxes, trays and coasters.



Cushion cover



Hand bag



Saari border



Hand bag



File cover



File bag



Notebook cover



Utensil



Chair

COVERAGE AND CONSERVATION

Minakshi Khati initiated The Aipan Project under the name Minakriti in December 2019 to revive Aipan art. To date, one thousand orders have been received through this project, providing women from rural homes in Kumaon with a source of income. These women are engaged by the project to create Aipans and meet the demands of their customers. Additionally, Minakshi Khati introduced the Selfie with Aipan project to encourage the younger generation to appreciate Aipan art.

Project Aipan was launched by the Enactus team at Indraprastha College for Women (IPCW) in an effort to support the Aipan art form. The plan was to teach the artists the essential business skills and turn them into stakeholders in the company.

Under the Societies Registration Act, 1860, the Indian government established the Uttarakhand Handloom & Handicraft Development Council (UHHDC) in 1860 to safeguard indigenous producers of diverse cultural and religious goods, such as Aipan art. It attempts to create steady job possibilities by highlighting homegrown art items.

In 2015, the Uttarakhand government made the decision to purchase artwork featuring Aipan to be shown in government buildings and offices.

Uttarakhand Power Corporation Limited (UPCL), Garhwal Mandal Vikas Nigam (GMVN), and Kumaon Mandal Vikas Nigam (KMVN) were a few of the government structures. The state tourist department, led by Harish Rawat, made the decision.

The government launched Cheli Aipan as a way to support Aipan art. The Aipan Resort was founded in Chopta, Rudraprayag, Uttarakhand, with the intention of promoting the state's native artistic expression and providing support to the artists. The resort wants to practice indigenous art in its unadulterated form by concentrating it in one location. The resort, which was founded by a group of young businesspeople, has had great success promoting art even before non-Uttarakhandi visitors.

This art has taken on a commercial form out of the traditional hobby. This business has opened new doors of employment for many art loving youth. From file folders, covers to the textile industry, the ancient Aipan art is leaving its mark everywhere and now in 2023 it got selected in GI Tag List 2023

CONCLUSION

The Aipan folk art showcases visual depictions of symbols employed in a wide range of rituals that hold significance in the cultural, religious, and everyday life aspects of Uttarakhand.

The traditional and all-encompassing folk art of Uttarakhand is the strong foundation of its culture and religious outlook; undoubtedly, since ancient times there has been an inextricable link between these art forms in the cultural, religious and various rituals of human life. In the present times, the importance and relevance of Aipan art forms has increased even more; because now this art is not limited only with religious or rituals activities, but the women of Uttarakhand have given it a new identity by connecting it with commercial activities. On the basis of which it would be fair to say that Aipan folk art can prove to be a suitable medium to make women empowered and self-reliant in that area. Various non-government organizations and government organization are working on conservation of this art. Present study was also an attempt in this direction where the designs were developed for textiles and handicrafts through adaptation of Aipan motifs. It creates a new definition for the value addition of Aipan and provides new range of designs for sarees and other costumes.

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EXPORT PROSPECTS AND MARKETS

No hurdles remain for temporary removal of cotton export duty

The decks seem to be finally getting cleared for the removal of 11 per cent import duty on all varieties of raw cotton. According to sources, all stakeholder ministries are gradually veering towards the idea of a temporary removal of duties for four months from July to October.

Some officials said the thinking within a section of the government, including agriculture, is that removal of import duty for a limited period—that too when there is a lean phase in cotton trade—won't have a big impact on farmers and their interest would remain protected.

India currently imposes around 11 per cent duty on cotton that kicked in from January 1, 2026, after the exemption period ended.

However, the import duty on Long Staple Cotton or ELSS cotton still remains at zero as India is not a major producer of the cotton.

The textiles sector has been battling for removal of import duty on grounds that it would provide immediate relief to the sector while at the same time ensure India's competitiveness in the world markets.

All major textile industry associations had approached that central government with a request to abolish the import duty for now. This is in view of surge in domestic cotton prices due to lower domestic production and also current West Asia crisis.

Even newly-elected Chief Minister of Tamil Nadu C Joseph Vijay has approached Prime Minister Narendra Modi to scrap the import duty to prevent job losses and protect the domestic textile industry.

Tamil Nadu has one of the largest textiles industries in the country.

Meanwhile, the textiles sector felt the existing duty structure on raw cotton will increase their input costs, adversely impacting the competitiveness of the domestic textiles industry and impact export commitments.

There is also question of a shift towards blended fibres as raw materials for synthetic fibres enjoys duty exemptions while raw cotton remained subject to duty that would lead to uneconomic shift towards the blended industry.

However, a section of the cotton trade contended that the key reason that has been highlighted in various forums is that export competitiveness of Indian textile will get hampered.

This is due to higher duty as people who want to export can import at nil duty under the Advancer License Scheme (AIS).

They also argued that if duty free cotton imports are allowed at this juncture it could lead to dollar outflow. The last time India lowered the import duty on cotton, the total outflow was around \$1.1-1.2 billion and the amount of duty foregone was also substantial.

The same section believes that a cut in duty at this juncture could be detrimental to the interest of farmers just ahead of the kharif sowing season and also a loss for those growers who are holding on to their produce, estimated to be around 4 million bales in anticipation of better prices. One bale is equal to 170 kgs.

"The last time, India lowered import duty on cotton, farmers were forced to sell their produce at below minimum support priced (MSP) rates as a massive 3 million bales of cotton got imported in just three months as domestic demand was met through imports. A similar situation might happen again particularly for those growers who are holding on to their produce in the hope of better returns," a senior trader said.

However, with cotton prices rallying in global markets due to variety of reasons, including the West Asia war, rates in the domestic markets have also surged since the start of April by almost 10-15 per cent. □

Textile exporters expects to double U.K market share in 3 to 5 years

Indian Textile exporters expect to double their share in the UK market in the next 3-5 years as the India-UK trade deal kicks in from July 15. That will bring India at par with its competitors like Bangladesh, Pakistan, Vietnam and Turkey due to zero duty access.

Coming in the backdrop of the promise of stability in West Asia after the initiation of the US-Iran peace deal, the UK deal will help immediately in the planning and negotiations, said industry bodies TEXPROCIL and CITI (Confederation of Indian Textile Industries)

India-UK Comprehensive Economic and Trade Agreement (CETA) will boost access to the UK, one of the largest markets for Indian textile and apparel products. "The sector can expect to grow by 10-12% against the current growth of 6.7% per annum in the next 3 years from the date of entry into force of the agreement.

Textiles trade, including garments & home textiles, is expected to increase from the present level of \$1.9 billion to \$3 billion in the next 3 years," said Vijay Agarwal, chairman, TEXPROCIL.

India's share in the UK T&C market in all categories like garments, made-up, home textiles etc is expected to increase from 6.7% at present to at least 12% in the next 3-5 years.

"Coming in the backdrop of the increased possibilities of stability returning to West Asia soon, and clarity now available on when the India UK CETA will come into force will prove of immense benefit to the textile and apparel industry in their business planning and negotiations with existing and prospective buyers of Indian textile and apparel items," said Ashwin Chandran, chairman, CITI. □

US buyers highly willing to stitch deals with Indian apparel exporters

News of a possible US Iran truce talks has prompted US buyers to resume enquiries with Indian apparel exporters. However, buyers are seeking discounts of 5-10% across apparel categories, putting pressure on already-thin exporter margins.

"Enquiries are coming, but US buyers are offering lower prices," said KM Subramanian, president of the Tirupur Exporters Association (TEA).

India's ready made garment (RMG) exports have declined for the sixth consecutive month in May, registering a year-on-year de-growth of 14.1% in May 2026 primarily due to weaker demand in the United States. India's largest apparel export market. The USA accounts for nearly one-third of India's total apparel exports.

Despite the overall decline in garment exports, exports to several key markets like the UK, UAE, Germany, Spain and Italy have grown, as India tries to diversify its export destinations.

Sundhir Dhingra, owner of Orient Craft, said for orders for the Spring 2027 season, buyers are demanding discounts of up to 10%. Indian exporters have little choice but to accept the

terms as competing sourcing destinations such as Vietnam, Indonesia and Cambodia have been more successful in capitalising on the China-plus-one opportunity.

Industry executives attribute the stronger performance of these countries to better cost competitiveness, more diversified product offerings, efficient supply chains, shorter lead times and greater buyer confidence. The US accounts for nearly one-third of India's total apparel exports, making demand trends and pricing pressures in the market critical for the sector.

"India's decline in exports can be attributed to a combination of weaker US demand, cautious retail buying, increased competition from other countries," said Subramanian.

"While the RMG exports declined by 14.2% in USD terms during May 2026, the decline in Indian currency was relatively lower at 3.6%, indicating that the exchange rate movements partly cushioned the impact," he added.

Despite the overall decline in garment exports, exports to several key markets like the UK, UAE, Germany, Spain and Italy have grown. Dhingra said that the Free Trade Agreement with the UK and Europe has given some encouragement to the apparel exporters. □

Textile exporters hope fresh growth opportunity in UK market to three-fold increase

India's Textile and apparel exporters expect the India-UK Comprehensive Economic and Trade Agreement (CETA) to create fresh growth opportunities, with industry players projecting double-digit growth in export volumes and India's share of the US textile market rising three fold to 10-15% over time.

The clarity on the implementation of the trade pact comes at a time when stability is expected to return to West Asia, a key destination and transit route for Indian textile exports, strengthening the industry's export outlook.

"With the India-UK FTA creating a level playing field and buyers diversifying sourcing, India is well positioned to gain share. We expect double digit growth in the near term and see potential for India's UK market share to rise to 10-15% over time," said Prabhu Damodaran, convenor and secretary of the India Tex-preneurs Federation (ITF).

EXPORT PROSPECTS AND MARKETS

India exported nearly \$1.8 billion worth of apparel and home textiles to the UK in FY 26, accounting for around 5% of the market. India and the UK recently announced that the CETA will come into force on July 15. The agreement provides zero-duty access on 99% of India's exports to the UK, covering nearly 100% of trade value across product categories ranging from processed foods and marine products to auto components. Tariffs of up to 12% on textiles and clothing and up to 16% on leather and footwear product will be eliminated.

The UK Department for Business and Trade estimates that the FTA will increase imports from India by about £2.9 billion. Imports of clothing are projected to rise by £475 million (45%), textiles by £175 million (40%), and footwear by £55 million (30%).

Garment exports face new challenge from US

The United States' new 12.5% "forced-labour" tariff is unlikely to give India any advantage over China, the principal target of the measure, nor will it place India at a disadvantage relative to competing exporters such as Vietnam, Bangladesh, Malaysia or Thailand. The levy applies at the same rate across these countries, with only Indonesia receiving marginal relief through a lower 10% tariff.

The new duty will, however, raise compliance costs for India's textile and readymade garment (RMG) exporters in their largest overseas market. Industry estimates suggest the additional burden could share 8-10% off operating margins, a significant hit in a sector where margins typically range between 5% and 8%. Premium products may be relatively insulated, as exporters in those segments enjoy greater pricing power with buyers.

The immediate impact of the tariff, imposed under Section 301 of the US Tariff Act, expected to include a temporary pause in sourcing expansion plans by major American retailers and a 3-5% increase in production costs due to stricter compliance requirements.

"The cost of certifications, audits, testing, documentation, digital tracking systems and supplier verification can add between 1% and 5% of an export order's value, with smaller exporters bearing a disproportionately higher burden," said Ajay Srivastava, founder of the Global Trade

Research Initiative (GTRI). For garments, the incremental cost could range from a few cents to more than a dollar per piece, depending on the level of traceability and verification employed.

Industry Executives said US buyers, known for their aggressive price sensitivity, are unlikely to absorb the additional costs. Except in niche categories, exporters will be forced to shoulder much of the burden through lower margins.

The Industry's current level of traceability may also fall short of US requirements. Under the new regime, importers must demonstrate that their supply chains are free of forced labour.

"Only about 25-30% of Indian apparel export consignments currently carry formal fibre-traceability certifications," said Ajay Sahai, director general of the Federation of Indian Export Organisations (FIEO). "These are largely driven by requirements imposed by global brands and large retailers rather than industrywide standards."

India's exposure to Chinese inputs varies sharply across product categories. For cotton apparel, dependence is negligible as India is largely self-sufficient and remains a net exporter of cotton-based inputs. However, Chinese suppliers remain critical in synthetic and blended textiles, particularly speciality yarns, performance fabrics, trims embellishments. Industry estimates place Chinese content at 12-15% in such products.

India imported nearly \$3.8 billion worth of yarns, fabrics and related textile inputs from China in FY 26, compared with apparel exports of \$15.8 billion. While this may suggest significant dependence, a large portion of those imports is consumed domestically in segments such as home textiles and technical textiles.

"India has not diversified and upgraded its man-made fibre ecosystem sufficiently. That remains the key reason for our dependence on China in this segment," said Chandrima Chatterjee, secretary-general of the Confederation of Indian Textile Industry.

The latest tariff comes four years after the US enacted legislation barring imports linked to forced labour in China's Xinjiang region. That move accelerated the "China+1" sourcing strategy among retailers such as Walmart, Target, Gap and JCPenney. While India did attract some additional orders, Vietnam and Bangladesh captured a larger share because of their stronger manufacturing

EXPORT PROSPECTS AND MARKETS

ecosystems and deeper intergration with global supply chains.

Industry sources estimate that Indian secured a modest 4-6% increase in sourcing in categories such as cotton-rich home textiles and basic apparel between 2022 and 2025. However, the gains were not substantial enough to transform the sector's fortunes.

The numbers bear this out. India's apparel exports stood at \$15.8 billion in FY 26, little changed from FY 25 and only marginally above FY 20 levels. The US share in India's textile and clothing exports has remained broadly stagnant at 25-26%, rising to about 30-32%, in the garment segment. Readymade garment exports to the US actually declined from \$5.3 billions in FY 22 to \$4.8 billion in FY 26.

According to Sahai, the blanket 12.5% tariff has prompted US retailers to adopt a wait-and-watch approach, freezing short term sourcing expansion plans. India's greatest vulnerability lies in synthetic textiles, where exporters may have to demonstrate that Chinese-origin intermediates have no links to sanctioned regions or entities.

Consumer-facing down-stream segments such as garments, home furnishings, bed linen and towels are expected to face the greatest scrutiny because they move directly into US retail channels.

Cotton-based exports may be relatively insulated, but challenges remain. Full farm-to-retail traceability is common only in organic cotton supply chains. For conventional cotton, India's fragmented farming structure and multi-layered mandi system make comprehensive traceability difficult.

Large integrated textile companies and leading exporters have responded by accelerating investments in traceability systems, including blockchain-based tracking, DNA tagging and isotopic testing to establish fibre origin and rule out links to restricted regions. Compliance frameworks such as the Global Organic Textile Standard and recycled-content certification are also gaining importance.

Prabhu Dhamodharan, convenor of the Indian Texpreneurs Federation, said compliance linked trade measures are becoming a bigger concern than headline tariff rates.

"India should seek maximum relief through the proposed bilateral trade agreement with the US, which could provide a meaningful competitive

advantage. At the very least, tariff treatment should remain aligned with competing countries," he said.

Manoj Sethia, managing director of Surat-based Ginza industries, said synthetic textile manufacturers continue to rely heavily on imports from China and Europe.

"Nylon and polyester filament yarns are mostly imported from China. At present, there is no robust mechanism to establish whether forced labour has been used in their production," he said.

The importance of the US market is evident from India's export profile. In FY26, the US accounted for 55.6% of India's carpet exports, 43.9% of made ups and home furnishings exports, 34.8% of laminated industrial textile exports, 30.9% of knitted apparel exports and 30.2% of non-knitted apparel exports. □

Textiles and apparels saw a 2% y-o-y decline in 2025-2026

Textiles and apparels, which are among India's top merchandise exports, saw a 2% y-o-y decline in shipments in FY 2025-2026.

Exports in FY 26 were worth \$35.80 billion against \$36.61 billion in FY 25.

The Union Commerce Ministry data points to a 1.78% CAGR of textile and apparel exports from 2014-2015 (\$29.47 billion) to FY 26. It peaked to \$37.54 billion in 2021-2022. And the, growth declined by 2% last financial year.

According to data compiled by the Southern India Mills Association (SIMA) based on government statistics, exports were \$37 billion in FY 15, This crossed \$40 billion in FY 22, but fell to \$36.44 billion in FY and closed FY 26 at \$35.78 billion.

There are multiple factors affecting exports in the last 12 years and mainly in the last two years, say industry sources.

Exchange rate

"We need to take into consideration the exchange rate in 2024- 2025 and 2025-2026. The rupee was at 86.60 on April 2, 2025 and ended 2025-2026 at 94.83 on March 31 this year," said an export promotion council official, who did not want to be identified.

"When the U.S. orders fell in 2025-2026, demand from China, Bangladesh and Sri Lank improved. There was a regional balance to some extent.

"In terms of volume, exports may have grown marginally between 2024-2025 and 2025-2026 though there were severe supply chain disruptions,"

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said Siddhartha Rajagopal, executive director of the Cotton Textiles Export Promotion Council.

"Though exports to Africa shot up for a few months last fiscal, it was one of the most uncertain periods for the textile and garment exporters," said K. Sakthivel, chairman of the Powerloom Council. "We are in Japan now and talking to buyers. We will get a better picture in the coming days," he said.

Exports to the U.S.

Chairman of the Apparel Export Promotion Council (AEPC) A. Sakthivel said that though orders from the U.S., which are among the top three markets for Indian exporters, saw several challenges in 2025-2026, because of the tariff threat. Buyers did not vanish totally. Some of them reduced the prices, some of them shifted a part of the orders, and some waited. So, there were still orders going to the U.S. last year. Now, the suppliers are expecting to get tariff refunds at least to some extent," he said.

AEPC plans to organise buyer-seller meets from September in the EU countries to tap the opportunities that will come with the implementation of the Free Trade Agreement, A. Sakthivel added.

Regarding long-term export performance, industry officials said when the rupee was about 65 per dollar in FY15, annual textile and garment exports were almost \$30 billion, going by Commerce Ministry statistics. With the Indian rupee at almost 95 in 2025-2026, exports are at \$35 billion. Basically, exports are not growing and apparel shipments have witnessed a major impact, especially in the last couple of years. This is felt more by the MSME exporters, they said.

Likely drop

There are some in the industry who feel that in terms of volume of exports between 2014-2015 and 2025-2026, there could have been a one-third drop. Indian Chamber of Commerce, National Export Committee on Textiles head Sanjay K. Jain said that apparel exports contraction in May (12.98%) is partly due to West Asia slowing down and also because of the higher base of 2024-2025 because of the rush in orders to meet the tariff deadline.

The industry is hoping for a revival of the market in the coming months with the FTAs and end of the U.S.-Iran war. □

India-Oman trade pact to provide significant boost to Kashmir handicrafts sector

Kashmir's handicraft sector expects the India-Oman Comprehensive Economic Partnership Agreement (CEPA), which came into force on June 1, to provide a significant boost to exports from the region by removing customs duties on several handicrafts products entering Oman, a key market.

Javed Ahmad Tenga, President of the Kashmir Chamber of Commerce and Industry (KCCI), told reporters that Kashmir exports about ₹250 crore worth of handicraft products annually to Gulf countries.

Key Market

"Oman is an important destination for Kashmiri handicrafts, particularly shawls. Earlier, there was a 5 per cent duty on handicraft items. The CEPA will remove this duty, making our products more competitive and benefiting both exporters and artisans," Tenga said.

A wide range of Kashmiri shawls, including Pashmina, woollen, Sozni-embroidered and jacquard varieties, are exported to Oman and other Gulf markets. The agreement comes at a crucial time for the sector. The Gulf region remains one of the largest markets for Kashmir's handicraft products, and the recent disruptions have created a liquidity crunch across the sector, affecting thousands of artisans, weavers and small exporters dependent on overseas demand. □

CSE-listed Meenakshi India Chennai-based apparel exporter preparing for direct listing on the BSE

Meenakshi (India) Ltd, a Chennai-based apparel exporter, is preparing for a direct listing on the BSE in June as it seeks to enhance visibility and position itself for future growth despite continuing uncertainty in global textile markets.

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The nearly four-decade-old company, which supplies casual bottoms, shorts and jackets to premium international retailers such as Nordstrom and brands including GANT, Lyle & Scott and John Varvatos, is currently listed on the Calcutta Stock Exchange, which closed its operations.

"We are technically already a listed company. This is a direct listing and not an IPO," said Ashutosh Goenka, Chairman and Managing Director of the company. He added that the company does not plan to dilute promoter stake or raise fresh capital through the market at present.

Promoter Holding

The promoters hold around 71 per cent stake in the company, while the remaining shares are owned by public investors, corporates and high-net-worth individuals.

The company said it remains largely debt-free except for working capital borrowings, most of which are currently unutilised.

The proposed BSE listing comes at a time when apparel exporters are facing pressure from uncertainty over US tariff policies, elevated freight costs and delayed demand recovery in Europe.

Founded originally as a textile trading and fabric distribution business in 1982, the company entered apparel manufacturing in 1991 with its first factory in Ambattur, Chennai. Operations were later consolidated in Salem due to labour availability and sourcing advantages.

The company currently operates three manufacturing facilities in Salem with around 1,000 machines and integrated garment washing facilities. It specialises in premium casual wear products such as washed pants, shorts and jackets for the US and European markets, including brands such as Marc O'Polo.

The company reported turnover of around ₹190 crore in FY25, with exports contributing over 99 per cent of revenues.

However, management said growth has slowed because of tariff-related disruptions in the US market and weak demand conditions in Europe. □

Government reinforcing import substitution policy in priority sectors

The government is reinforcing its import substitution policies, even as tariffs for foreign goods are being whittled down under a flurry of

bilateral free trade agreements. It has constituted six working groups to finalise a list of 100 products that are currently not being manufactured in India at the required scale and require focused policy support to boost domestic production.

The six groups will focus on electronics; pharmaceuticals and medical devices; capital goods; automobiles and electric vehicles; advanced manufacturing; chemicals; construction equipment; defence and aerospace; and energy.

The groups will comprise officials from the Ministry of Commerce and Industry, Niti Aayog, and other ministries overseeing these sectors. Representatives from the Department of Economic Affairs and the Ministry of Ports, Shipping and Waterways have also been included. All six groups will be headed by Amardeep Singh Bhatia, secretary, Department for Promotion of Industry and Internal Trade (DPIIT).

According to sources, preliminary work on identifying the 100 products has already been completed. The groups will deliberate further and finalise the list for submission to the cabinet secretariat soon. "We have identified a set of products. Some very interesting products have come up in the auto sector and motorcycles. We came to know that there are a lot of things that are not getting manufactured in India. We have the capability, perhaps some gaps in technology exist," Bhatia said at an event recently.

India continues to face a significant gap between the domestic output and demand for intermediate goods, resulting in heavy reliance on imports. This gap is also being addressed and focussed attention on 100 products would aid that effort.

Imports of electrical machinery stood at \$104.8 billion in FY26. Imports of other machinery used across industrial and agricultural sectors amounted to \$74 billion. Chemical imports were valued at \$48 billion, while imports of medical equipment and related products totalled \$15.3 billion.

Crude oil and petroleum products remained India's largest import category, with imports worth \$203.4 billion. Total merchandise imports in FY26 were \$776 billion. Reducing the import bill could help contain the trade deficit, which has been widening steadily and is exerting additional pressure on the economy amid ongoing global uncertainties. ■

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Making textile-to-textile recycling work in Europe

In the previous article “From Concept to Capacity – Textile Recycling Comes of Age”, textile-to-textile recycling is shown to be advancing from pilot projects towards industrial-scale implementation. Building on that discussion, this feature examines the next challenge facing textile-to-textile recycling: moving from technological readiness to large-scale implementation. Featuring perspectives from FEAD (European Waste Management Association) and Recycling Europe, it explores the policies, infrastructure, market conditions and industry collaboration needed to make textile-to-textile recycling commercially viable at scale.

Mandatory separate textile collection, emerging eco-design requirements and increasing attention to recycled content continue to build the foundations for a more circular textile economy in Europe.

Considerable obstacles remain, however, and for many stakeholders involved in this growing ecosystem, progress is not happening fast enough.

What will it take to transform textile-to-textile recycling from a promising concept into a commercially viable industrial reality across Europe?

A coordinated path to circularity

According to Recycling Europe and FEAD, both based in Brussels, success will depend on far more than recycling technology alone. Accelerating textile-to-textile recycling requires coordinated action across the value chain – combining policy certainty, market demand, infrastructure investment and practical solutions for managing post-consumer textile waste.

Mariska Boer, President of Recycling Europe’s Textiles Branch, argues that Europe already possesses many of the ingredients needed to succeed.

“Europe has the ambition, the industrial knowledge and the innovation potential,” she says. “What is needed now is a coherent approach that addresses the full value chain – from design and collection to sorting, recycling and end-market uptake.”

Recycling Europe represents textile collectors, sorters and recyclers stakeholders working to advance textile circularity and recycling systems across Europe, with a focus on creating the conditions needed for textile-to-textile recycling to become commercially viable.

At the same time, FEAD – which represents Europe’s private waste and resource management industry through 21 national associations and around 3,000 companies – warns that the realities of handling textile waste at scale must remain central to policymaking.



Mariska Boer, President of Recycling Europe’s Textiles Branch

Differing streams and challenges

For FEAD Junior Technical Officer, Giulia Caroli, the discussion begins with recognising that not all textile waste presents the same challenge.

“Currently, post-industrial and pre-consumer textiles are occasionally reintegrated into manufacturing processes,” she observes. “Post-consumer textiles, however, are different. They are heterogeneous, more difficult to process and far more dependent on effective collection, sorting and recycling systems.”

This distinction becomes particularly important in discussions around recycled content requirements.

Closing the cost gap

Both organisations agree that the economics of textile recycling remain one of the sector’s biggest obstacles. Recycled fibres continue to struggle to compete with virgin materials, not because they lack quality or value, but because market conditions do not yet reflect the environmental and social costs associated with virgin fibre production.

Making textile-to-textile recycling work in Europe

Boer believes regulation must create stronger market pull.

“As long as virgin fibres remain the cheaper option, textile-to-textile recycling will struggle to scale at the pace Europe needs,” she says.

Her organisation supports binding recycled content targets for textiles, particularly with a focus on postconsumer recycled content, to create predictable demand and strengthen the investment case for recycling infrastructure.

FEAD supports that direction but stresses that targets must be designed carefully.

“Recycled content requirements for textiles should focus specifically on post-consumer waste,” Caroli says. “Expanding these targets to include pre-consumer or post-industrial streams would weaken incentives to invest in genuine end-of-life recycling solutions.”



Giulia Caroli, FEAD Junior Technical Officer

This focus comes at a critical moment for the sector. Across Europe, textile collection volumes are increasing as separate collection obligations come into force, but operators are also seeing falling average quality in collected materials, driven in part by the continued growth of ultra-fast fashion.

According to FEAD, lower garment quality reduces opportunities for reuse and pushes larger volumes into recycling streams before the economics are ready to support them.

Building the infrastructure

That pressure places collection and sorting infrastructure at the centre of the transition.

“No recycling industry can scale without reliable access to suitable feedstock,” says Boer.

Separate textile collection, she argues, is only the first step. Europe must also invest in systems capable of sorting, pre-processing and directing textiles into their highest-value applications, while improving traceability and ensuring clearer separation between reuse and recycling streams.

FEAD echoes that concern, warning that preserving existing collection and sorting capacity may be just as important as developing future recycling technologies.

“Temporary financial support will be essential to preserve existing collection and sorting capacity until Extended Producer Responsibility schemes for textiles become fully operational across Europe,” Caroli stresses.

The association also points to transitional measures including tax incentives, VAT reductions for reuse, repair and recycling activities, and investment support for recycling infrastructure.

Scaling recycling requires an interconnected ecosystem

What will drive the next phase of textile recycling?

- » Stronger demand for post-consumer recycled fibres
- » Investment in collection and sorting infrastructure
- » Advances in sorting, recycling and traceability technologies
- » Greater collaboration across the textile value chain
- » Policy frameworks that support circular production

Collection, sorting, fibre processing, recycling, spinning, traceability and manufacturing integration are increasingly being linked into connected circular production systems.

While significant progress has been made in recycling technologies, scaling circular textile production will require coordinated investment across multiple stages of the value chain.

This is creating new opportunities not only for recyclers, but also for technology providers supporting sorting, automation, digital traceability, fibre processing and manufacturing integration.

Making textile-to-textile recycling work in Europe

Regulation as a market enabler

Policy and legislation are seen as equally decisive.

For Recycling Europe, regulation must move beyond waste management and actively enable circular raw materials markets.

Boer calls for effective Extended Producer Responsibility (EPR) schemes, stronger eco-design requirements, clear and verifiable definitions for recycled content and recyclability, and legal certainty around end-of-waste criteria.

“Legislation must do more than manage waste,” she says. “It must actively create the conditions for circular raw materials to become the new normal in the textile sector.”

FEAD agrees that eco-design rules represent a major opportunity but cautions that they must remain aligned with existing EU waste legislation.

“Without clear definitions, there is a risk that recycled content obligations could unintentionally reward upstream process optimisation instead of addressing the real end-of-life management challenges facing the textile sector.”

Beyond the pilot phase

Technology remains a critical enabler, but neither organisation sees it as a standalone solution.

Mechanical recycling already plays an important role for certain textile streams, while chemical recycling technologies continue to develop for more complex and blended materials.

At the same time, advances in textile sorting are beginning to improve feedstock quality. FEAD highlights near-infrared (NIR) identification technologies capable of recognising component composition at fibre level as a promising development, although many solutions remain at pilot or early commercial stage.

“The main bottleneck is often not the recycling technology itself,” Caroli notes, “but rather the availability of consistent, correctly specified feedstock and stable market demand that recyclers require to operate viably at scale.”

Boer reaches a similar conclusion.

“Technology alone will not solve the challenge. It must be matched by design requirements, infrastructure and market demand.”

Encouragingly, many of the core technologies required to support textile-to-textile recycling are

already available or rapidly maturing. Across sorting, material identification, fibre regeneration, spinning adaptation and traceability, the industry is increasingly shifting its attention from innovation towards implementation.

For both organisations, Europe’s opportunity is clear – but so is the scale of the task ahead.

If textile-to-textile recycling is to become a strategic industrial reality rather than a circular ambition, Europe will need policies that reward post-consumer recycling, support collection and sorting systems, stimulate demand for recycled fibres and accelerate investment in recycling technologies.

The technologies required to support textile-to-textile recycling are advancing rapidly. The next phase will depend on building the infrastructure, market demand and industry partnerships needed to scale implementation.

For recyclers, manufacturers, brands and technology providers, the opportunity now lies in transforming proven innovations into commercially viable circular production systems.

Only through a coordinated, value-chain-wide approach can Europe build a competitive textile recycling sector that delivers both environmental impact and long-term industrial resilience.

As the industry works to overcome these challenges, collaboration across the textile manufacturing value chain will become increasingly important.

Bringing together technology providers, manufacturers, recyclers, brands, researchers and policymakers help accelerate knowledge exchange, partnership development and practical implementation.

ITMA 2027 will convene stakeholders from across the global textile and garment manufacturing ecosystem, creating opportunities to explore technologies, business models and collaborations that support the transition towards industrial-scale textile recycling.

By fostering dialogue across the full value chain, ITMA 2027 provides a timely setting to advance practical solutions and partnerships that can help make textile-to-textile recycling commercially viable and scalable.

For further information, please contact:
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Vibrant Presence of Mayer & Cie. at concluded ITM 2026

ITM 2026: Mayer & Cie. Global presents itself successfully at international industry trade fair

Reliable partner with a new philosophy

Mayer & Cie. Global has used ITM 2026 in Istanbul for its first major international appearance since the restart. Together with the Turkish representative Mayer Mümessillik, the company presented its premium circular knitting machines "Made in Germany", explained its future positioning within the group of companies and held talks with customers and representatives from numerous markets. The response to the restart was positive. The clear orientation of the company, the reliable worldwide network of representatives and the resumption of service and spare parts supply were welcomed by customers.



Two OV 3.2 QCe models were shown at ITM 2026.

Premium technology "Made in Germany"

Together with Mayer Mümessillik, Mayer & Cie. Global presented two OV 3.2 QCe circular knitting machines. The machines have been among the company's most successful models for many years and represent the premium interlock segment, which is in strong demand both in Turkey and internationally.

With its trade fair appearance, Mayer & Cie. Global deliberately sent a signal of continuity. Development and production of its premium machines will continue to take place in Germany. Customers can therefore continue to rely on the quality and performance for which the Mayer & Cie. brand has stood for decades.

Clear positioning

The future direction of Mayer & Cie. Global and its cooperation with Huixing attracted considerable interest at the trade fair. The team used numerous discussions to explain the company's positioning.



Mayer Mümessillik, Mayer & Cie.'s long-standing agency in Turkey, organized the presentation of the Mayer & Cie. brand at ITM.

Mayer & Cie. premium machines will continue to be developed and manufactured in Germany. At the same time, the partnership with Huixing opens up additional opportunities: in future, customers will also be able to obtain suitable solutions from the Huixing portfolio for the middle and lower market segments. This enables Mayer & Cie. Global to serve a broader range of customer requirements without changing the premium positioning of the Mayer & Cie. brand.

Alton Xu, owner of Mayer & Cie. Global, explains: "With our new setup, we can now support customers across a much wider range of market requirements than before. At the same time, we remain fully committed to our premium segment and Mayer & Cie.'s promise of quality. Where budget constraints or specific applications require different solutions, we can now offer additional alternatives. This strengthens our market position and enables our representatives to support and retain customers within the Mayer & Cie. Global network in the long term."

Exchange with international representatives

ITM also provided an important platform for personal exchange with international representatives. Delegations from Mexico, Uzbekistan, Russia and Iran used the trade fair to discuss further cooperation and to get to know

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Alton Xu and the Mayer & Cie. Global team in person.

The direct exchange underlined the importance of the global sales and service network for the company's further development.



Mayer & Cie. Global is supported by a worldwide network of representatives, many of whom have been working with the company's circular knitting machines for decades.

New requirements in the interlock segment

In addition to market and company topics, technological developments were also a key focus of the discussions. In the interlock segment, demand is currently increasing for so-called fivethread knitted fabrics. This special variation of a double-face fabric offers additional design and performance options and is increasingly being used in sportswear and technical apparel.

Mayer & Cie. Global regards this development as an important future topic and is working to integrate corresponding solutions into its technology portfolio in the near future. The aim is to support customers quickly and practically, even when new market requirements arise.

Positive response to the restart

Overall, ITM 2026 confirmed the strong position of the Mayer & Cie. brand in the Turkish market. For many customers, reliable service and secure spare parts supply remain decisive factors alongside innovative technology – especially as Mayer & Cie. machines are used in many modern knitting mills throughout the country.

The positive response to the trade fair appearance shows that the restart of Mayer & Cie. Global is being closely followed by the market and is meeting with a high level of acceptance among customers and partners.

About Mayer & Cie. Global

Mayer & Cie. is a German manufacturer of circular knitting machines headquartered in Albstadt. Founded in 1905, the company has been family-owned for four generations and is recognized worldwide for its premium technologies in single jersey, double jersey, interlock and jacquard. In the course of its history, Mayer & Cie. has delivered more than 80,000 machines worldwide.

Since April 2026, the established brand is continued by Mayer & Cie. Global. The owner is Xu Hongjie, a member of the entrepreneurial family behind the Chinese circular knitting machine manufacturer Huixing. Mayer & Cie. Global combines its many years of engineering expertise with an international, agile management approach. The company focuses on customer-oriented knitting solutions, less complexity and close cooperation with partners and customers worldwide.

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Spykar announces offline growth plans; aims to add 100 stores over the next two years pan-India

Spykar expanded its space of retail footprint

The brand has recently launched four new stores in Ghaziabad, Vizag, Simdega and Darbhanga

Spykar, one of India's leading denim-first fashion brands, has expanded its retail footprint with new stores upcoming across multiple cities including Ghaziabad, Vizag, Simdega, and Darbhanga. As part of its growth strategy, the brand is focusing on larger malls and premium high streets, with recent openings at Lakeshore Mall (Hyderabad), Inorbit Mall (Vizag), and Ansa Mall (Ghaziabad). This expansion is a part of a larger expansion plan pan-India. The brand aims to expand its retail footprint with the addition of 100 new stores across India over the next two years, taking their total store count to 380+ stores. This announcement reinforces their commitment to reach consumers in key growth markets nationwide.

With changing consumer aspirations and rapidly evolving shopping patterns, tier 2 and tier 3 cities in India have emerged as important growth hubs for fashion and lifestyle brands. Increasing purchasing power, rising fashion consciousness, and demand for premium shopping experiences have significantly transformed consumer behaviour in these markets over the last few years.



Speaking on what drives the expansion, Sanjay Vakharia, Co-Founder & CEO, Spykar Lifestyle, quips, "In 2026, we have seen a surge in offline expansion across retail brands from various sub-sectors. Despite access to digital mediums, the look and feel of products and experience of shopping remains desirable. Our growth plans reflect Spykar's continued commitment to bring a more immersive and elevated shopping experience to consumers across India."



The newly launched stores reflect Spykar's evolving design language and youthful spirit, offering a fresh and immersive shopping experience. Designed with a more premium and modern aesthetic, the stores highlight the brand's focus on

creating spaces that go beyond retail and deliver a complete lifestyle-driven experience.



The layout and visual merchandising have been curated to enhance customer experience, allowing shoppers to explore the brand's signature denim range along with a wide selection of casual and fashion-forward apparel. The collection continues to reflect Spykar's core philosophy of comfort, individuality, and effortless style, catering to the dynamic fashion needs of today's youth.

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Tommy Hilfiger starts the season with the launch of "The Football Shop" Capsule Collection

Inspired By The World's Game

Tommy Hilfiger is dialing up the energy this season with The Football Shop, a capsule that taps straight into the global football frenzy, reworked through a cool, preppy lens. It's less about the pitch and more about the vibe, where sport, style and culture collide in a way that feels fresh, youthful and instantly wearable.

Think match-day dressing, reimagined. Bold jerseys, colour-blocked polos and relaxed outerwear

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come together with easy staples that don't just belong in the stands. The mood is effortless but elevated, capturing that off-duty athlete aesthetic that's equal parts laid-back and put-together.



Drawing from global flags and iconic kits, the collection leans into vibrant colour, athletic detailing and fluid silhouettes that move seamlessly from stadium to street. It's a celebration of team spirit and individuality, wrapped up in pieces that feel modern, versatile and distinctly Tommy.

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How Tech-Enabled Ecosystems are Powering the next phase of Textile Manufacturing

Attributed to Abhishek Sharma, Co-Founder & CEO, Fashinza

For decades, textile manufacturing operated on a relatively fixed formula: long production cycles, fragmented supplier networks, limited visibility, and heavy dependence on manual coordination. Scale was the defining advantage, and cost efficiency was the primary benchmark of competitiveness. But global supply chains today are undergoing one of the biggest transformations the industry has witnessed in decades, and technology is at the centre of this shift. From AI-led demand forecasting and predictive production planning to automation, cloud-based supply chain platforms, and real-time factory monitoring, digital technologies are fundamentally changing how textile manufacturing

ecosystems operate across sourcing, production, inventory, and logistics.

The modern fashion and textile ecosystem is no longer driven only by production capacity. It is increasingly driven by speed, flexibility, transparency, and data-led decision-making. Consumer demand patterns are evolving faster than traditional manufacturing systems were designed to handle. Fashion cycles have shortened dramatically, inventory risks have increased, and brands now expect manufacturing partners to respond in real time rather than in seasons.

This shift is fundamentally changing how global textile supply chains operate.

One of the biggest changes is the rise of digitally connected manufacturing ecosystems. Traditionally, supply chains were fragmented across sourcing teams, vendors, factories, logistics partners, and quality control systems each operating independently with limited real-time visibility. Today, technology platforms are integrating these layers into a more connected infrastructure where production, inventory, timelines, and vendor coordination can be tracked far more efficiently.



Abhishek Sharma
Co-Founder & CEO, Fashinza

This visibility is becoming critical in an industry where delays, overproduction, and supply-demand mismatches carry significant financial consequences. Technology is helping manufacturers move from reactive operations to predictive planning. AI-led demand forecasting, real-time production monitoring, automated quality checks, and data-driven sourcing decisions are enabling businesses to reduce inefficiencies while improving turnaround times.

"At Fashinza, we believe the future of textile manufacturing will be driven by technology, agility, and data-led decision-making. AI-powered production planning, digital supply chains, and real-time factory visibility are helping brands move faster, reduce waste, and improve efficiency.

As global supply chains evolve, technology-driven manufacturing ecosystems are enabling greater flexibility, transparency, and stronger long-term factory partnerships," says Abhishek Sharma, Co-Founder and CEO at Fashinza.

At the same time, global sourcing strategies are evolving rapidly. Geopolitical uncertainty, freight disruptions, rising costs, and supply chain concentration risks have pushed brands to diversify sourcing destinations and build more resilient manufacturing networks. This presents a significant opportunity for India.

India already has strong fundamentals, a large manufacturing base, deep textile expertise, raw material availability, and a growing skilled workforce. However, the next phase of growth will depend not just on scale, but on how effectively the industry adopts technology and integrates into modern global supply chains.

The competitive advantage of the future will belong to manufacturers who can offer agility alongside scale. Brands today want shorter lead times, better visibility, compliance transparency, and faster replenishment cycles. Technology is enabling this shift by making supply chains more connected, responsive, and efficient.

Another major transformation is the growing focus on transparency and traceability. Global brands and consumers increasingly expect visibility into sourcing, production, and sustainability practices. Digital manufacturing systems are helping create more accountable and data-driven supply chains.

Ultimately, the future of textile manufacturing will be defined not only by production capacity, but by intelligent supply chains, operational agility, and the ability to adapt quickly to changing market demands. Businesses embracing technology-led manufacturing today will be best positioned to lead the next phase of global textile growth.

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D'Decor showcases Bedding by D'Decor as a Gift on Mother's Day

This Mother's Day, Gift the Luxury of Serenity with Bedding by D'Decor

With Mother's Day just around the corner, the search for a gift as meaningful as her love, begins.

She is the woman who has shaped your life with her unwavering support and guided you with grace; now is the time to shower her with the gratitude she deserves.

This year let's move beyond the ordinary and gift her a sanctuary of refined comfort. Bedding by D'Decor offers a collection of bedding as unique as she is, turning her bedroom into a haven of timeless elegance and warmth. Whether she finds joy in understated sophistication or the rich textures of festive design, these ensembles are the perfect way to honor the woman who makes every house feel like home.

Luxor

Indulge her appreciation for the finer things with Luxor, a super-premium bedding ensemble crafted for those who appreciate understated opulence. Featuring an 800 thread count cotton sateen bedsheets set, paired with a monotone embroidered quilted bed cover, Luxor brings luxury home. The plain bedsheets, elevated with exclusive panel embroidery, complements the sophisticated bed cover beautifully creating a serene, indulgent bedroom escape. It is the perfect gift for a mother who believes true luxury lies in the details.



Raaga

Celebrate the rhythm of her life with the Raaga Collection by D'Decor—a luxurious velvet bedding ensemble adorned with rich, grid-inspired embroidery. Designed to echo the rhythm of a musical symphony, this set includes two euro shams, two plush pillows, a decorative pillow, and a finely embroidered bed cover. It offers a touch of festive design to her cherished space, making it a

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magnificent gift that reflects the harmony she brings to the family.



Bedsuites

A premium bed linen ensemble, the Bedsuites Collection by D'Decor, is the epitome of textured & embroidered elegance. From metallic hints and abstract artistry to minimalist designs and understated embellishments, the Bedsuites collection is the simplest way to bring festive cheer to any bedroom. It is the ideal choice for mothers who believe life is a celebration.



Cuddle

Guaranteed to give sweet dreams is the Cuddle Collection by D'Decor, an exquisite 4-piece quilted bed cover set, crafted in plush cotton sateen, in a palette of soft pastels and rich mid-tones with deep hues. The matching quilted pillows, finished with engineered panel detailing, and the mix of organic,

geometric and abstract patterns echo the calm of nature, bringing comfort to the bedroom. With both all season and winter options, Cuddle is the perfect present that promises warmth, softness, and style.



Discover many more exquisite bed ensembles from the house of D'Decor to select the perfect gift this Mother's Day.

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Cannes Lions AOTY 2022

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HKRITA Signs MoU with two key global partners Jeanologia and Looptworks to Establish the Green Machine Circular Textile Ecosystem, Marking a Breakthrough in Scalable Textile Recycling

The Hong Kong Research Institute of Textiles and Apparel (HKRITA) yesterday officially signed a landmark Memorandum of Understanding (MoU) with two key global partners, Jeanologia and Looptworks, to establish the Green Machine Circular Textile Ecosystem – a first-of-its-kind collaboration to accelerate the large-scale recycling of blended textiles.

Bringing together cutting-edge innovation, industrial machinery expertise, and real-world adoption, this tripartite initiative unites HKRITA with Jeanologia as the first official machinery partner and Looptworks as a prospective adopter. The partnership signals a decisive shift from research-driven innovation to practical, scalable deployment with industry support, creating a

complete and actionable pathway for circular transformation.

At the centre of this ecosystem is HKRITA's latest Green Machine 4.0, the newest iteration of its pioneering hydrothermal recycling technology. This advanced version recovers polyester at 98% or higher purity from cotton-polyester textiles without harmful processes. Through this collaboration, Jeanologia contributes by delivering industry-ready machinery engineered to European standards that meets the CE high-pressure requirement, enabling seamless integration and streamlined logistics. Meanwhile, Looptworks, a Certified B-Corp recycling specialist, transforms diverse pre- and post-consumer textiles into high-quality GRS-certified fibres. This cross-industry collaboration supports expandable industrial implementation across diverse settings, enabling the industry to execute circular solutions at scale.

By integrating scientific innovation, engineering excellence, and operational deployment, the Green Machine ecosystem provides a viable pathway for circular transformation. This initiative empowers textile recyclers to process previously unrecyclable materials and unlock new revenue streams, while enabling fashion brands to incorporate recycled fibres into their supply chains in commercial volumes. It also supports manufacturers in adopting more sustainable production models, helping all stakeholders close the loop on textile waste and reduce dependence on virgin resources.

Mr Jake Koh, Chief Executive Officer of HKRITA, said, "The circular economy is no longer a distant goal—it is here. With the Green Machine 4.0 now proven adoption-ready and scalable, this partnership marks a decisive shift from research to commercialisation. True innovation is defined by real-world impact, and today we are making it a reality."

Mr Enrique Silla, CEO and Founder of Jeanologia, said, "For the last 25 years, we have transformed the denim industry through technology, innovation and collaboration. Today, we are bringing that same experience to one of the industry's greatest challenges: textile-to-textile recycling. At Jeanologia, we believe recycling must become part of the industry's pre-competitive space, where companies work together to create solutions that no single organisation can achieve alone. By combining HKRITA's innovation, Jeanologia's industrial engineering and textile bleaching expertise, and Looptworks' operational deployment, we are creating a model that can help make circularity a reality at industrial scale."

Mr Scott Hamlin, Founder and CEO of Looptworks, said, "Looptworks has had a relationship with HKRITA for over a decade. We are proud to have worked together with the research and management teams at HKRITA to further develop textile circularity innovations at scale. The Green Machine represents a shining example of what is possible for textile recycling. Blended materials have long been a major barrier to circularity, and this technology enables us to effectively realise their value at scale. By reintroducing recovered fibres into the supply chain, we are proving that circular solutions are both environmentally practical and economically viable."

Aiming to ensure ecologically sound circularity in the industry, HKRITA invites textile recyclers, fashion brands, and manufacturing partners to join the ecosystem and explore opportunities for collaboration, adoption, and expansion.



Mr Jake Koh, CEO of HKRITA (middle), Ms Begoña García, Jeanologia Global Director of Sustainable Innovation, (left) and Mr Scott Hamlin, Founder and CEO of Looptworks, (right) have signed the MoU for this landmark tripartite initiative, advancing a complete and actionable circular textile ecosystem.

About The Hong Kong Research Institute of Textiles and Apparel (HKRITA)

Established in 2006, HKRITA is funded by the Innovation and Technology Commission of the HKSAR Government and is hosted by The Hong Kong Polytechnic University. Celebrating its 20th anniversary in 2026, HKRITA continues to contribute to the competitiveness of the textile and apparel industry by providing one-stop services in applied research, technology transfer and commercialisation. HKRITA also plays a vital and expanding role in driving sustainable improvements in the industry and thus bringing benefits to society as a whole.

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About Jeanologia

Jeanologia is a Spanish technology company with more than 30 years of experience transforming the textile industry through innovation. Today, more than 40% of the world's jeans are produced using Jeanologia technologies.

The company pioneered technologies such as laser, G2 ozone and water recycling systems, helping brands and manufacturers eliminate harmful processes, reduce water and chemical consumption, and improve productivity.

As part of its Mission Zero vision, Jeanologia is now extending its expertise beyond garment finishing to accelerate textile circularity, developing industrial solutions for water reuse, textile recycling and the transition towards a waste-free industry.

About Looptworks

Looptworks is a Certified B-Corp textile-to-textile recycling specialist offering innovative, scalable solutions for brands and organisations world-wide. Based in Gresham, Oregon, Looptworks is the first and only GRS certified, recycling company in the United States equipped with a circular system capable of processing multiple types of materials into a range of finished spinning and nonwoven fibre products. The Looptworks facility is fully operational, and features a unique technology that transforms pre-and post-consumer textiles into high-quality recycled fibres.

Our process starts where others end.

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FESPA bags 'Organiser Team of the Year' at the AEO Excellence Awards with the recognition of remarkable contribution of FESPA to the global event industry

FESPA is delighted to announce that it has been named 'Organiser Team of the Year' by the Association of Event Organisers (AEO) at its prestigious AEO Excellence Awards.

The award recognises FESPA's outstanding contribution to the global events industry, its continued commitment to delivering world-class exhibitions and the strength of FESPA's global team, which operates across multiple regions while maintaining a unified, collaborative culture.

In its award submission, FESPA demonstrated growth in visitor numbers, exhibitor satisfaction and engagement for its exhibitions across its global event portfolio. The events consistently achieved high levels of decision-maker attendance, as well as commercial returns for participating exhibitors.

Beyond the delivery of its global exhibitions, FESPA has lowered its environmental impact while continuing to support communities in need.

For example, through its Profit for Purpose programme, FESPA reinvests 100% of its event profits back into its global print community via its global Association network.

In addition, it runs the FESPA Foundation, which generates educational resources for schools and communities in need with excess materials printed at FESPA exhibitions. Since its launch in 2025, the FESPA Foundation has supported schools in South Africa and Brazil by donating resources, funding and infrastructure improvements that have directly benefited more than 1,000 students.

FESPA has also taken steps to operate more sustainably, thereby leading by example and holding itself accountable. This year, it obtained ISO 20121:2024 for Sustainable Event Management, following ISO 20121:2012 certification in 2025. FESPA also achieved year on year CO₂e reductions between its 2024 and 2025 exhibitions.

FESPA also facilitates and supports knowledge-sharing for its global community. It runs insight-led conference programmes alongside its global exhibitions, which are designed to help attendees adapt to changing market demands, as well as learn about trends, insights and opportunities for growth.

In addition, throughout the year, FESPA's global Association network runs educational events and conferences for their respective local communities.

Neil Felton, CEO, FESPA, comments: "This award-win was made possible thanks to the passion, dedication and resilience of our global team, who consistently go above and beyond to deliver exceptional events for the print sector and its related industries. What makes FESPA different is our purpose-led approach, as everything we do is rooted in our mission to 'Connect, Inspire and Support' our global community.

"We are incredibly proud that our events drive commercial success for our exhibitors and partners, yet also create lasting impact on communities in need through initiatives such as the FESPA Foundation.

"This win reflects the collective efforts of our team, our members and our wider community, all of whom play a vital role in making FESPA what it is today."

About FESPA

Founded in 1962, FESPA is a global federation of Associations for the screen printing, digital printing and textile printing community. FESPA's dual aim is to promote screen printing and digital imaging and to share knowledge about screen and digital printing with its members across the world, helping them to grow their businesses and learn about the latest developments in their fast-growing industries.

FESPA Profit for Purpose

Profit for Purpose is FESPA's international reinvestment programme, which uses revenue from FESPA events to support the global speciality print community to achieve sustainable and profitable growth through four key pillars - education, inspiration, expansion and connection. The programme delivers high quality products and services for printers worldwide, including market research, seminars, summits, congresses, educational guides and features, in addition to supporting grassroots projects in developing markets. For more information visit, www.fespa.com/profit-for-purpose.

Forthcoming FESPA events include:

- ▶ FESPA Africa 2026, 8 – 10 September 2026, Gallagher Convention Centre, South Africa
- ▶ FESPA Mexico 2026, 10 – 12 September 2026, Centro Citibanamex, Mexico City

- ▶ FESPA Middle East 2027, 12 – 14 January 2027, Dubai Exhibition Centre, Dubai
- ▶ FESPA Brasil 2027, 1 – 4 March, 2027 – Expo Center Norte, São Paulo, Brazil
- ▶ FESPA Global Print Expo 2027, 6 – 9 April 2027, Messe Munich, Germany
- ▶ European Sign Expo 2027, 6 – 9 April 2027, Messe Munich, Germany
- ▶ WrapFest 2027, 6 – 9 April 2027, Messe Munich, Germany
- ▶ Textile 2027, 6 – 9 April 2027, Messe Munich, Germany

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On World Environment day some key finding from Denim Industry Progress & Insights 2025 getting shared

Denim Sustainability by the Numbers

A snapshot of the industry's progress and remaining challenges

EIM (Environmental Impact Measurement) is a methodology developed in Spain that has become a global standard for measuring the environmental impact of textile finishing processes.

Its annual report, Denim Industry Progress & Insights 2025, provides an up-to-date overview of the environmental evolution of the global denim industry.

KEY FIGURES

66% of processes are now classified as low environmental impact.

30 liters

Average water consumption per garment, reflecting a stabilization of the industry after years of continuous improvement.

85% of processes are classified as low impact in terms of energy consumption, driven by equipment modernization and automation.

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27% of processes are still classified as high chemical impact, making it the industry's main remaining challenge.

68% of processes show low impact on worker health, thanks to the growing adoption of more responsible and automated technologies.

KEY FINDINGS**Sustainability is improving, but progress remains uneven**

The data points to steady progress driven by process optimization and the gradual adoption of more efficient technologies. However, improvements are not consistent across all environmental indicators.

Water and energy continue to improve

The industry continues to make progress in reducing resource consumption. Water use remains stable at around 30 liters per garment, reflecting a plateau after years of continuous improvement. Energy delivers the strongest results, with 85% of processes now classified as low impact thanks to equipment modernization and automation.

Chemical impact remains the industry's biggest challenge

Despite progress in other areas, 27% of processes are still classified as high chemical impact. The use of generic chemicals, limited transparency around certain formulations and the persistence of traditional practices such as pumice stones and potassium permanganate continue to slow progress across the industry.

The challenge is adoption

The report highlights a gap between the solutions already available and their implementation at scale. Technologies capable of significantly reducing the environmental impact of finishing processes already exist, yet adoption remains uneven across parts of the industry.

Automation is improving worker health

The replacement of more aggressive manual techniques with automated technologies is helping improve working conditions and reduce impacts on worker health.

WHY IT MATTERS

- It is estimated that around 5 billion pairs of jeans are produced every year.
- The fashion industry faces growing pressure to reduce its environmental footprint and improve transparency across its supply chains.
- EIM provides an objective way to measure the industry's environmental progress and compare performance using common benchmarks.

- Measuring environmental performance helps brands, manufacturers and suppliers identify opportunities for improvement and make more informed, data-driven decisions.

MEDIA RESOURCES**Spokesperson available:**

Begoña García Creator of EIM and co-author of the report

Download links:

- Full Denim Industry Progress & Insights 2025 report
- Press release and images

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**Business Performance of VIRGIO**

- Achieved 200% quarter-on-quarter revenue growth, affirming its place among India's fastest-scaling sustainable fashion-tech brands.
- Recorded 315% growth between FY24 and FY25, with ambitions to become a ₹100 crore brand by FY26.
- Enabled AI-powered trend mapping, real-time forecasting, and digital sampling to support rapid 21-day design-to-launch cycles and smarter inventory planning.
- Onboarded 60,000+ new customers within its first year, supported by a vibrant digital community with 290K+ Instagram followers.
- Enabled AI-powered trend mapping, digital sampling, and smart manufacturing to produce on-demand collections within weeks; driving operational efficiency and eco-conscious production.
- Available across major e-commerce platforms—Myntra, Nykaa Fashion, and Ajio, alongside newly launched offline stores in Bengaluru, Ahmedabad, Navi Mumbai and Delhi NCR, with further expansion in progress.
- Successfully expanded into the UAE and US markets, and also available in Nepal at Bhat Bhateni, the country's largest retail chain.
- Introduced the Digital Product Passport (DPP)- enabling transparency by tracing each garment's lifecycle, materials, and environmental footprint.

Potential conversation angles

- ▶ Can sustainability become aspirational instead of instructional?
- ▶ Why consumers shouldn't have to choose between trend-first fashion and conscious consumption
- ▶ The rise of demand-led fashion and the future of overproduction
- ▶ How AI and data are reshaping fashion design and inventory planning
- ▶ Building transparency and trust in a category often criticized for greenwashing
- ▶ Reinterpreting The Devil Wears Prada for a new generation of fashion consumers
- ▶ Turning a fashion drop into a cinematic, culture-led brand experience
- ▶ How nostalgia-driven storytelling is shaping fashion marketing for Gen Z and millennials
- ▶ Reimagining clean fashion through demand-led production and lower inventory waste
- ▶ Why transparency in pricing and sourcing is becoming a key differentiator in fashion

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Kornit Digital unveils Konnections 365 — A Year-Round Movement Building on the Success of Live Konnections 2026 Event

Local events, webinars, on-demand content, and podcasts unite creatives, brands, retailers, supply-chain experts, and print producers – leading seismic shift in apparel and textile production.

Kornit Digital (NASDAQ: KRNT) ("Kornit" or the "Company"), a global pioneer in sustainable, on-demand digital fashion and textile production recently announced the launch of Konnections 365 - a year-round movement designed for the people moving the apparel, print, and retail industries forward. The strategy is built on the overwhelming success of Konnections 2026 held in Hollywood, Florida, featuring more than 500 customers, partners, and collaborators who together are driving the future of apparel and textiles.

Bringing together brands, retailers, creatives, print producers, and supply-chain experts, Konnections 365 delivers thought leadership, local and global experiences, committees, webinars, podcasts, and on-demand resources. The intent is to help the industry navigate a watershed moment

driven by digital print, AI, sustainability, new inventory models, and emerging technologies.

"During our live Konnections event, the room moved and now the industry is ready to follow. We brought together an ecosystem around one clear truth: the winners will be the companies that connect demand, production, technology, and speed – faster than the market can change," said Ilan Elad, President at Kornit Digital Americas. "Kornit 365 is an extension of this movement, and we can't wait to see how the industry responds."

Konnections 365 is built on three pillars:

- ▶ **Movement** — Year-round community driving industry priorities;
- ▶ **Learn** — Practical education through content and thought leadership;
- ▶ **Connect & Act** — Events and pilot programs that turn ideas into measurable results.

Participants benefit from rapid learning, local-to-global engagement, and the ability to move from ideas to pilots that reduce waste, shorten lead times, and improve margins.

Education is free for all participants. However, community events, business networking, and pilot programs are by invitation only for the Kornit Digital Production Community and ecosystem.

Join the Konnections 365 movement to learn, collaborate, and lead. Visit <https://kornitkonnections.com/konnections365home/>

About Kornit Digital

Kornit Digital (NASDAQ: KRNT) is a worldwide market leader in sustainable, on-demand, digital fashion and textile production technologies. The Company offers end-to-end solutions including printing systems, inks, consumables, software, and fulfillment services through its global fulfillment network. Headquartered in Israel with offices in the USA, Europe, and Asia Pacific, Kornit Digital serves customers in more than 100 countries. To learn more, visit www.kornit.com.

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ITMA 2027 gathers strong momentum

Emerging Innovators Find a Global Launchpad at ITMA 2027

In line with the theme "Co-creating the future of textiles", ITMA continues to strengthen its support for start-ups, recognising their role in driving innovation and shaping the future of textile and garment manufacturing. Through the Start-Up Valley, emerging companies gain access to a global marketplace where they can connect with industry leaders, potential partners, investors and customers.

"Start-ups are an essential part of co-creating the future of textiles," said Alex Zucchi, President of CEMATEX. "By bringing together innovators and industry leaders, ITMA provides the environment and opportunities needed to accelerate innovation and help promising ideas evolve into viable business ventures."

Since its debut at ITMA 2023, the Start-Up Valley has attracted growing interest from entrepreneurial ventures worldwide. Applications for ITMA 2027 have nearly doubled compared with the previous edition, reflecting strong demand and reinforcing ITMA's position as the world's leading marketplace for textile and garment technologies.

As preparations progress, sector planning will move into the next phase following the close of stand space applications on 8 July 2026. Companies which submit their applications early will have greater assurance of securing exhibiting space within their relevant product sector before detailed planning gets underway.

Charles Beauduin, Chairman of ITMA Services, organiser of ITMA said: "In an era of rapid technological change, sustainability imperatives and increasing market volatility, no single organisation can shape the future alone. Industry leaders, innovators, researchers and manufacturers must come together in Hanover to collaborate, share expertise and develop solutions that will drive the next chapter of sustainable textile manufacturing. Such collective action is particularly important as geopolitical tensions and economic uncertainties continue to challenge global trade and investment."

Regular ITMA participant Woolmark sees ITMA as an important platform that aligns with its focus on innovation, sustainability and collaboration.

"ITMA brings together the full textile value chain. For Woolmark, it's a significant industry event that connects us with technology leaders, manufacturers and innovators shaping high performance natural fibre production, and an opportunity to showcase the possibilities of Merino wool innovation as solutions

for the journey towards a nature-positive future," said Julie Davies, General Manager, Industry Development, Woolmark.

Visitor interest is also expected to be strong, as textile and garment manufacturers look to ITMA 2027 to discover technologies, exchange ideas and identify solutions that can support their future business priorities.

"ITMA is where we can see the direction of the textile industry first-hand. We look forward to visiting ITMA 2027 in Hanover, where industry and textile research come together. In doing so, the trade fair creates the conditions for translating new ideas into practical applications more quickly. For Europe – and Germany in particular – as a textile hub, ITMA serves as a key driver for the transformation of the entire value chain," said Johannes Diebel, Managing Director Forschungskuratorium Textil e. V..

Taking place from 16 to 22 September 2027 at Messegelände Hannover, Germany, ITMA 2027 will continue to spotlight innovation across the entire textile and garment manufacturing value chain, with a focus on advanced materials, automation and the digital future, sustainability and circularity, and human-centric manufacturing.

The last ITMA exhibition was held in Milan in 2023. It featured 1,709 exhibitors from 47 countries and welcomed more than 111,000 visitors from 143 countries.

With demand building across sectors, interested companies are encouraged to submit their stand applications by 8 July 2026 at: <https://exh.itma.com/ITMA2027/ExhibitorCentre/Login.aspx>.

About CEMATEX & ITMA

The European Committee of Textile Machinery Manufacturers (CEMATEX) comprises national textile machinery associations from Belgium, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland and the United Kingdom. It is the owner of ITMA and ITMA ASIA. Considered the 'Olympics' of textile machinery exhibitions, ITMA has a 74-year history of displaying the latest technology for every single work process of textile and garment making. It is held every four years in Europe.

About ITMA Services

Headquartered in Brussels with a subsidiary in Singapore, ITMA Services is the appointed organiser of ITMA 2027 and future ITMA branded exhibitions. It is managed by professionals with extensive experience in organising ITMA and other major trade exhibitions around the world. It aims to maintain and expand ITMA's unique selling proposition and relevance to a global audience.

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ITM 2026 ends with Strong Visitor Interest and Considerable Trade Volume Despite Global Uncertainties

ITM 2026, one of the world's most prestigious organizations in the field of textile technologies, concluded with remarkable success. Held during a period of global economic fluctuations, regional uncertainties, and postponed investment decisions, ITM 2026 once again demonstrated the strength and future-oriented spirit of the textile technology sector. Welcoming 48,257 professional visitors and investors from 105 different countries, ITM 2026 provided momentum to the textile sector as an event where billions of euros worth of machinery sales and significant business collaborations were realized.

ITM 2026 International Textile Machinery Exhibition, which will be held in partnership with Tüyap Tüm Fuarçılık Yapım Inc. and Teknik Fairs Inc. and in cooperation with Textile Machinery and Accessories Industrialists Association (TEMSAD), was held at Tüyap Fair and Congress Center between 9-13 June 2026. Held simultaneously with HIGHTEX 2026 International Technical Textiles and Nonwovens Exhibition in an area of 110,000 square meters and 11 halls, ITM 2026 Exhibition hosted leading manufacturers of textile technologies. With the participation of more than 1,000 companies and company representatives from 59 countries, the exhibition once again demonstrated its international stature by attracting 48,257 professional visitors from 105 countries, of whom 53% were domestic and 47% were international visitors.

Visitor Influx from Diverse Regions, from Rwanda to Tuvalu

Istanbul's strategic location, transportation advantages, and lack of visa barriers were among the key factors that enhanced ITM 2026's global appeal. Industry professionals from Europe, Asia, Africa, America, and the Middle East gathered in Istanbul to explore new technologies and evaluate investment opportunities.

Many investors and industry representatives, particularly those facing difficulties attending exhibition in Europe due to visa issues, viewed ITM 2026 as a crucial platform for establishing international business connections. Professional visitors from

diverse regions of the world, ranging from Rwanda and San Marino to Chile, Tuvalu, Swaziland and the Comoros, attended the ITM 2026 Exhibition.

The countries from which the visitors came are as follows: Afghanistan, Albania, Algeria, Andorra, Armenia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Brunei Darussalam, Bulgaria, Canada, Central African Republic, Chile, China, Colombia, Comoros, Croatia, Czech Republic, Denmark, East Timor, Egypt Eritrea, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Indonesia, Iran, Iraq, Italy, Japan, Jordan, Kazakhstan, Kosovo, Kuwait, Kyrgyzstan, Lebanon, Libya, Lithuania, Macedonia, Madagascar, Malaysia, Mauritius, Mexico, Moldova, Morocco, Namibia, Netherlands, Nigeria, Norway, Oman, Pakistan, Palestine, Peru, Poland, Portugal, Romania, Russia, Rwanda, San Marino, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkish Republic of Northern Cyprus, Turkmenistan, Türkiye, Tuvalu, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uzbekistan, Vietnam, Yemen.

The Qualified Visitor Profile Satisfied the Participants

One of the most striking aspects of ITM 2026 was not only the number of visitors, but also the fact that they had strong investment potential and consisted of decision-makers. Throughout the exhibition, a significant portion of those visiting the stands were factory owners, senior executives, investors, and professionals who play an influential role in purchasing decisions.

Participating companies stated that they had the opportunity to make direct contact, especially with businesses planning new investments, and that the majority of these meetings resulted in concrete projects and acquisition processes. Many companies emphasized that the quality of visitors was higher than in previous years and that the exhibition was extremely productive from a commercial perspective.

The Foundations for New Investments were Laid with International Purchasing Delegations

ITM 2026 transcended being merely an event showcasing technologies, becoming a prominent business platform where significant commercial deals were concluded. From the very first day, many participating companies began selling machinery, and the meetings held over the five days resulted in new investment decisions and long-term collaborations. In particular, the presidents of leading textile companies

TEXTILE EVENTS

from Syria, Egypt, India, and Russia, along with their purchasing delegations, visited ITM 2026 and made machinery purchases. Solutions for all textile production processes, including weaving, knitting, spinning, finishing, garment manufacturing, denim, and digital printing technologies, were met with intense interest from investors. Participants stated that despite current economic conditions, investment appetite persists, and the exhibition, where billions of euros worth of machinery sales took place, provided significant motivation for the sector.

Future Technologies Attract Great Interest

Throughout ITM 2026, sustainability, energy efficiency, digitalization, automation, and AI-powered manufacturing technologies were among the areas that attracted the most attention from visitors. Technology launches and live machine demonstrations by leading global manufacturers guided investors in their future production plans. Industry professionals visiting the exhibition had the opportunity to examine firsthand technologies that will reduce production costs, increase efficiency, and support sustainable production.

High Demand Already for ITM 2028

The commercial activity and high visitor satisfaction generated by ITM 2026 have also brought interest in the upcoming event. Many participating companies have already requested space for ITM 2028, which will be held from June 13-17, 2028, while the exhibition is still ongoing, and pre-reservations for the event have reached remarkable levels.

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FESPA 2026 demonstrates the value of a diverse multi-event format for visitors and exhibitors

Largest FESPA co-located event offering to date delivers global audience with strong appetite to explore and invest

FESPA 2026, first flagship exhibition in Southern Europe since 2012

FESPA 2026 comprising FESPA Global Print Expo, European Sign Expo, Personalisation Experience, WrapFest, Corrugated and Textile welcomed visitors from the speciality print, signage, packaging, personalisation, wrapping and textile sectors to the Fira de Barcelona.

The expansion into new print-related vertical markets reinforced the organisation's FESPA Future strategy to Connect, Inspire and Support increasingly diverse global business communities. The co-located event portfolio also broadened FESPA's reach and audience, strengthening its position as a leading platform for innovation, knowledge exchange and business growth across the speciality print industry and beyond.

FESPA 2026 welcomed visitors from 126 countries with the largest audiences coming from Spain, Italy, the UK, Germany, France, Portugal, Netherlands, Poland, Belgium and Switzerland (in descending order). This reinforces the value of FESPA's peripatetic pattern, making the 2026 event easily accessible to southern European printers and supporting exhibitors to make connections with new prospective buyers.

FESPA 2026 achieved a total visitor attendance of 24,798, making it one of the most successful editions of the global event to date. 15,495 unique visitors attended the show, a 10% year-on-year increase on the 2025 event.

85% of visitors were senior decision makers, with 77% directors, CEOs, owners or managers. The collective median visitor budget was €3.5 billion, a 20.68% increase on 2025, signalling strong propensity to invest.

Michael Ryan, Head of FESPA Global Print Expo, comments: "By bringing together six clearly defined events, our aim was to give FESPA visitors a richer mix of opportunities to learn, be inspired and explore adjacent market sectors and applications. The patterns we've seen in event registration, usage of the FESPA app and conference attendance made it clear that most visitors have several overlapping areas of interest, so this approach serves their needs perfectly. For example, they might come to the show primarily for FESPA Global Print Expo and also engage with European Sign Expo, Textile and our FESPA Conference programme. This highlights the exceptional value of a comprehensive global event with multiple exhibition and content strands; it gives decision-makers access to a vast spectrum of specialist expertise to validate their current direction while also investigating new growth opportunities – all in one place."

Mathew Faulkner, EMEA Marketing & Innovation Director, Canon Europe, states: "FESPA is the ideal event for us in the wide-format market. It united the wide-format community and provided a unique opportunity for us to explore emerging technologies and the latest developments shaping the industry."

Whether it's décor, personalisation, or Corrugated—which we were proud to exhibit in and sponsor – FESPA is the perfect platform to showcase the power of digital print-on-demand across multiple verticals. Packed with inspiration, insights, innovative applications and creativity, it truly is the place to be and is the destination for industry experts."

Folker Statchetzki, Marketing Manager, Brother, says: "FESPA Global Print Expo has always been the ideal platform for us to showcase our latest innovations. It's clear that the event is a highly professional exhibition, where exhibitors openly share market developments and meaningful discussions take place between industry experts and visitors. Ultimately, attending FESPA offers a complete, all-in-one experience for anyone looking to stay connected with the print industry."

Co-located events and conference programmes

FESPA Global Print Expo's returning co-located events, European Sign Expo and Personalisation Experience, further enhanced the visitor offering. European Sign Expo showcased the latest innovations, products and solutions for the signage and visual communications sectors, while Personalisation Experience provided a dedicated platform for industry professionals to explore the commercial potential of customisation and discover new opportunities for personalised print applications.

This year, FESPA also launched two new co-located events –Corrugated and Textile – and included WrapFest in the flagship event portfolio for the first time.

Textile offered a focused environment for professionals in printed textile applications across fashion, apparel, sportswear and interior décor. Visitors were able to explore emerging trends, discover new technologies and applications, and exchange knowledge with industry experts.

WrapFest 2026 showcased the full spectrum of vehicle and surface wrapping solutions, including self-adhesive films, software, design tools and accessories. Complementing the exhibition, the event delivered a programme of live demonstrations, practical workshops, technical advice and skills development opportunities, providing valuable hands-on learning for wrap professionals.

Visitors also had the opportunity to attend three conference programmes at the event: The FESPA Conference; The Corrugated Conference and WrapTalks.

Amit Shvartz, General Manager & COO, Scodix, comments: "FESPA's new Corrugated event was a must-attend for us. As a company that serves the

signage and display market, it offered us the perfect opportunity to connect with key decision-makers, strengthen customer relationships and showcase our latest innovations and product developments."

João Sá, Head of Sales, ROQ International, also says: "ROQ has exhibited at FESPA for many years and, thanks to these events, we have been able to expand and strengthen our presence in different markets. This year, we were pleased to exhibit at the new Textile event and, as a manufacturer of screen and digital printing equipment with a strong focus on apparel and garment decoration, it was a logical decision for us to take this approach. For businesses operating in this market, Textile provides a platform to engage with a broad audience and connect with customers looking for solutions to their business challenges."

FESPA Global Print Expo, European Sign Expo, Personalisation Experience, WrapFest and Textile will return to Messe Munich, Germany from 6 – 9 April 2027.

About FESPA

Founded in 1962, FESPA is a global federation of Associations for the screen printing, digital printing and textile printing community. FESPA's dual aim is to promote screen printing and digital imaging and to share knowledge about screen and digital printing with its members across the world, helping them to grow their businesses and learn about the latest developments in their fast-growing industries.

FESPA Profit for Purpose

Profit for Purpose is FESPA's international reinvestment programme, which uses revenue from FESPA events to support the global speciality print community to achieve sustainable and profitable growth through four key pillars - education, inspiration, expansion and connection. The programme delivers high quality products and services for printers worldwide, including market research, seminars, summits, congresses, educational guides and features, in addition to supporting grassroots projects in developing markets. For more information visit, www.fespa.com/profit-for-purpose.

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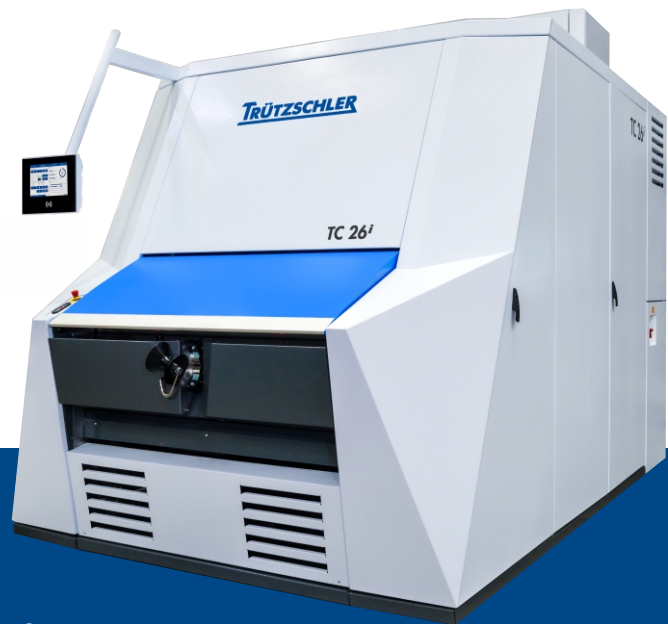
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Trützschler's Integrated Draw Frame IDF 3 meets aspiration of Spinning Mills in regard to the higher productivity

Integrated draw frame IDF meets requirement of productivity, stable quality and shorter processes altogether

Spinning mills worldwide are looking for solutions that combine higher productivity, stable quality and shorter processes, especially when processing short fibers. Trützschler's integrated draw frame IDF 3 has proven to be a powerful answer to these requirements. Evaluations from several customer trials in Türkiye under real production conditions highlight the strong performance of the IDF 3, particularly when combined with the next-generation card TC 30i.

Outstanding results with TC 30i and IDF 3

A leading Turkish spinning mill produces a 100% cotton rotor yarn (Ne 30/1). The mill compared its conventional set-up of one breaker and one finisher draw frame, running consistently at 90 kg/h, with a TC 30i card combined with the integrated draw frame IDF 3. While the conventional setup was limited to 90 kg/h, TC 30i and IDF 3 enabled a stepwise increase in production to 130 kg/h and later even 150 kg/h. Across all trials, the combination delivered higher and more consistent quality with lower IPI levels. These results confirm excellent process stability at significantly increased production output.



TC 30i and IDF 3 installation at a customer site in Türkiye.

Further results from other Turkish spinning mills underline the competitive advantage of IDF 3 combined with the TC 30i. Another customer operates TC 30i cards equipped with IDF 3, in a rotor spinning line which processes cotton and cotton blends. The combination shortens the process and delivers a 33% increase in productivity compared to a conventional competitor setup,

which included a breaker and a finisher draw frame. At the same time, consistently high quality is maintained. The customer reports that the decision to adopt the TC 30i and IDF 3 should have been made much earlier.

Proven performance beyond TC 30i

Another Turkish customer carried out trials using the IDF 3 combined with a TC 19i card, processing a blend of 50% cotton waste and 50% polyester. At a production rate of 130 kg/h, the IDF 3 process reduced IPI levels by around 50% compared to a conventional two-passage draw frame setup consisting of one breaker and one finisher draw frame. Even when the production rate was increased to 220 kg/h, the IPI values achieved with the IDF 3 remained below those achieved in the conventional process. Encouraged by these results, the mill management decided to remove competitor cards and competitor draw frames from the mill and to switch to the latest card generation, TC 30i, combined with IDF 3.



IDF 3 helps improve sliver quality, yarn evenness and strength – especially when processing higher short fiber content.

The proven solution for direct spinning

The success of IDF 3 lies in its ability to control short fibers reliably while enabling a shortened spinning preparation process. Results repeatedly show that the shorter the fiber and the higher the proportion of short fibers, the stronger the positive effect of the IDF 3 on sliver quality – resulting in improved yarn IPI values, better evenness and maintained yarn strength.

Conventional draw frames typically involve two drafting zones, which can lead to a higher amount of floating fibers, especially when processing short fibers. In contrast, the IDF 3 operates with only one drafting zone. With its special drafting zone geometry, the IDF 3 ensures reliable fiber guidance

and effectively stabilizes floating fibers. Its unique design minimizes count variations and leads to more homogeneous sliver and improved yarn quality.

These effects become especially powerful when combined with the TC 30i. The card delivers material at high productivity levels and the IDF 3 keeps up this speed, even during can change. At the same time, this powerful combination reduces space requirements, compressed air consumption and operator effort. In this way, TC 30i and IDF 3 unlock the full benefits of direct spinning, particularly for applications with high short fiber content or recycled materials.

About the Trützschler Group

The Trützschler Group SE is a German textile machinery manufacturer headquartered in Mönchengladbach, Germany. The company is divided into three business units: Spinning, Nonwovens and Card Clothing. Trützschler Spinning is the global technology and market leader in spinning preparation in the cotton and man-made fiber sector. With TRUECYCLED, Trützschler Spinning offers a complete solution in spinning preparation for state-of-the-art recycling of textile waste – from opening and cleaning to carding and drawing of secondary fibers, resulting in high-quality, sustainable yarns. Trützschler Card Clothing is the global market leader in the production of high-performance card clothing for cards and roller cards. Trützschler Nonwovens is a leading supplier of complete production lines and machinery for needle-punched, hydroentangled (spunlaced), through-air and chemical bonded nonwovens. Trützschler machines, installations and accessories are produced and developed in nine locations worldwide. This includes four factories in Germany (Dülmen, Egelsbach, Mönchengladbach, Neubulach), as well as sites in China (Jiaxing and Shanghai), India (Sanand), the USA (Charlotte) and Brazil (Curitiba). Local service companies in Türkiye, Mexico, Uzbekistan and Vietnam and local service teams in Pakistan, Bangladesh and Indonesia provide customer proximity in key regions for the textile processing industry. For more information visit: www.truetzschler.com

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Barmag

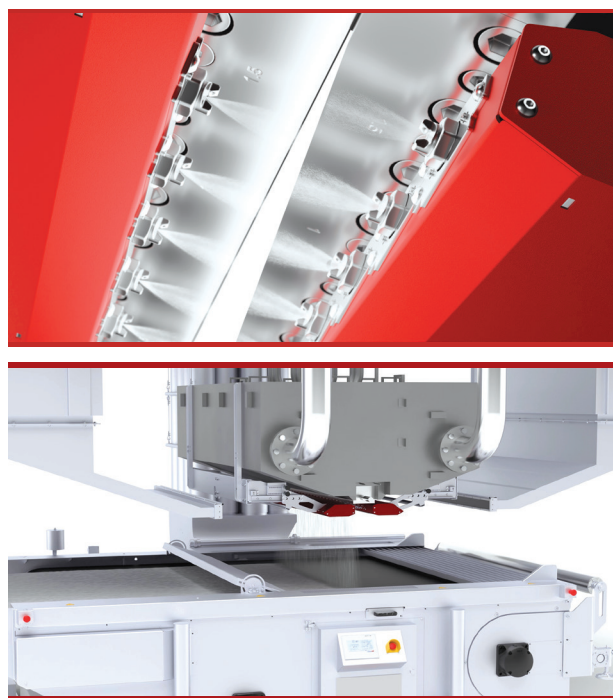
FILTECH 2026: Neumag Nonwoven Showcases Technologies for Meltblown and Spunbond Emphasize on Nonwovens for Filter Media

Under its Neumag brand, Barmag will present its technologies for the production of nonwovens for filter media at this year's FILTECH. From June 30 to July 2, the company will be represented at the Cologne trade fair in Hall 8, Booth E68.

The main focus is on solutions for producing high-performance filter media at competitive costs. Here, Neumag excels in both the meltblown sector and with its spunbond solutions.

Meltblown technology for the highest quality requirements

Neumag's meltblown technology enables the efficient and straightforward production of high - performance nonwovens for filtration, insulation, and sorption applications. A wide variety of polymers can be processed—from classic polyolefins such as PP and PE, through PET, PLA, PBT, and PA, to specialty plastics like PPS or TPU. All of these and other raw materials can be processed safely and reliably using the Neumag meltblown process.



The hycuTEC hydrocharging unit reduces the pressure drop of a typical FFP2 filter medium to less than a quarter, thereby achieving filtration efficiency of over 99.99%.

SCIENCE IN INDUSTRY

The hycuTEC hydrocharging technology, which was honored with the Edana Filtrex Innovation Award, enables the production of particularly high-performance electret filter media. This allows the pressure drop of a typical FFP2 filter medium to be reduced to less than a quarter. "Filtration efficiencies of over 99.99% are easily achievable with standard media weighing around 35 g/m² and a maximum pressure drop of 35 Pa," explains Andreas Frisch, Regional Sales Director Nonwoven. "Furthermore, the additional drying step is eliminated in most applications—another advantage of this innovative technology," he adds.

Spunbond solutions for high-performance filter concepts

Spunbond nonwovens are becoming increasingly important in filtration—both as carrier materials and as standalone filter media. By tailoring nonwoven structures specifically to the task at hand, customer - specific requirements can be precisely met. It is also possible to combine multiple functions within a single layer.

In particular, the company's long-standing expertise in bicomponent spinning processes opens up new possibilities in the design of innovative nonwoven structures. The Neumag Bico spunbond process allows for the combination of different fiber cross-sections as well as the simultaneous production of different fibers from one or more polymers on a single line. The spectrum ranges from classic coresheath and side-by-side filaments to split fibers and so-called mixed fibers.

Barmag Huitong Engineering technology makes PA6 direct spinning economically viable

Barmag Huitong commissioned polymerization (CP) plant for Polyamide 6 in in chinese province, Zhejiang

Barmag's subsidiary Barmag Huitong (Yangzhou) Engineering Co., Ltd. commissioned the first continuous polymerization (CP) plant for polyamide 6 in the Chinese province of Zhejiang.

Following a brief construction and commissioning phase of just 7 months, the plant began production at the end of 2025. Since then, 20 metric tons of high-quality polyamide 6 have been produced daily with significantly reduced energy consumption; this material is processed into filament yarn for textile applications via a direct spinning facility. With this, the renowned

polyamide manufacturer has laid the groundwork to further expand its competitive edge in the demanding polyamide 6 market.



In the future, Barmag will be able to produce polyamide 6 – from polymerization through to the finished spool – all under one roof.

The joint venture between the German chemical fiber plant manufacturer Barmag and the Chinese chemical plant specialist Huitong has further developed the classic two-reactor technology, making it competitive and establishing the concept as the ideal choice for future PA6 direct spinning. In addition, Barmag Huitong Engineering is


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continuously working on process and equipment innovations to increase plant efficiency for its customers while promoting the sustainable development of the nylon industry chain.

About Barmag

Since 2026, the Swiss Rieter Group has been operating its man-made fibers business as subsidiary under the traditional name Barmag. This includes the established product brands Barmag and Neumag. As a future-oriented company, the research and development of Barmag is driven by energy-efficiency and sustainable technologies (e-save).

Barmag is one of the leading providers of manmade fibers filament spinning systems, texturing machines, BCF systems, staple fibers systems and solutions for the production of nonwovens. Together with its range of polycondensation and extrusion systems and their key components, Barmag caters to the entire manufacturing process – from the monomer all the way through to the textured yarn – and supports it with customer-oriented engineering services. The product portfolio is rounded off with automation and digital solutions. In addition, Barmag offers high-precision gear metering pumps for the textile industry and other sectors, including the automotive, chemical and paint industries.

The main markets for the Barmag product portfolio are in Asia, particularly in China, India, Türkiye and the USA. Worldwide, Barmag – with round about 2,500 employees – has a presence in 120 countries with production, sales and distribution and service organizations. At the Research and Development centers in Remscheid, Neumünster (Germany), and Suzhou (China), highly qualified engineers, technologists and technicians develop innovative and technologically leading products for tomorrow's world.

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BB Engineering GmbH

BB Engineering launched a new innovative product at the ITM in Istanbul

New spinning package with two-step filtration for recycled yarns and more

At the ITM in Istanbul, BB Engineering unveiled its new, patented ValuePack spinning package for the first time, which features a two-stage filtration system. This is particularly beneficial for re-cycling processes.

Until now, spinning packs have used either metal powder ("sand") or filter candles as filter media. Both options are suitable for different applications, and each has its own specific advantages and disadvantages. Sand packs are characterized above all by high melt homogeneity and are therefore particularly suitable for virgin material. Packages with filter candles, on the other hand, offer a larger filter area and were originally developed specifically for recycling applications. The increased filter area improves filtration performance and extends service life but is also associated with a lower flux rate and shear, which can have a negative effect on homogeneity.



Rendering of ValuePack

In the new ValuePack spinning package, BB Engineering combines both approaches — metal sand and filter cartridges — in a two-step filtration process. The melt first flows through the filter cartridge, where it is efficiently filtered down to 15 µm across a large filter surface area. It then passes through the sand chamber, where homogenization and shearing in particular take place. The concept is as simple as it is innovative and offers clear advantages. It results in significantly improved homogeneity in terms of temperature and viscosity, better spinning performance, and higher yarn quality. This added value is particularly evident in recycling processes, where it enables the production of higher-quality products.

SCIENCE IN INDUSTRY

Furthermore, the ValuePack's two-stage filtration can also offer advantages in other demanding or quality-critical applications.

Another advantage of the ValuePack is its pressure-independent seal. This helps prevent leaks, which can occur with self-sealing packages. At the same time, this allows for a wider process window. Existing systems can be easily retrofitted to accommodate the ValuePack, which is slightly longer due to its design.

With its multi-stage filtration in the spinning package, BB Engineering plays a pioneering role and, underscores its expertise in the field of synthetic fiber spinning and recycling. At the ITM trade show, visitors were able to experience how the ValuePack works through an impressive VR animation.

About BB Engineering GmbH

BB Engineering GmbH is a German machine building company founded in 1997 as a joint venture between Barmag, nowadays a subsidiary of the Rieter group, and the Brückner group. Today, the company employs about 150 members of staff at its location in Remscheid, Germany, focusing their business on the development, engineering, design and manufacturing of extrusion, mixing and filtration technologies as well as complete spinning lines (VarioFil®), air-texturizing lines (JeTex®) and recycling technologies (VacuFil®, Visco+) for the plastics and textiles industry.

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www.bbeng.de



Uster Technologies AG

Recycled fibers: the vital data for quality and profitability

Uster's new Recycling Opening Index guides spinners to the perfect blend, so that the spinners can optimise their circularity credentials

Uster AFIS 6 now offers the key data for better decisions when blending recycled fibers. Process control is decisive in determining the quality and economic outcome. The new R RecyclingModule of AFIS 6 introduces the Recycling Opening Index (ROI), so spinners can optimize their circularity credentials. It is officially launched at ITM 2026 in Istanbul, Türkiye.

Cotton recycling has become a strategic priority for brands, regulators, and technology providers because it directly addresses the textile sector's biggest challenges: growing volumes of waste, resource scarcity, climate impact, and regulatory pressure.



Uster AFIS 6 – The fiber process control system

Recycled waste and the use of it

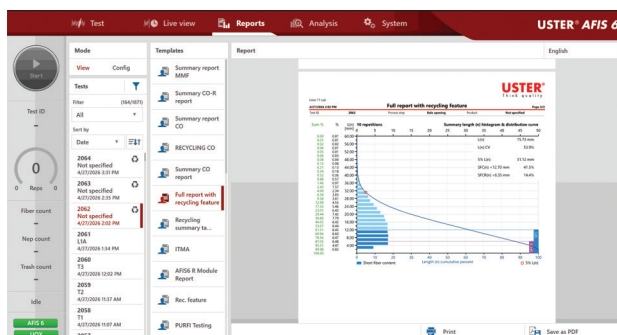
Recent industry data shows that most textile waste is post-consumer waste (75% by volume) while post-industrial (pre-consumer) waste makes up around 25%. However, when it comes to recycling – turning this waste into quality new yarn – the situation is different.

Even though it's a smaller share of total waste, about 95-99% of post-industrial waste is already being reused. Almost every scrap of factory waste is already being collected and spun back into yarn. That's because it's clean, consistent, and relatively easy to process.

Spinners generally see it as the safer option to start their recycling activities with post-industrial waste. These raw materials are more predictable in their behaviour, so it's simpler to refine spinning techniques to suit them. An optimized process can then be developed for blending in pre- and/or post-consumer waste.

Controlling processes with recycled raw materials

Now, objective measurement data from Uster is available to give clear indicators of processability and profitability when using recycled raw materials. This comes with the Recycling Opening Index (ROI), together with the total yarn pieces value. The ROI is a metric in the Uster AFIS 6 R Recycling Module, which describes the effectiveness of the opening process in the recycling of cotton fibers. It is defined as the ratio of opened fibers to remaining yarn pieces (hard ends). 'Total yarn pieces' means the sum of yarn fragments present in the raw material that have not yet been fully opened into individual fibers.



Screenshot of Uster AFIS 6 R Recycling Module measurement showing summary of length (n) histogram and distribution curve

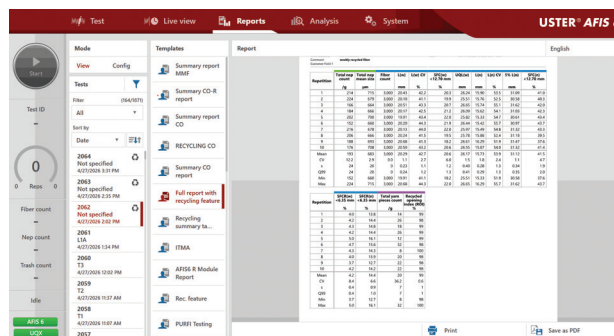
If a low ROI value is indicated, this suggests a poor degree of opening, which can disrupt the spinning process and cause issues such as yarn irregularity (IPI), weak spots and uneven surface structures.

So, the ROI is a vital metric for evaluating the quality of recycled cotton materials. For the first time, spinners can have a quantitative assessment of the opening process.

R Recycling Module of Uster AFIS 6

Uster AFIS 6 with the R Recycling Module supports better decisions through real measurements. The concept of the Recycling Opening Index (ROI) combined with the number of yarn pieces per gram, provides spinners with a more precise evaluation of recycled material processing. The R Recycling Module also offers advanced recycling parameter measurements, as well as a refined short fiber content analysis with < 6.35 mm indicating the non-spinnable fiber content. In addition, the module enhances fiber quality assessment by incorporating detailed nep and fiber length parameters. The R Recycling Module on

AFIS 6 is an optional, on-demand feature designed exclusively for this latest model.



Screenshot showing the new Uster AFIS 6 Recycling R Module properties (SFC < 6.35 mm, ROI and yarn pieces/gr).

The new module fits perfectly within Uster AFIS 6, with its expanded measurement range for 100% synthetic fibers giving details of cut length and denier/fineness to help spinners make proper raw material selections. The updated reporting package simplifies complex data analysis, and the integrated Uster Statistics remains the essential tool for spinners to optimize intermediate process steps – finally empowering full control of their processes.

About Uster Technologies

Uster Technologies is the world's leading provider of quality management solutions from fiber to fabric.

High-technology instruments, systems and services cover quality control, prediction, certification and optimization. The portfolio comprises quality management, laboratory testing and in-line process control instruments for fibers, staple fiber, and filament yarns, fabrics and nonwovens.

Uster Statistics, the unique global benchmarks for textile trading, complement a portfolio of value-added services that includes training, consultancy and worldwide after-sales.

The Uster philosophy aims to drive innovation forward by meeting market needs – always with 'quality in mind'.

Uster Technologies is headquartered in Uster, Switzerland and operates worldwide. The company has a global network of 7 subsidiaries, with 50 sales agents and local service stations around the world.

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SCIENCE IN INDUSTRY

Dhartex A DH Group Companies

A brief profile of Dhartex

Dhartex Machinery India Pvt. Ltd. is a reputed name in the Indian and international textile machinery market. The company specialized in the design manufacturing and commissioning of high-performance equipment for wet finishing, dyeing, drying, squeezing, and fully automated size cooking solutions.

With a legacy built on trust, precision engineering, and innovation, Dhartex has grown to become a preferred technology partner for modern textile processing units. The company focuses on combining functionality, energy efficiency, and operator-friendly automation to develop robust systems that improve textile production quality and operational consistency.

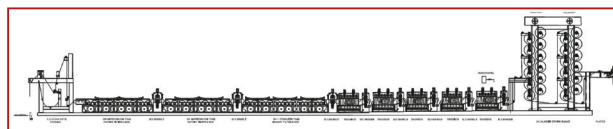
Mr. Narendra Panchal, the Managing Director and pioneer behind Dhartex Machinery India Pvt. Ltd. brings with him over 35 years of rich and hands-on experience in the textile machinery sector. With

his deep-rooted technical knowledge and visionary approach, Mr. Panchal has led the company from its early beginnings to a well-recognized and respected brand in the textile industry. Mr. Panchal continues to mentor new generations of engineers and technologists within the company, maintaining Dhartex's industry edge.

DMERC PRO™

Chainless Mercerizing Range

Next-Generation Mercerization for Superior Fabric Quality



Introducing D-MERC-PRO™ the latest innovation from Dhartex—a cutting edge Chainless Mercerizing Range engineered for optimal performance, low maintenance, and unmatched fabric quality. Designed with advanced automation and energy-efficient technology,

Wuxi Universal First Precision Technology Co Ltd, Wuxi P.R.China

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TECHNICAL & TECHNOLOGICAL PARTS SUPPLIER

World's Largest Manufacturer of Compact Mesh Aprons

Astrosun China Introducing - Non Stick, Long Life **DELIGHT PJ**
- Lattice apron for all types of Compact Systems

- ◆ Nonstick- Easy clean - Mesh Apron
- ◆ Long Life - 2 times
- ◆ Low maintenance - Longer Cleaning cycles
- ◆ Huge Operator Saving
- ◆ Ring Frame Utilization improves due to less stoppage
- ◆ Faster payback
- ◆ Special coating - protected surfaces - easy smooth rotation
- ◆ Safe on the mango tube
- ◆ More consistent and stable running of Ring frame
- ◆ Available in all sizes for All compact systems

New DELIGHT PG 80 - APRON

After run 6 month
DELIGHT PJ 80 mesh apronCurrent Mesh Apron - Problem Fiber
Sticking to The SurfaceAfter run 6 month
Normal mesh apron

CHIVEN SPINNING

📍 B 26 Hudco Housing Unit, Near PSG Hospital, Peelamedu, Coimbatore - 641004, Tamilnadu , INDIA.
📞 +91 94861 61827 📠 0422- 2571988 ✉ chivenspinning@rediffmail.com

D-MERC-PRO™ redefines mercerizing with seamless fabric handling and consistent results across a wide variety of woven fabrics.

Benefits

Superior Fabric Quality : Enhanced luster, dye uptake, and hand feel make your fabrics stand out in the competitive textile market.

Energy & Resource Efficiency : Reduced water, steam, and chemical usage contribute to a lower environmental footprint and operational cost.

Low Maintenance, High Uptime : The chainless design, robust construction, and self-cleaning systems ensure longer intervals between maintenance shutdowns.

Fast ROI : Increased productivity, reduced wastage, and long service life translate into rapid return on investment.

Applications

- 100% Cotton Woven Fabrics
- Cotton Blends
- Poplin, Twill, Voile, Satin & Shooting Fabrics
- High-thread-count Shirting Materials

Key Features

1. **Chainless Fabric Transport System :** Eliminates the need for traditional chains, reducing mechanical wear, maintenance costs, and downtime.
2. **Uniform Tension Control :** Intelligent tension regulation across the entire range ensures perfect dimensional stability and smooth mercerizing.
3. **High-Efficiency Dwell Time Impregnator Tank :** Ensures uniform and deep penetration of caustic soda by controlling dwell time precisely. The well engineered tank design allows even saturation of fabric, crucial for achieving consistent luster, improved strength, and enhanced dye affinity.
4. **Advanced Stabilizer Tank System :** Designed to lock in the mercerizing effect, the stabilizer tank ensures controlled relaxation and alkali retention time. This results in better fiber swelling, dimensional stability, and minimized fabric shrinkage. Integrated washing and neutralization ensure effective alkali removal and smooth fabric feel.
5. **High-Performance Caustic Recovery System :** Maximizes lye recovery and minimizes chemical consumption, resulting in a more sustainable and cost-effective process.

6. **Modular Design :** Flexible, space-saving layout tailored to your production floor—easily expandable for future upgrades.

7. **Advanced Automation & Monitoring :** Intuitive HMI with real-time process visualization, automatic concentration control, and integrated production analytics.

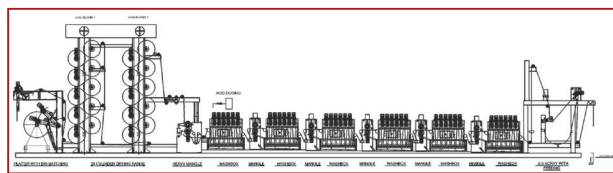
8. **Efficient Washing & Neutralizing Units :** Multi-stage counterflow washing for thorough alkali removal and minimal water usage.

9. **Optimized for Fine & Delicate Fabrics :** Gentle yet precise treatment ensures high luster, enhanced dye affinity, and improved fabric strength.

DWASH PRO™

Smart Washing in Wet Finishing

Intelligent Open-Width Washing System for Pre-treatment, Dyeing & Finishing



Clean Fabric. Controlled Process. Consistent Results.

DWASH PRO™ by Dhartex is a next-generation modular open-width washing unit designed to optimize washing performance while drastically reducing water, steam, and chemical consumption. With intelligent automation features and customizable configurations, it ensures consistent quality across fabric types and processing needs.

Smart Automation for Precision Washing

Automation Feature	Description
Water Flow Control	Auto-adjusts water input based on fabric load & speed using VFD-regulated pumps and flow meters
Steam Control	Steam injection regulated by temperature sensors & PID logic to maintain precise liquor temperatures
Dosing System	Smart dosing unit integrated with pH sensors to neutralize acids/alkalis in real-time
Tank Filtration	Continuous inline filtration system removes suspended particles to extend liquor life and protect fabric
Sensor Integration	pH, temperature, flow, and level sensors enable real-time monitoring and closed-loop feedback

SCIENCE IN INDUSTRY

PLC-HMI System	Centralized touch panel with recipe management, alarm systems and SCADA
Water Reuse Logic	Cascade rinsing and recycled liquor return with conductivity-based quality control

Core Features & Technical Excellence

1. Vertical Fabric Passage

- Enhances drainage and liquor contact
- Ideal for deep, uniform penetration of water or neutralizing agents

2. Modular Construction

- Add/remove wash modules as per process length
- Supports washing sections, hot wash, neutralizing, or chemical rinsing

3. Twin Drive System (Optional)

- Independent top and bottom drives for ultra-low tension handling
- Especially useful for sensitive or stretch-prone fabrics

4. Splint Rollers & Pneumatic Compensators

- Optimize liquor extraction without excess tension
- Maintain smooth and wrinkle-free passage

5. Tension Control System

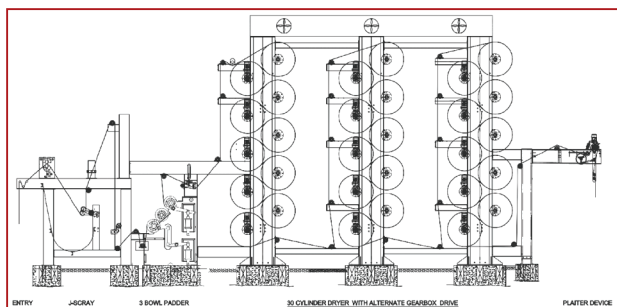
- Real-time tension feedback loop via load cell & pneumatic cylinders
- Prevents fabric elongation or distortion during high-speed runs

Applications

- Open-Width Washing after Mercerization
- Post-Dyeing Neutralization
- After-Scouring or Bleaching Rinsing
- Final Finishings Wash
- Sizing Agent Removal

DHARTEX PRODRY™

Professional-grade, High-Performance Drying System



Introducing Prodry

Precision Drying. Intelligent Steam Control. Superior Results.

The Dry Nova Dryer is a high-efficiency, modular cylinder drying system designed for modern textile finishing.

Now enhanced with advanced steam automation — including moisture control and steam pressure regulation for both individual cylinder groups and the entire dryer — Dry Nova guarantees maximum performance, minimal energy waste, and consistently flawless fabric quality.

Intelligent Steam Accessory Package

1. Group-Based Steam Pressure Control

- Independent steam regulation for each cylinder group
- Enables thermal profiling based on fabric behavior
- Improves drying balance and energy efficiency

2. Whole-Dryer Steam Management

- Centralized pressure control for full-system stability
- Maintains consistent heat across all drying zones
- Ideal for continuous production lines

3. Real-Time Moisture Control

- Inline moisture sensors instantly measure fabric wetness
- Dynamic steam flow adjustment
- Prevents over-drying and preserves fabric hand

4. Closed-Loop Automation

- Seamless feedback between sensors and steam valves
- Self-regulating system ensures process consistency
- Enhances overall production efficiency

Flexible Customization Options

- Optional cylinder or zone shutdown
- Pendulum roller for optimized fabric handling
- Alternative belt drive system
- Integrated or standalone cooling cylinders
- Exhaust hoods, fans, or enclosures for heat management
- Entry frames, winders, and stackers for separate operation

Key Benefits

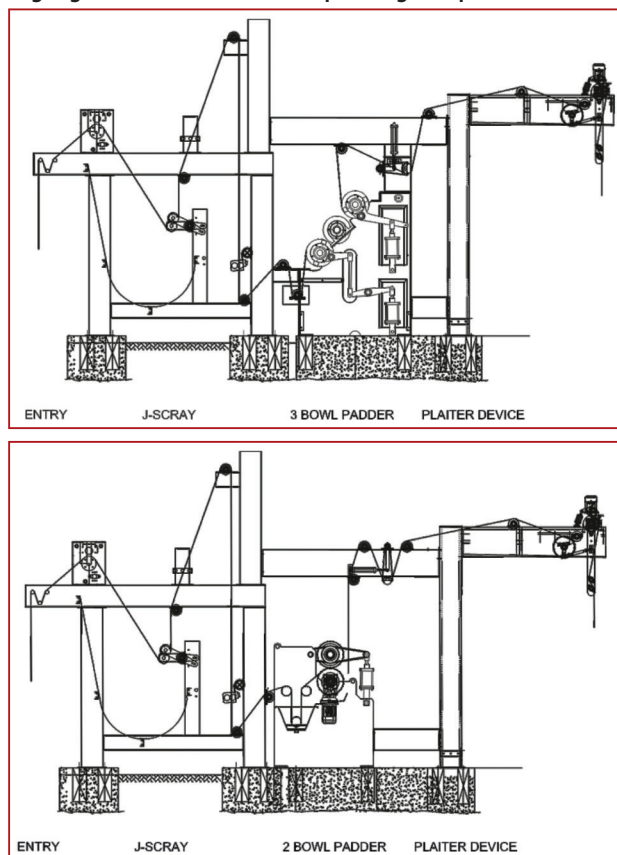
- **Built to Last** : Heavy-duty, vibration-free frame design
- **User-friendly** : PLC interface with intuitive controls
- **Energy Efficient** : Smart steam regulation minimizes consumption

- ▶ **Fast Start-up** : Quick heat-up times reduce delays
- ▶ **Fabric Safe** : Tension-free drying for sensitive textiles
- ▶ **Consistent Output** : Uniform temperature for flawless finish

DHARTEX PADMASTER™

Mastering the Art of Fabric Squeezing

Highlights dominance in fabric padding and pressure control



Engineered for Versatility – Built for Precision

Now with Advanced Filtration Unit

Smarter Application. Cleaner Operation. Greater Efficiency

The Dhartex Padder System, enhanced with a high-efficiency filtration unit, elevates precision textile processing to new heights. Continuous chemical bath filtration ensures :

- ▶ Chemical purity
- ▶ Reduced chemical wastage
- ▶ Consistent processing temperatures

Configurable to Your Needs

1. 2-Bowl Padder

- ▶ Compact, efficient desing for standard operations

- ▶ Ideal for light to medium squeezing applications

2. 3-Bowl Padder

- ▶ Enhanced pressure uniformity
- ▶ Suitable for high-throughput, multi-stage finishing lines

Squeezing Variants

1. Low Squeezing Option

- ▶ Gentle on delicate, lightweight fabrics
- ▶ Enables precision chemical application with minimal mechanical stress

2. High Squeezing Option

- ▶ Equipped with swimming rolls and nip-pressure control
- ▶ Maximizes dewatering, reducing drying load and improving efficiency

Key Features

1. **Integrated Filtration Unit** : Maintains chemical purity, reduces re-dosing, extends bath life and cuts operating costs
2. **Thermal Stability System** : Ensures consistent bath temperature for uniform fabric-to-fabric results
3. **Adjustable Nip Pressure** : Up to 50 N/mm, adaptable to different fabric requirements
4. **Durable Roll Surfaces** : Speical coatings for fabric protection and long-term durability
5. **PLC-Controlled Operation** : Maintains chemical purity, reduces re-dosing, extends bath life, and cuts operating costs
6. **Available Widths** : From 1400 mm to 3600 mm
7. **Pressure Systems** : Motorized or pneumatic options for flexible integration

Applications

- ▶ Dyeing
- ▶ Pre-Treatment
- ▶ Resin & Softener Application
- ▶ Moisture Control
- ▶ Finishing

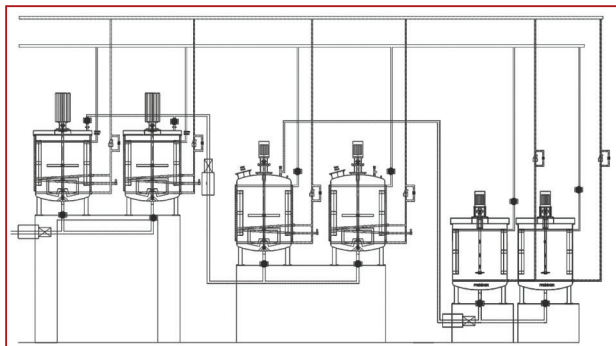
Achieve consistent results, cost efficiency and process reliability with the Dhartex PadMaster™ — now smarter with filtration and temperature management. Built to meet the demands of modern textile finishing.

Dhartex Sizepro™

Precision Sizing. Consistent Performance

Fully Automated Sizing Solution for Precision, Productivity and Consistency

SCIENCE IN INDUSTRY



Smart Sizing Starts Here

The Dhartex SizePro™ Cooking Kitchen is a state-of-the-art, fully automated system engineered for superior slurry preparation in modern textile sizing. It integrates the Pre-Mixing, Pressure Cooking, and Storage stages under a centralized control architecture — ensuring consistent performance, minimal waste, and zero process variability.

System Components with Technical Specifications

Size Pre-Mixing Vessel

Initial Dispersion & Pre-Heating Stage	
Feature	Description
Construction Material	SS 304/SS 316L grade stainless steel
Design Type	Cylindrical vertical tank with dished ends
Agitation System	Top-mounted high-efficiency anchor-type agitator with VFD control
Load Cells	For accurate weight-based ingredient dosing
Heating System	Steam jacketed electric pre-heating coil
Instrumentation	PT-100 temperature sensors, level transmitters, digital pressure gauges
Capacity Options	750/1000/1500/2000/3000 Litres
Special Features	Foam-level sensors (optional), auto dosing ports for chemicals

Size Pressure Cooking Vessel

High-Temperature Gelatinization & Cooking Phase	
Feature	Description
Construction Material	SS 304/SS 316L pressure-rated stainless steel
Design Pressure	2 to 4 bar (as per process requirement)
Agitation System	Bottom-entry propeller agitator with variable speed drive
Heating System	High-efficiency steam jacket or direct steam injection
Vacuum System	Optional vacuum degassing unit with condensate trap

Cleaning System

Fully integrated CIP (Clean-in-Place) rotary spray balls

Instrumentation

Digital temp. & pressure transmitters, safety relief valves, RTDs

Insulation

Double-layer with thermal cladding

Capacity Options

750/1000/1500/2000/3000 Litres

Safety

Pressure relief valves, rupture discs, interlocked steam control

Key Advantage

- Repeatable Batch Quality**
 - Intelligent gelatinization, precise viscosity
- Energy Saving**
 - Optimized pre-heating and controlled steam usage
- Minimal Labor**
 - Fully automated flow with process alerts
- Modular Scalability**
 - From single-vessel setups to large-scale kitchens
- Clean & Safe**
 - Hygienic design, pressure-certified, CIP-enabled vessels

Applications

Ideal for preparing size slurries for:

Cotton, Polyester, Viscose, and Blended Yarns used in

- Apparel Weaving
- Technical Textiles
- Industrial Fabrics

Dhartexpro Dry Cylinders

Precision Engineered for Superior Drying Performance

At DhartexPro, we build cylinders that drive your production forward. With over 35 years of specialized experience, we manufacture thin-walled steam, thermo oil, electrically heated, and water-cooled drying and cooling cylinders designed to meet the highest quality and safety standards.



Our cylinders are a trusted choice across a variety of applications, including sizing machines, non-woven production lines, and both textile and technical fabric finishing processes. Built with precision and innovation, DhartexPro Dry Cylinders guarantee exceptional temperature uniformity,

minimal radial run-out, and flawless welding quality for optimum performance and durability.

Cylinder Types

- ▶ Steam Heated
- ▶ Thermo Oil Heated
- ▶ Electrically Heated
- ▶ Water Cooled

Ready-Assembled Accessories

- ▶ Heavy-duty, grease-lubricated pillow block bearings designed for high-temperature use
- ▶ Stainless steel siphon pipes for safe condensate removal
- ▶ High-quality two-way rotary joints with integrated vacuum breakers
- ▶ Flexible, corrugated stainless steel hoses for reliable fluid transfer

Key Advantage

1. **Robust Construction**
 - ▶ Thin-walled cylinders built as pressure vessels, certified to international standards including CE.
2. **Wide Operating Range**
 - ▶ Steam pressure up to 16 bar (204°C saturated steam), electric heating up to 300°C
3. **Flexible Dimensions**
 - ▶ Standard diameter of 800 mm (custom sizes 400 mm to 800mm), surface widths up to 4500 mm.
4. **Premium Materials**
 - ▶ Outer shells crafted from high-grade stainless steel (AISI 304, AISI 316L) with wall thicknesses up to 5 mm.
5. **Superior Surface Quality**
 - ▶ Highly belt-ground surfaces polished with optional Teflon and custom non-stick coatings.
6. **Durable Side Plates & Journals**
 - ▶ Made from high-grade carbon steel with advanced insulation and bolted journals featuring special high-temperature sealing.
7. **Precision Tolerances**
 - ▶ Typical true running less than 0.1-0.8 mm and diameter tolerance ± 0.4 -0.6 mm ensure smooth, reliable operation.

Dhartexpro Guide Rollers and Steam Rollers

Precision Guidance for Smooth Fabric Handling



DhartexPro Guide Rollers are engineered to deliver reliable, smooth, and precise fabric guidance throughout your drying and finishing processes. Manufactured from premium stainless steel and designed for exceptional durability, these rollers ensure optimal fabric tension control, minimizing the risk of fabric damage, creasing, or misalignment.

Key Features

1. Premium Materials

- ▶ Constructed from high-grade stainless steel (AISI 304 & 316) for superior corrosion resistance in demanding production environments.

2. Optimal Diameter

- ▶ Standard diameters up to 600 mm, ideal for guiding a wide range of fabrics — from delicate knits to heavy technical textiles.

3. Robust Construction

- ▶ Built to last with heavy-duty bearings that guarantee smooth rotation and reduced maintenance.

4. Enhanced Fabric Care

- ▶ Precision-ground surfaces offer gentle fabric contact, preventing snagging and ensuring wrinkle-free processing.

5. Versatile Application

- ▶ Compatible with all fabric types and suitable for integration into various finishing lines.

6. Seamless Integration

- ▶ Designed to perfectly complement DhartexPro Dryers and other finishing equipment, enabling synchronized and efficient fabric flow.

For further information, please contact:

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Web : www.dhartexindia.com

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Vatva, G.I.D.C.,

Ahmedabad-382445, Gujarat, India

Manufacturing Unit

Plot No. 3703/E, Phase-4,

Behind new Nirma, G.I.D.C.

Vatva, Ahmedabad-382445, Gujarat, India ■

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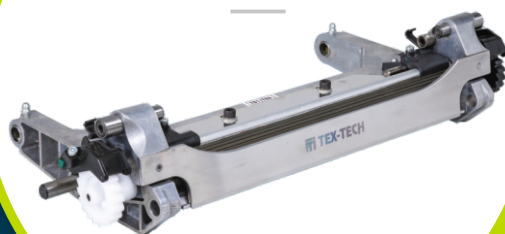
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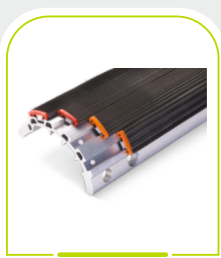
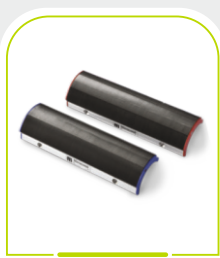
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