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SCIENTIFIC AND ECONOMIC ANALYSIS OF INDUSTRIAL ENTERPRISES PURCHASING TEXTILE OILS IN UZBEKISTAN

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Abstract - *This article presents a scientific and economic assessment of the market for textile oils and specialty lubricants used by industrial textile enterprises in Uzbekistan. The study does not examine domestic production of textile oils; instead, it focuses on purchasing enterprises, imported product classes, technical quality requirements, price differences and the effect of lubricant procurement decisions on enterprise-level economics. Open Volza import analytics for the Uzbekistan textile lubricant and HSN Code 2710 segment indicate 78 buyers, 109 global suppliers and 286 import shipments, with POSCO International Textile, Biryuza Group and Texparts UZ appearing among the most active buyers [1]. From a technical perspective, the central demand is associated with ISO VG 32 needle/sinker oils, washable needle and sinker lubricants, elastane compatibility, anticorrosion behavior and non-staining performance on fabrics. Open price benchmarks vary from 5.85 to 24.41 EUR/L, showing that package size, brand positioning and product class can substantially change annual procurement budgets and price sensitivity. The results indicate that although textile oils usually represent a small share of total manufacturing cost, they are strategic process inputs because downtime, accelerated needle and sinker wear, repeated washing, oil stains and export-quality risks can generate significant indirect losses. The article proposes a total-cost-of-ownership approach for procurement decisions in textile enterprises.*

Keywords: *textile oil; needle oil; sinker oil; ISO VG 32; textile industry of Uzbekistan; import analysis; Volza; procurement economics; knitting machines; price sensitivity; total cost of ownership.*

INTRODUCTION

Textile oils belong to the group of "low-volume but high-impact" technological resources in textile manufacturing. They affect friction, heating, needle and sinker wear, yarn breakage, fabric oil staining, washing quality and the stability of auxiliary mechanical units in spinning, weaving, knitting, winding, sewing and finishing operations. For this reason, textile lubricants should not be viewed as ordinary industrial oils only; they are specialty technological chemical materials directly linked to fabric quality, export requirements and machine reliability.

As the export scale and processing depth of the Uzbek textile industry increase, the demand for specialty lubricants also becomes more complex. Official information reports that Uzbekistan's textile exports reached USD 2.6 billion in 2025 and that the planned target for 2026 is USD 4.0 billion [3]. At the global level, Textile Exchange reports that fiber production reached 132 million tonnes in 2024 and, if the current business-as-usual trend continues, may reach 169 million tonnes by 2030 [4]. These factors increase demand for washable, elastane-compatible and corrosion-protective oils in high-speed circular and flat knitting machines.

The purpose of this article is to analyze the market for textile oils in Uzbekistan through the

lens of purchasing industrial enterprises and import-distribution channels. The focus is placed on buyer enterprises, imported product types, technical classes, price differences, enterprise procurement budgets, consumption optimization and the assessment of technical and economic risks.

RESEARCH NOVELTY AND PRACTICAL SIGNIFICANCE

The novelty of the study lies in analyzing the textile oil market not merely as a list of imported products or prices, but as a procurement system linked to the production profiles, technical needs and purchasing risks of industrial textile enterprises. Import shipment activity, enterprise production intensity, lubricant class and open price benchmarks are combined into one scientific and economic analytical logic.

The practical significance of the study is the transition from the "lowest price per liter" approach to a "total procurement cost and technological risk" model. Such an approach helps large textile enterprises establish evidence-based procurement policies by considering package size, supplier stability, availability of TDS/SDS documents, compatibility with elastane and washing processes, real consumption norms and the operational consequences of lubricant performance.

LITERATURE AND TECHNICAL BACKGROUND

The term textile lubricant covers several product families: spindle oils, sewing-thread lubricants, coning oils, needle and sinker oils, chain oils, antistatic sprays, protectors and general hydraulic or industrial oils. In import records for Uzbekistan, the most visible textile-specific segment is associated with ISO VG 32 needle and sinker oil products. Textol WE ISO 32 Plus is described with a density of about 870 kg/m³ at 15 °C, kinematic viscosity of 32 mm²/s at 40 °C, Cleveland flash point above 180 °C and washability properties [8,13]. TotalEnergies TIXO STAINLESS 32 also belongs to the textile/knitting/ISO VG 32 segment and is intended for needle and sinker lubrication, rust protection, elastane compatibility and suitability for post-washing operations [9].

The technical description of Klüberoil Tex 1-32 N indicates that needle and sinker oils can reduce wear of stitch-forming elements and lower operating costs through scourability and corrosion protection [10]. Scientific literature shows that chemical fingerprinting, coefficient of friction, needle heating, washability and non-staining behavior on fabric are important indicators in the characterization of textile lubricants [14-17].

From an industrial viewpoint, the economic value of a textile oil cannot be assessed only by its price per liter. A premium lubricant may generate savings by improving wash-off behavior, reducing fabric staining, extending the service life of needles and sinkers, increasing service intervals and reducing downtime. Mayer & Cie. reports that the Senso Blue RS system can reduce needle-oil consumption by up to 20% through speed-dependent lubrication, by up to 40% through used-oil recycling and by up to 50% through an integrated approach [12].

MATERIALS AND METHODS

The study was conducted using open sources, import analytics and calculated economic scenarios. The data were divided into three levels: buyers of textile lubricants under HSN 2710 in Uzbekistan according to Volza import-export analytics; official technical pages of manufacturers and distributors; and open retail/distributor prices used to build price-sensitivity scenarios.

Open Volza pages provide shipment counts and percentage shares, but they do not fully disclose the exact physical volume, CIF/DDP value or annual consumption for every shipment. Therefore, the market size and procurement budget values in this article should not be interpreted as official customs declarations. They are treated as a scientific and economic assessment model based on shipment activity, production scale and technical lubricant class.

The annual procurement budget was calculated using the following formula:

$$B = (M \times 1000 / \rho) \times P$$

where B is the annual procurement budget, EUR/year; M is the calculated consumption volume for the market or enterprise, t/year; ρ is the density of the textile oil, kg/L; and P is the

purchase price, EUR/L. In the calculations, ρ = 0.87 kg/L was used because ISO VG 32 needle/sinker oils such as Textol and Klüberoil are reported to have densities around 0.86–0.87 kg/L [8,10].

Table 1.

Data types used in the study and their reliability level.

Data type	Source	Purpose of use	Reliability level
Importer and shipment data	Volza, HSN 2710 Uzbekistan	Segmentation of buyers and assessment of import activity	Medium-high: shipment data are available, but tonnage is not open
Enterprise scale	Official or industry sources for POSCO, Biryuza and Fergana Global	Explaining production intensity and technical lubricant needs	Medium-high
Technical properties	Official/distributor TDS pages for Textol, Total and Klüber	Identification of product class and quality requirements	High
Prices	Euro Industry, OilOnline and Booob.it	EUR/L benchmarks and sensitivity model	Medium: retail/distributor prices, not landed import prices
Market trend	gov.uz and Textile Exchange	Macroeconomic context for demand growth	Medium-high

RESULTS

According to Volza, the Uzbekistan textile lubricant and HSN Code 2710 segment includes 78 buyers, 109 global suppliers and 286 import shipments. The leading buyers shown by the platform are POSCO International Textile with 21 shipments and a 17% share, Biryuza Group with 19 shipments and a 15% share, and Texparts UZ with 15 shipments and a 12% share [1]. These indicators do not represent tonnage; however, they help identify the enterprises and channels where import activity is concentrated.

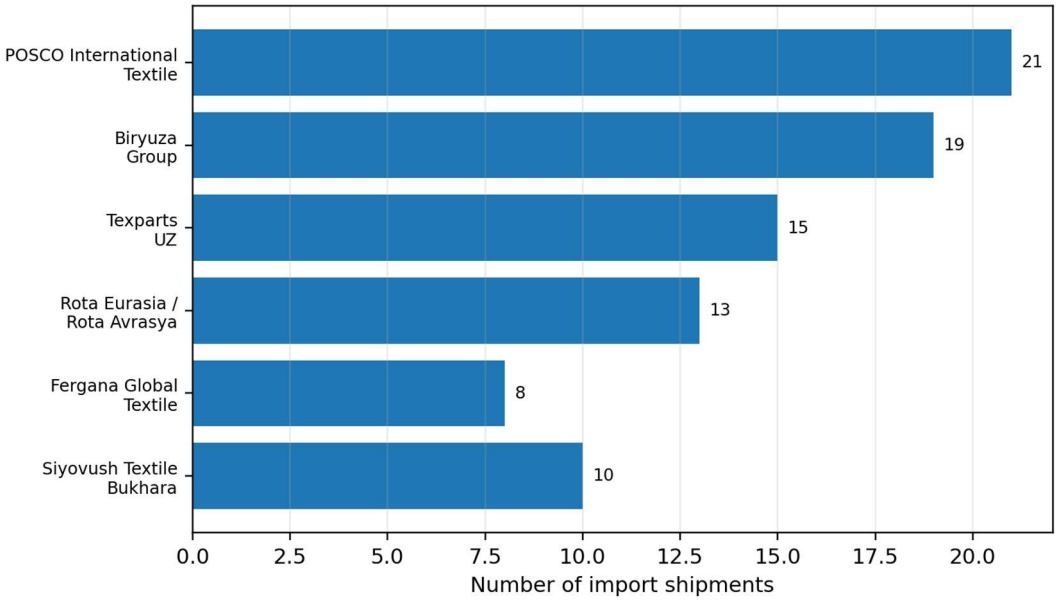

Figure 1. Enterprises and distributors with high textile-oil import/procurement activity in Uzbekistan.

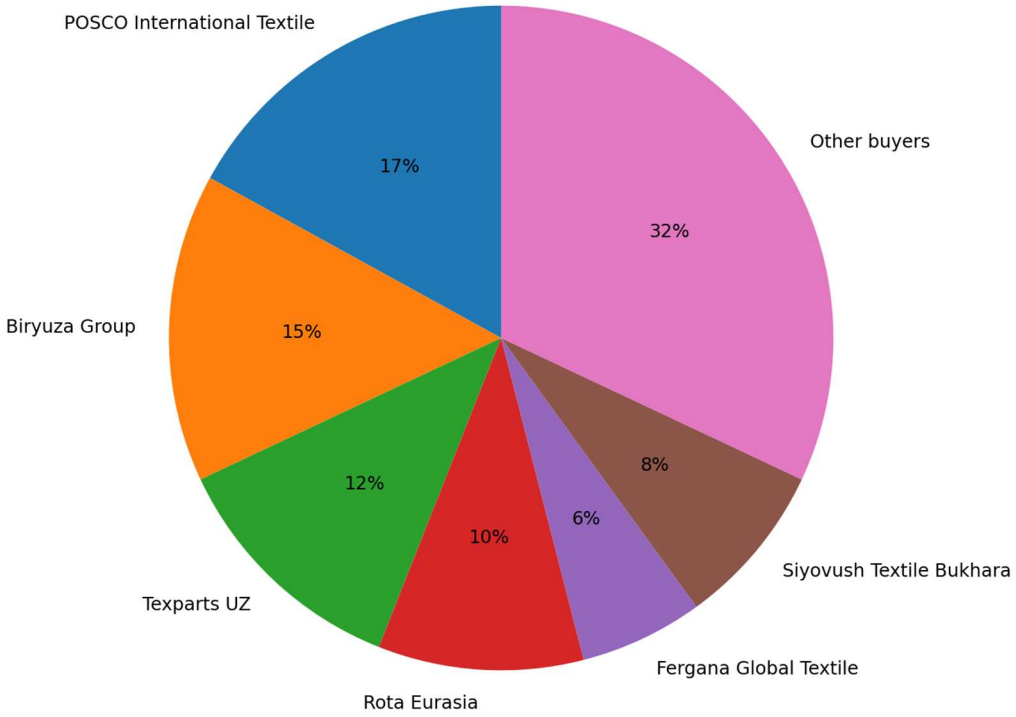

Figure 2. Buyer segmentation based on percentage shares visible in the open Volza page.

Table 2.

Main buyers in Uzbekistan's textile-oil import segment and their economic role.

Buyer/importer	Shipments	Volza share, %	Economic role in the market
POSCO International Textile	21	17	Large integrated producer with spinning, weaving and technical service needs
Biryuza Group	19	15	Knitting, fabric production, dyeing/printing and ready-garment direction
Texparts UZ	15	12	Import-distribution of textile equipment, spare parts and lubricants
Rota Eurasia / Rota Avrasya	13	10	Textile-oil, service and distributor channel
Fergana Global Textile	8	6	Integrated spinning, knitting and dyeing chain
Siyovush Textile Bukhara	10	8	Knitting/textile producer with needs for service lubricants
Other buyers	200	32	Fragmented small and medium consumers

POSCO International Textile has a large production base associated with facilities in Fergana, Tashloq, Qumtepa and Bukhara [5]. The POSCO International sustainability report indicates a capacity of 250,000 spindles, 53,000 t/year of cotton yarn and 33,000 km/year of fabric [6]. Biryuza Group is described as a full-cycle enterprise that includes knitting, dyeing, printing and ready-garment manufacturing [7].

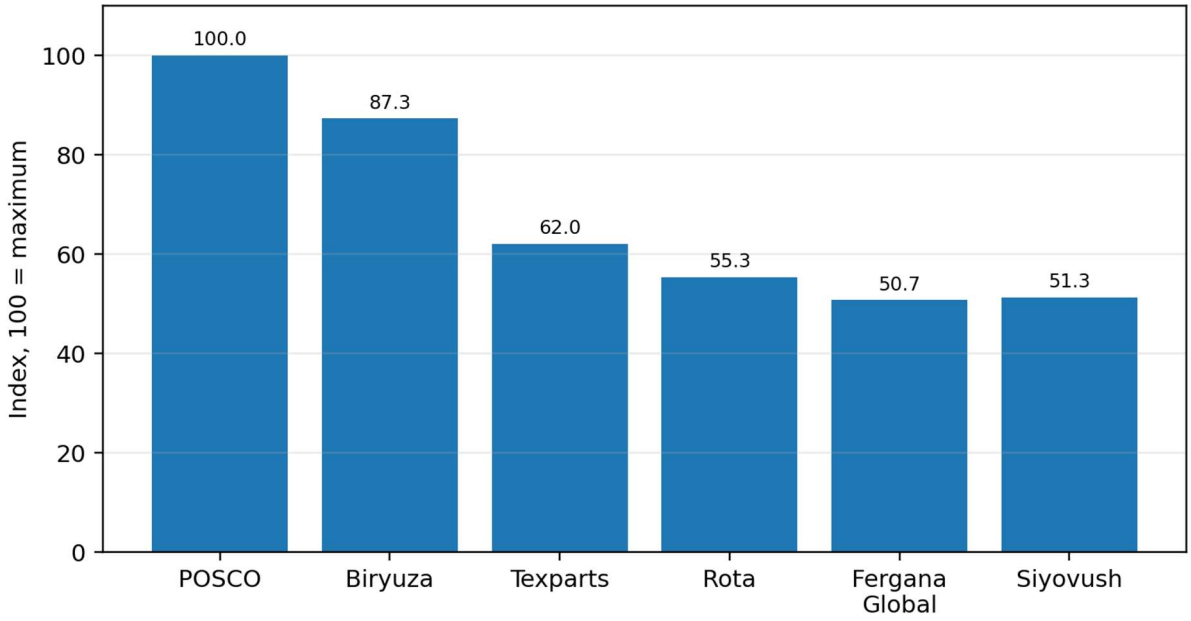

Figure 3. Procurement-need index based on shipment activity and production intensity; this is an analytical index, not real tonnage.

The names of imported products show that textile oils are not a single product type. They can be grouped into ISO VG 32 needle/sinker oils, wash-out or emulsifiable knitting oils, spindle/hydraulic/general industrial oils, chain oils, high-temperature service oils, antistatic sprays, protectors and cleaning-lubricating agents. For a knitting factory, washable needle oil is critical; for spinning and weaving enterprises, spindle, hydraulic and auxiliary oils may also play a significant role.

Table 3.

Textile oils and technical classes visible in Uzbekistan by enterprise/importer.

Enterprise/importer	Visible products	Technical class	Production-related use
POSCO International Textile	Shell Tellus Oil; WD Lubricant Oil-40	Hydraulic/general industrial oil	Service of spinning/weaving equipment and auxiliary units
Biryuza Group	KLUBEROIL-TEX 1-32 ORN / KLUBEROIL TEX 32 ORN	ISO VG 32 needle and sinker oil	Needles, sinkers, cams, cylinders and ring zones in knitting machines
Texparts UZ	KLUBEROIL TEX 1-32 ORN; Solution Tex M	Needle/sinker oil and cleaning-lubricating agent	Service-import channel for knitting equipment
Fergana Global Textile	Total TIXO STAINLESS 32; Lusin Protect RS 400	Washable needle oil plus antistatic/protector spray	Knitting, winding, splicer and elastane-containing fabrics
Rota Eurasia / Avrasya	Textol WF/WE ISO 32 Plus; Nadel- und Platinenöl 200-I; OXA	ISO VG 32 needle/sinker oil	Large-diameter circular knitting and knitting machines

	S-32		
Siyovush Textile Bukhara	RENOLIN HT63; OLYTEX ORB-32	Chain/synthetic oil plus textile-machine oil	Chain transmissions and finishing/knitting service needs

Textol WE ISO 32 Plus is described as a needle/sinker oil for modern large circular knitting machines. It is suitable for dosing through pump and spray lubrication systems, has high washability and is reported to be neutral to spandex/elastomeric materials [8,13]. Total TIXO STAINLESS 32 is also intended for the knitting segment, where it reduces friction of needles, needle beds and sinkers and supports rust protection and elastane compatibility [9].

In price comparisons, product class, brand, package size and purchasing channel are decisive. Textol WE ISO 32 Plus is shown at 1169 EUR excluding VAT for a 200 L barrel, or about 5.85 EUR/L; the 20 L package is shown at 144.95 EUR excluding VAT, or about 7.25 EUR/L [13]. This means that purchasing the same product in a larger package can reduce the unit price by approximately 19%. Total TIXO STAINLESS 32 in a 20 L retail package appears at around 205.94 EUR, or about 10.30 EUR/L [18]. Klüberoil Tex 1-32 N appears as a premium benchmark in both 200 L and 20 L packages [10,19].

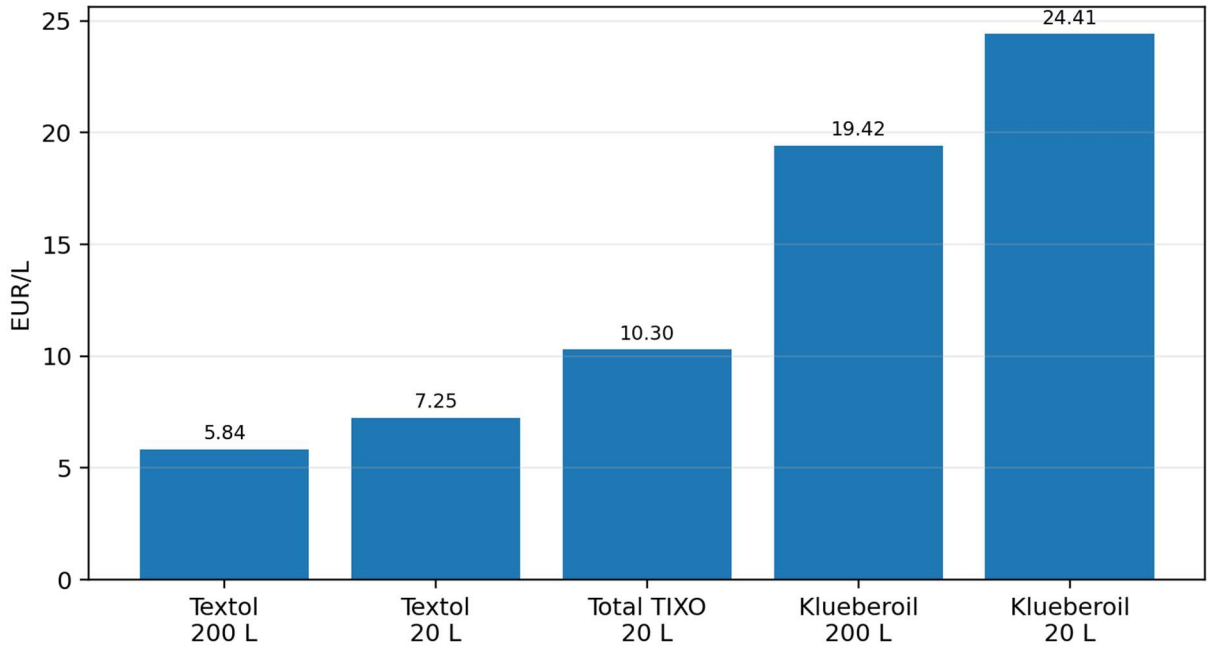

Figure 4. EUR/L comparison based on open retail/distributor prices; these are not landed import prices.

Table 4.

Open price benchmarks for selected textile oils.

Product	Country/channel	EUR/L	Price type	Comment
Textol WE ISO 32 Plus, 200 L	Germany/EU	5.84	excl. VAT	200 L barrel; low unit price
Textol WE ISO 32 Plus, 20 L	Germany/EU	7.25	excl. VAT	20 L canister; small batch
Total TIXO STAINLESS	Italy/EU	10.30	retail	20 L retail benchmark

32, 20 L				
Klüberoil Tex 1-32 N, 200 L	Netherlands/EU	19.42	excl. VAT	200 L premium benchmark
Klüberoil Tex 1-32 N, 20 L	Netherlands/EU	24.41	excl. VAT	20 L premium benchmark

The observed price difference creates three procurement strategies for textile enterprises: a premium-only strategy for export products with high technical risk; package optimization, in which the same product is purchased in 200 L barrels instead of 20 L canisters; and differential application, where high-performance oil is used only on stain-sensitive or elastane-containing knitting lines, while technically adequate but lower-priced oils are used for general service points.

Demand for textile oils is connected with textile production volume, machine speed, product-quality requirements and export markets. Growth in global fiber output implies not only a larger volume of yarn and fabric but also more operating hours for machines and a higher need for technical service lubricants [4].

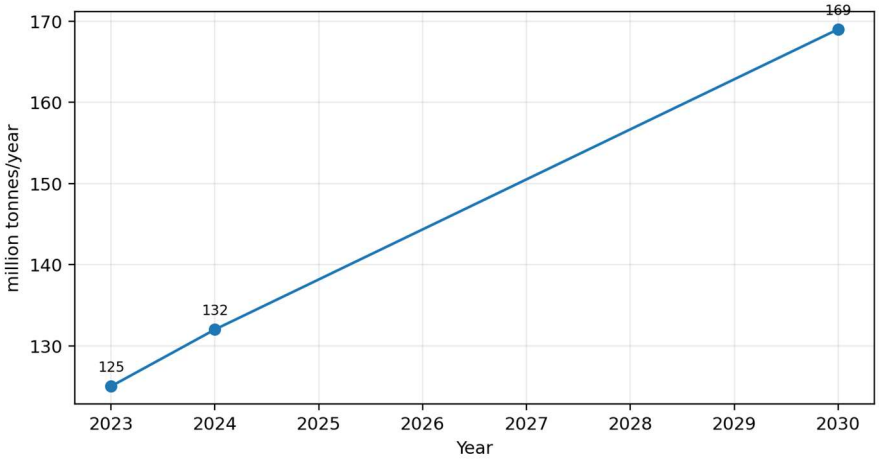

Figure 5. Global fiber production: 2023, 2024 and 2030 forecast.

For Uzbekistan, the reported textile export value of USD 2.6 billion in 2025 and the USD 4.0 billion target for 2026 indicate expansion of the production chain [3]. As export markets expand, demand for high-quality textile oils increases not merely as a routine consumable, but as a condition for defect-free exportable fabrics and finished products.

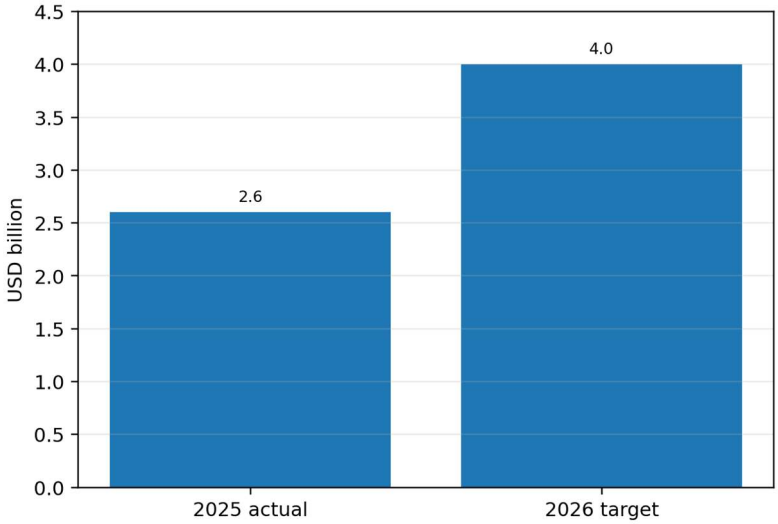

Figure 6. Uzbekistan textile exports: 2025 actual value and 2026 target.

Because open sources do not provide exact annual tonnage for Uzbekistan, three market-volume scenarios were adopted: 100 t/year, 250 t/year and 500 t/year of textile oils. Prices were calculated as a low benchmark of 5.85 EUR/L, a base mixed-import price of 8.50 EUR/L and a premium benchmark of 24.41 EUR/L. At a market volume of 250 t/year, the annual procurement budget may be about 1.68 million EUR under the low benchmark, 2.44 million EUR under the base price and 7.01 million EUR under the premium benchmark.

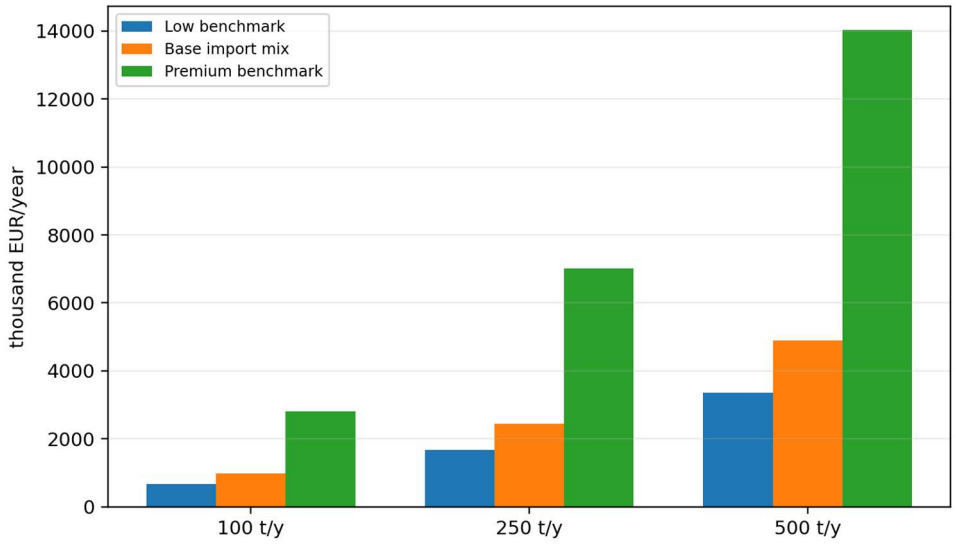

Figure 7. Procurement-budget scenarios for the textile-oil market in Uzbekistan.

Table 5.

Annual procurement-budget scenarios: sensitivity to physical volume and price.

Market volume	Low benchmark 5.85 EUR/L	Base 8.50 EUR/L	Premium 24.41 EUR/L
100 t/y	672.4 thousand EUR/y	977.0 thousand EUR/y	2805.7 thousand EUR/y
250 t/y	1681.0 thousand EUR/y	2442.5 thousand EUR/y	7014.4 thousand EUR/y
500 t/y	3362.1 thousand EUR/y	4885.1 thousand EUR/y	14028.7 thousand EUR/y

DISCUSSION

The procurement logic of textile oils in Uzbekistan is based on two buyer profiles. The first profile includes large integrated manufacturers such as POSCO, Biryuza, Fergana Global and Siyovush; for these enterprises, lubricant performance directly affects production rhythm and exportable product quality. The second profile includes import-distributors such as Texparts UZ and Rota Eurasia/Avrasya, which influence final users through technical service, spare parts and lubricant supply chains. Therefore, the "largest buyer" and the "largest distributor" should be assessed as separate market actors.

Table 6.

Procurement strategies for enterprises purchasing textile oils.

Buyer type	Main requirement	Procurement criterion	Economic effect
Large spinning/weaving	Stable service and large volume	200 L barrels, annual contract and TDS/SDS	Lower unit price and lower risk of stock-out

complexes		control	
Knitting and elastane-fabric producers	Non-staining, washable and elastane-compatible oil	ISO VG 32, wash-out test and elastane compatibility	Lower risk of rejects and repeated washing
Dyeing/finishing enterprises	No adverse effect on washing and dyeing	Stain test, degreasing protocol and low odor	More stable export-batch quality
Distributor/service importers	Wide portfolio and fast delivery	Needle oil + cleaner + protector + chain-oil package	Higher service value for customers
Small and medium enterprises	Price and small quantities	20 L packages supported by batch test and TDS/SDS	Safe minimal procurement and lower excess stock

The economic value of a textile oil is expressed not only through direct purchase price but also through the prevention of indirect losses. Procurement decisions should therefore be shifted from the EUR/L criterion to EUR/machine-hour, EUR/tonne of fabric or EUR/defect-free export batch. In this article, total cost of ownership is expressed as:

$$TCO = C_{purchase} + C_{downtime} + C_{spare} + C_{washing} + C_{defect} + C_{logistics}$$

where Cpurchase is the purchase cost of the oil; Cdowntime is the loss related to machine stoppage; Cspare is accelerated wear of needles, sinkers and service parts; Cwashing is the cost of repeated washing or degreasing; Cdefect is the risk of staining, rejects or export-batch rejection; and Clogistics is the cost of packaging, delivery and inventory. This model helps reveal the hidden costs of low-priced but technically weak lubricants.

The internal technological discipline of a manufacturing enterprise is also important for controlling lubricant consumption. The Mayer & Cie. Senso Blue RS example shows that speed-dependent dosing and used-oil recycling can reduce needle-oil consumption by up to 50% under an integrated approach [12]. For Uzbek textile factories, this result indicates that procurement consumption can be reduced not by product substitution, but by auditing lubrication points, dosing, filtration and used-oil collection systems.

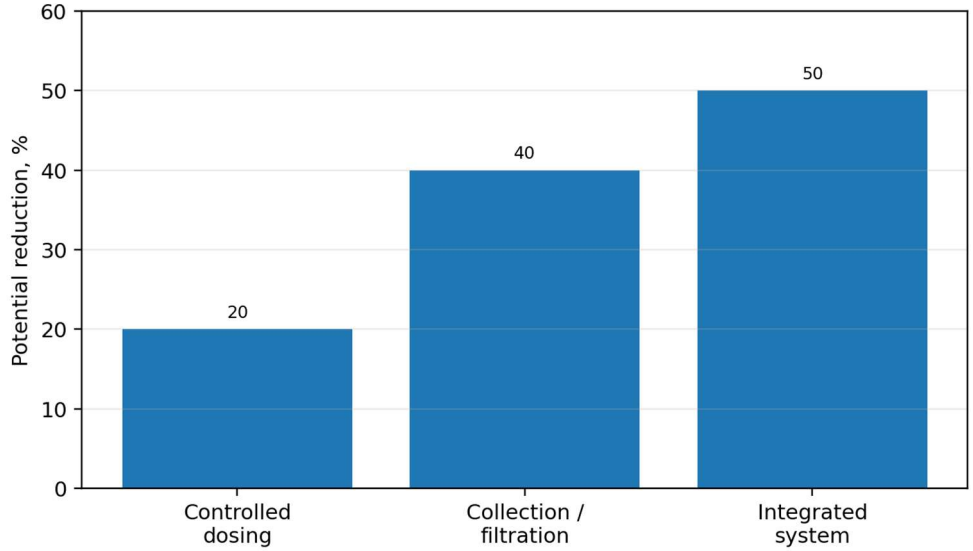

Figure 8. Potential reduction of needle-oil consumption through internal technological optimization.

For industrial application, the procurement evaluation of textile oils can be organized in five sequential steps. First, the production profile is identified: spinning, knitting, weaving, dyeing, finishing or a combined process. Second, the machine type, lubrication points, operating speed and existing dosing system are recorded. Third, the candidate lubricant is checked through TDS/SDS, ISO VG class, washability, elastane compatibility, corrosion protection and non-staining requirements. Fourth, the products are compared not only by EUR/L but also by total cost of ownership. Fifth, a trial batch is monitored by real consumption rate, downtime, defect rate, wash-off behavior and machine-service data before a long-term procurement contract is approved.

The main limitation of the study is that open import platforms show shipment counts, but they do not fully disclose tonnage, contract price, CIF/DDP value and real annual consumption for all shipments. Therefore, the price and budget scenarios should be used as an initial assessment for decision-making. Final conclusions at the enterprise level require 12-month invoices, BoL/shipment declarations, package size, number of machines, operating hours, real dosing rates, TDS/SDS documents and pilot-test results.

CONCLUSION

The textile-oil market in Uzbekistan is an important industrial segment shaped by large manufacturing enterprises, import-distributors and technical-service suppliers. POSCO International Textile, Biryuza Group, Texparts UZ, Rota Eurasia, Fergana Global Textile and Siyovush Textile are visible as active actors in textile-oil procurement, and their needs are directly linked to production profile, machine type and export-quality requirements. Textile oils are therefore not ordinary lubricants; they are process materials that influence machine stability, the service life of needles and sinkers, fabric quality and exportable output in knitting, weaving and yarn production.

The main technical requirement of the market is associated with ISO VG 32 needle/sinker oils, washability, compatibility with elastane and synthetic fibers, anticorrosion properties and non-staining behavior. Price analysis shows that brand, package size and technical class significantly affect purchase cost: Textol is observed at 5.85 EUR/L in a 200 L package and 7.25 EUR/L in a 20 L package, Total TIXO STAINLESS 32 at about 10.30 EUR/L, while Klüberoil Tex 1-32 N appears in the premium segment at 19.42–24.41 EUR/L. For large enterprises, package-size optimization, annual consumption planning and technical-economic comparison of several products are essential instruments for cost management.

The principal scientific and economic conclusion is that the true value of a textile oil is not determined by its price per liter alone. Downtime, accelerated wear of needles and sinkers, fabric staining, repeated washing and rejection of export batches directly affect procurement efficiency. Accordingly, Uzbek textile enterprises should select textile oils on the basis of TDS/SDS, ISO VG class, washability, elastane compatibility, real consumption rate, machine manufacturer recommendations and the total-cost-of-ownership model.

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