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WEC STAFF

TRIP REPORT

TO

SLOVAK REPUBLIC

DECEMBER 6 - 13, 1992

WORLD ENVIRONMENT CENTER
419 PARK AVENUE SOUTH, SUITE 1800
NEW YORK, NEW YORK

DECEMBER 1992

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I. ITINERARY

December 6, 1992 - Vienna, Austria

- Arrival in Vienna, Austria
- Meeting with Sandy Hale, Senior Advisor to the Slovak Ministry of Environment

December 7, 1992 - Vienna/Bratislava, Slovak Republic

- Travel to Bratislava
- Met with representatives from Ministry of Economy
- Met with representatives from Ministry of Environment
- Interviewed candidates for in-country coordinator position

December 8, 1992 - Bratislava/Senica

- Travel to Senica
- Met with management of Slovensky Hadvod
- Travel to Bratislava

December 9, 1992 - Bratislava/Dubova/Kosice

- Travel to Dubova
- Met with general manager of Petrochema
- Travel to Kosice

December 10, 1992 - Kosice/Strazske/Bratislava

- Travel to Strazske
- Met with management of Chemko
- Met with management of VSZ

- Travel to Bratislava

<u>December 11, 1992 - Bratislava/Vienna, Austria</u>

- Met with representatives from Ministry of Economy
- Met with USAID representative at U.S. Consulate
- Travel to Vienna, Austria

<u>December 12, 1992 - Vienna</u>

- Travel to U.S.

II. EXECUTIVE SUMMARY & OBSERVATIONS

The objective of the one week trip to Slovak Republic was to explain the World Environment Center's (WEC) Waste Minimization Demonstration Project (WMP) to the Ministry of Economy and Ministry of Environment and visit enterprises that may be viable candidates for the WMP.

WMP is a systematic planned procedure using various techniques of source reduction and recycling with the objective of identifying ways to reduce or eliminate waste through no or low cost techniques. The program is developed and implemented using the services of U.S. environmental consulting firms and WEC pro bono experts who work with the management of the selected enterprise. WEC is planning to conduct two WMP in the Slovak Republic, with the first project to start in March, 1993.

WEC staff visited two petrochemical companies, a synthetic fiber manufacturer and the largest steel works. The visits to these enterprises were arranged by the Ministry of Economy and Mr. Samuel Hale, Jr., WEC Regional Senior Environmental Expert.

The companies were very cooperative and expressed their interest in participating in the WMP. All four enterprises fit the basic requirements to participate in WMP. They generate pollution; they are state owned with no foreign joint venture partners; and they are economically viable. The managers acknowledged the importance of the WMP program and pledged their active support and participation. They also agreed to have representatives from other enterprises in the region participate in an Oversight Committee, involve local consulting companies, and publicize the results of the project.

Mr. Marian Krsko of the U.S. Agency for International Development (USAID) mission was briefed about the trip and endorsed the WMP. He will try to visit the selected enterprise along with the WEC team when the first project is started.

III. MEETINGS

December 6, 1992 - Vienna

Met with Mr. Samuel Hale, Regional Senior Environmental Advisor to the Slovak Republic Ministry of Environment, to review the agenda for the following week (Attachment A). Mr. Hale said that the visits to the industrial sites were arranged by the Ministry of Economy with input from the Ministry of Environment. The Ministry of Economy was informed about the World Environment Center's Waste Minimization Project and they were eager to hear the details of the project.

December 7, 1992 - Bratislava

Ministry of Economy of the Slovak Republic

Attendees:
- Frantisek Holler, Director of the Technical and Economical Department
- Andrej Soltes, Dip. Ing.
- Samuel Hale, Regional Senior Environmental Advisor, WEC
- Thomas J. McGrath, Vice President, WEC
- Dorothy E. Chuckro, Deputy Project Manager, WEC

Thomas J. McGrath explained WEC's Waste Minimization Project in detail. WEC will implement a WMP at industrial facilties in the Slovak Republic starting in March 1993. Mr. Holler said that he is familiar with WEC's activities and the WMP at Chemopetrol in Litvinov, Czech Republic. The Ministry of Economy identified several enterprises for consideration by WEC. The enterprises and the reasons for their selection are as follows:

1. Slovensky Hodvab factory in Senica is a synthetic fiber manufacturer. The management of Slovensky Hodvab has established a good working relationship with the local municipal authorities in their efforts to solve environmental problems.

2. Petrochema in Dubova is located between the two largest national parks in the Lower Tatra mountain region. The pollution it causes, directly effects the ecological stability of that region.

3. Chemko in Strazske is a major chemical company located in eastern Slovakia. It is a major polluter in the region, but also one of the region's largest employers. The Slovak government intends to continue this plant in operation and considers it an important company.

Additional factors are: top management is focused on correcting existing environmental problems; they recognize the potential cost savings from WMP; each enterprise has available data on its operations and waste generation; and the enterprise is willing to cooperate with local consulting firms by allowing them inside the factory to participate in the WM project. Mr. Holler mentioned that the Slovak industry will spend an estimated 35 billion krowns in environmental improvement in order to comply with new laws and regulations that will be passed by the Slovak parliament in early 1993. He also offered his assistance and requested a meeting on Friday, December 11, 1992, to hear about our progress.

Ministry of the Environment of Slovak Republic

Attendees:

- Josef Skultety, Director of Department of International Relations
- Mary M. Arndtsen, Legal Advisor to the Slovak Ministry of Environment
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

A description of WEC's WMP was given by Mr. McGrath. Mr. McGrath also reviewed the itinerary for the week and the enterprises that will be visited. Mr. Skultety agreed with the selection of the enterprises and emphasized the importance of doing WMP in the Slovak Republic. Mr. Skultety offered any assistance needed by WEC to carry out the WMP.

Interviews

Interviewed several possible candidates for the WEC in-country coordinator position. A selection will be made after WEC staff returns to New York.

December 8, 1992 - Senica

Slovensky Hodvab

Attendees:

- Dip. Ing. Jozef Cema, Technical Director
- Ing. Frantisek Dzubas, CSc., Head of Research and Central Laboratories
- Vaclav Hrdlicka, M.Sc., Chief of Plant Viscose Fibres
- Dip. Ing. Jan Salis, Manager of Technical Development
- Mr. Havelka, Head of Department of Technical Services (Water Energy)
- Ing. Vladimir Malinovsky, Chemat Bratislava
- Dipl. Ing. Josef Balan, Ph.D., Interpreter
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

In 1920, Slovensky Hodvab began production of viscose fibers consumed by the textile industry. Located 90 kilometers northeast of Bratislava, Slovensky Hodvab is a state-owned enterprise employing 840 people on three shifts. In 1978, it added polyester fiber production in a second plant. The plant was temporarily closed by the federal government in 1988 for causing environmental problems. After lengthy negotiations with the federal and local municipal governments, the plant re-opened under new management which agreed to solve the ecological, health and safety problems by 1996.

Slovensky Hodvab is one of the largest employers in the region and their shut down had serious effects on the local economy. This year the enterprise opened a new manufacturing line (third plant) producing industrial polyester fibers. Current production of viscose and polyester fibers is at full capacity and industrial polyester fibers will reach full capacity in early 1993.

Since 1990, the enterprise has reviewed and adjusted their production to comply with German environmental laws and standards. The new Slovak environmental laws and regulations are foreseen to be passed in early 1993, at which time, there will be a need for implementing technical changes to the manufacturing processes in order to meet the compliance.

Mr. Hrdlicka indicated that an existing problem which could be addressed by WMP occurs during viscose fiber production and it is a 3% loss of SO_2 into the wastewater stream. The management of Slovensky Hodvab was very

interested in being considered for the WMP. Slovensky Hodvab enterprise is considered to be economically stable and important to the economy.

December 9, 1992 - Dubova

Petrochema

Attendees:
- Jan Matas, Ing., Plant General Manager
- Dipl. Ing. Josef Balan, Ph.D., Interpreter
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

Petrochema was built in 1936 for refining domestic crude oil by atmospheric and vacuum distillation. Currently, Petrochema produces 110 to 130 end products generating annual sales of 1.5 billion kcs. There are three basic product groups.

I. Propellants - gas and diesel oil, and fuel oil.

II. Specialized Oils (oils with specific application) - dark oil, transformer and condenser oil; corrosion inhibited oils; form oils; refrigerator oil, whale oil, oil for heat transmission, agents for metal working and cutting.

III. Raw Material for the production of industrial powdered, liquid cleaning and washing detergents.

The first product group (I) processes 100,000 metric tonnes (mt) per year of domestic crude oil and is operating at full capacity. The production of specialized oils operates at 60% capacity. A manufacturing line for detergent agents is currently under construction and scheduled to open in January, 1993.

The largest amount of waste material is generated by the specialized oil (II) production. The waste material is a residue from the distilled crude oil, first phase of purification and refinement. The amount is 7,000 to 10,000 mt per year of emulsion consisting of oil, sulfuric acid and organic substance which is referred to as "Goodron" sludge. An additional 4,000 mt per year of waste is generated by the second phase of refinement in which a chalky silica substance is used to absorb the impurities.

There are also 14,000 to 15,000 thousand mts per year of solid and semi-solid sludge generated by the wastewater treatment plant. The wastewater treatment plant uses mechanical, chemical and biological treatment for the waste generated by I and II product groups. Two thirds of this waste material is burned in one of the two on-site incinerators (one incinerator is 15 years old and the second one is 5 years old). The remaining one third of waste is disposed in a landfill. The incinerators emit sulfur dioxide and other agents. The exact composition and quantity of the emissions is not known.

Mr. Matas expressed his interest in the WMP and suggested the reduction of pollutants into the wastewater as a suitable WMP.

December 10, 1992 - Strazske/Kosice

Chemko

Attendees:

- Ing. Jaroslav Gilani, Chief Executive Officer
- Karel Hyska, Chem. Eng. Technical Manager
- Dipl. Ing. Milan Bavolar, Product Development and Environmental Research Department
- Ing. Peter Laca, Implementation Department
- Ing. Lubos Vatral, Translator
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

Chemko Strazske was opened in 1952 primarily as a producer of explosives for the army. It is strategically located in the most eastern part of the Slovak Republic between Ondava and Laborec Rivers. Chemko is within 60 miles of the Hungarian, Ukranian and Polish border. It currently employs 3,200 people producing a variety of organic and inorganic chemicals, i.e., cyclohexanone, urea-formaldehyde glues and liquid nitrogen fertilizers. For a detailed list and description of Chemko's products, refer to Attachment D.

Prior to 1984, Chemko produced 20,000 mt of PCBs, of which 50% was consumed by the domestic market and the balance exported. In 1984, the government mandated PCB production to be stopped. It is estimated that there are 800 mt of PCBs in a landfill, 800 mt contained capped landfill, 120 mt were burnt in cement kilns in 1987.

The main source of pollution at Chemko is the power plant which generates annually 100,000 mt of ash and 8,500 mt of SO_2. The power plant does not meet the existing federal environmental standards. The landfill, where 1,000,000 mt of ash is deposited, has reached its capacity. Chemko is examining the possibilities of increasing the landfill's capacity by six fold.

They believe that there are viable options for using some of their waste as a raw material. For example, ash can be used as an additive in the manufacturing of building materials. However, the presently state-owned cement factory has no economic incentive or interest in a joint cooperation.

The current production of cyclohexanone, (60% capacity), produces 25,000 mt per year of solid waste which are incinerated in an incinerator built in 1985. The incinerator does not meet federal standards. Air emission levels are 2,500 mt of CO and 400 mt of organic compound mixtures. Chemko has until 1998 to comply with air regulations legislated in 1991.

In 1980, the federal authorities restricted Chemko from discharging their wastewater directly into the river because it posed a health threat to the population of Michalovce. Currently, all water is processed at the wastewater treatment plant.

Chemko's management recognizes the need for WMP. It acknowledges that it has a poor image with the local municipalities and general population. Chemko management would welcome the opportunity to change that with the positive publicity that WMP will create.

<u>VSZ a.s. Kosice (East Slovakia Steel Works)</u>

Attendees:

- Ing. Jan Hrusik, Head of Environmental Protection Department
- Dipl. Ing. Oskar Winkler, Inspection and Energetics Department
- Two (2) Technical Staff Members
- Ing. Lubos Vatral, Translator
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

VSZ was established in 1950 as the largest steel producer in Czechoslovakia.

Production is 4,000,000 mt per year. The enterprise employs 15,000 people at their steel division and exports 70% of its output. The steel production facility includes coking, blast furnaces, casting, and hot and cold rolling mills. Currently, one third of its output is from continuous casting. VSZ plans to have all of its output come from continous casting by 1993.

VSZ is responsible for 20% to 30% of all SO_2 emissions in the Kosice area. Its coking plant is the single largest source of air pollution. As of 1992, VSZ is committed to follow CSFR policies of attaining compliance with EC environmental standards. The plant projects to reach full compliance by 1997.

VSZ also generates 3,000,000 mt of solid waste per year. 2,000,000 mt are reused or sold for reuse and 1,000,000 mt is stored on-site. In addition, 10,000 mt of hazardous waste is generated per year in a form of metallurgical sludge containing zinc and lead.

Mr. Hrusik was very interested in the WMP. He requested that WEC send a proposal to Dr. Marian Savissky, Vice President, for his review.

December 11, 1992 - Bratislava

Ministry of Economy of the Slovak Republic

Attendees:

- Ing. Imrich Szitas, Deputy Minister, Division for the Basical Branches
- Ing. Tomas Bojnicky
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

Ing. Szitas is the Deputy Minister responsible for the energy division. It includes mining and metallurgy. Mr. McGrath described the WMP and reported on our visits to the different companies. Mr. Szitas indicated his support of our project and requested to be kept informed about our future progress.

NOTE: We subsequently found out that we were directed to the wrong person. Mr. Holler, who was traveling, had arranged for us to meet with another person whose name was similar to Mr. Szitas. Subsequently, Mr. Hale met with Mr. Holler and informed him about our results and contacted Mr. Szitas.

U.S. Agency for International Development - U.S. Consulate

Attendees:

- Mr. Marian Krsko, Project Advisor
- Thomas J. McGrath, WEC
- Dorothy E. Chuckro, WEC

Mr. McGrath briefed Mr. Krsko on WEC's past activities in Central and Eastern Europe; gave a detailed description and purpose of the WMP; the status of on-going WMP in Poland and Czech Republic, reported on our meetings and discussions with the Ministries of Economy, Ministry of Environment and various industrial enterprises.

Mr. Krsko thanked us for the briefing and said that prior to his present position at USAID, he worked in the Ministry of Economy, and if WEC needs assistance from the Ministry, he can direct us to the right person. He was pleased to hear that the first WMP will be scheduled to begin as early as February, 1993 and he was receptive to joining WEC staff in visiting the selected candidate enterprise if his schedule permits. Mr. Krsko requested to be kept informed about progress and selection of enterprises for WMP.

IV. BUSINESS CARDS OF CONTACTS

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V. ATTACHMENTS

ATTACHMENT A

TO:	Tom McGrath and Dorothy Chukro
FROM:	Sandy Hale 43-1-443793
SUBJ:	Slovakia Schedule and Contacts
DATE:	December 4, 1992

Schedule

Monday, Dec. 7

10 a.m.	Frantisek Holler Director, Technical and Economic Department Division of Chemical and Consumer Goods Industries Ministry of Economy Mierova 19, Bratislava Phone/FAX 23 20 24
2 p.m.	Jozef Skultety Director, International Relations Department Ministry of Environment Hlboka 2, Bratislava Phone 492 002, FAX 497 267 (also, pick up air ticket Kosice-Bratislava)
Hotel (Mon-Wed)	Danube Hotel Rybne Namestie 1, Bratislava Phone 340 000, FAX 314 311

Tuesday, Dec. 8

8:30 a.m.	Meet at Ministry of Environment
8:45 a.m.	Interpreter arrives (Jozef Balaban)
9 a.m.	Depart for Slovensky Hodvab factory, Senica (artificial silk)
10 a.m.	Meetings begin at Slovensky Hodvab
3 p.m.	Return to Bratislava; interview counterpart candidates

Wednesday, Dec. 9

6:45 a.m.	Meet at Ministry of Environment
7 a.m.	Depart for Petrochema, Dubova (Banska Bystrica) (McGrath. Chukro, Balaban, and driver)
10 a.m.	Meetings begin at Petrochema Dubova
5:47 p.m.	~~Train from Banska Bystrica to Svolen~~
6:10 p.m.	Arrive ~~Zvolen~~
6:30 p.m.	Train from Zvolen to Kosice
10:47 p.m.	Arrive Kosice - taxi to Hotel Slovan, Hlavna Ulica 1, Kosice Phone: (095) 27378 (2 doubles reserved at 1560 Kcs/room - wait-listed for single rooms)

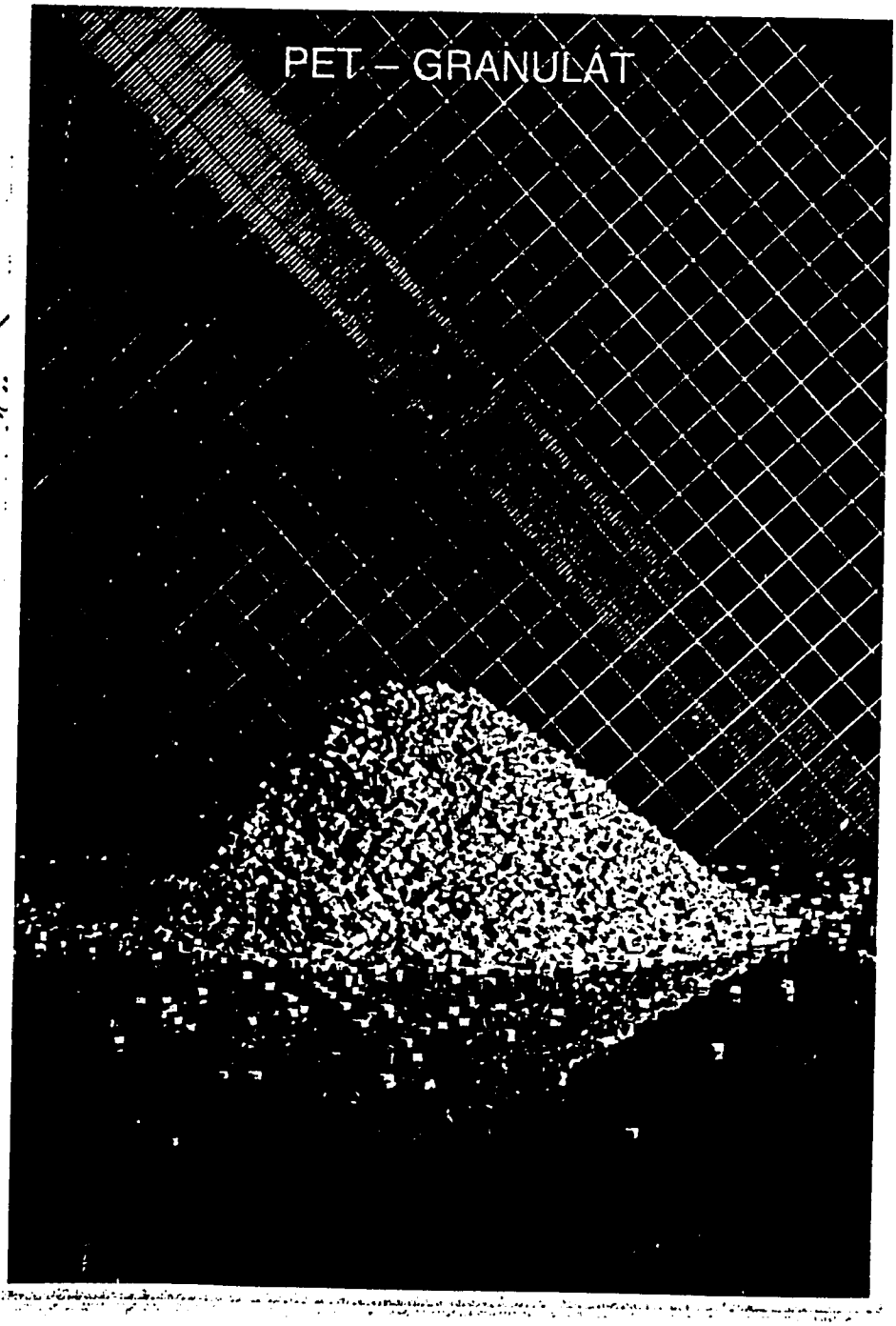
Thursday, Dec. 10

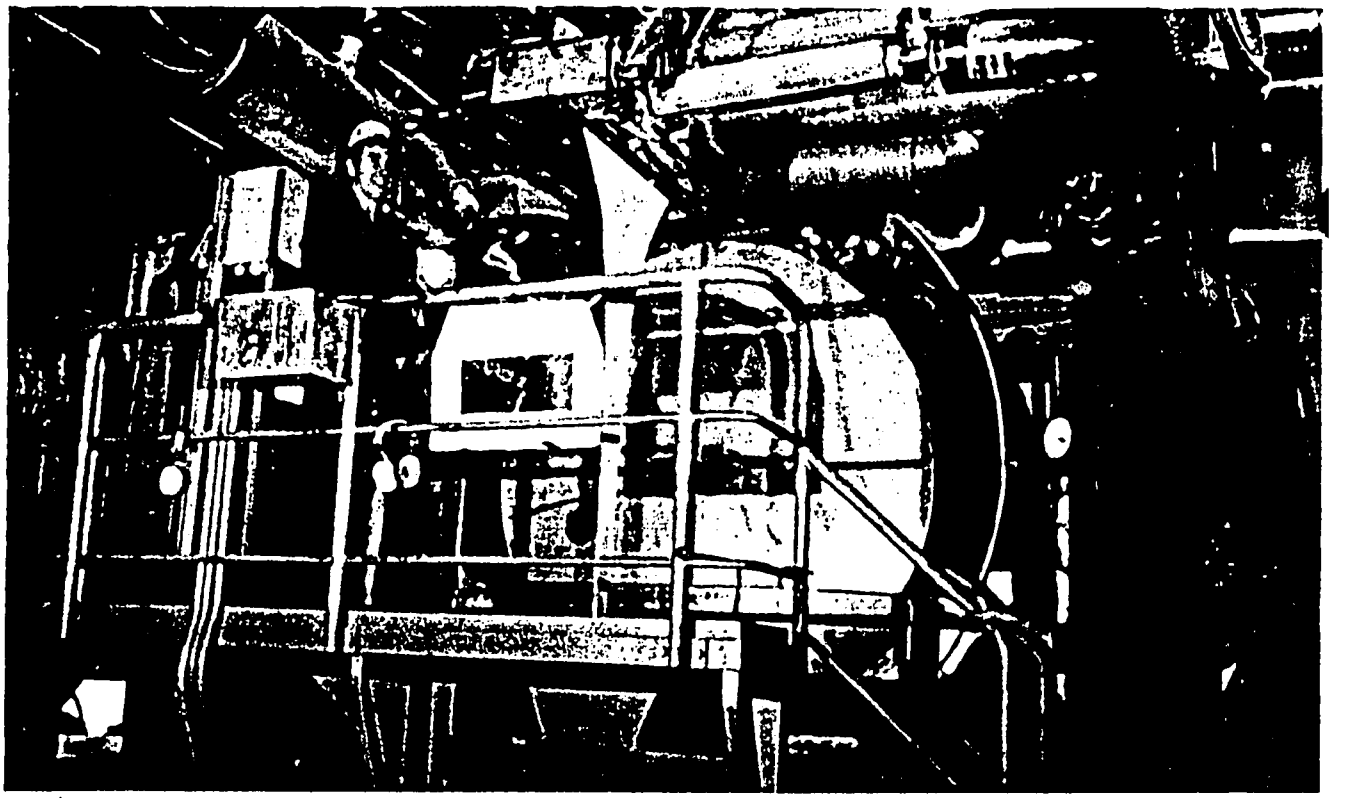
6:30 a.m.	Meet Lubos Vatral' at Hotel Slovan (Ing. Vatral is Environmental Training Project coordinator for Kosice region - works with Boris Stracansky. He knows VSZ managers. He is arranging car and will act as translator.)
6:45 a.m.	Depart for Chemko, Straske
8:30 a.m.	Meetings begin at Chemko (subject to confirmation by Mr. Holler - time changed from 10 a.m.)
11:30 a.m.	Depart for lunch and VSZ
2 p.m.	Meetings begin at VSZ (FAX: 095/ 733 267) (Mr. Hrusik, director of Environmental Inspection Dept. and Deputy Managers of Steel Division)
7 p.m.	Depart by plane from Kosice to Bratislava
8 p.m.	Arrive Bratislava - Danube Hotel

Friday. December 11

10 a.m.	Meeting with Mr. Holler, Ministry of Economy (to be confirmed)
~~2 p.m.~~	Meeting with Marian Krsko (and Pat Lerner?), AID
--	Other meetings (time to be arranged): - Olga Hauskrechtova (phone 375 871) - Remaining coordinator candidates

ATTACHMENT B





Je vláknotvorný syntetický polymér (polyetylénteftalát – PET) vyrábaný diskontinuálnym spôsobom. Základnými surovinami na jeho výrobu sú dimetyltereftalát (DMT) a etylénglykol (EG).

V prvom stupni jeho výroby sa DMT preesterifikuje monoetylénglykolom v esterifikačnom reaktore za prítomnosti katalyzátora, pričom sa získa diglykolester kyseliny tereftalovej za súčasného odštiepenia metylalkoholu. V druhom stupni sa diglykolester kyseliny tereftalovej polykondenzuje v polykondenzačnom reaktore, za prítomnosti katalyzátora, za súčasného odštiepenia prebytku etylénglykolu, až pokiaľ sa nedosiahne predpísaný polymerizačný stupeň.

Po ukončení polykondenzácie sa polymér vytláča pomocou dusíka cez štrbinu a po ochladení vodou sa reže na predpísaný rozmer granulátu. Sumárny vzorec polyetylénteftalátu je:

$$(C_{10}O_4H_8)n$$

PET je fyziologicky inertný a nevykazuje žiadne toxické rakcie.

PET granulát dodávame:
- polomatný (PM)
- mikromatný (MM)
- lesklý (L)

	PM	MM	L
Obsah TiO_2 v %	0,5	0,05	–
Relatívna viskozita	1,66 ± 0,012	1,8 ± 0,04	1,67 ± 0,024
Obsah popola v %	0,5 ± 0,003	0,07 ± 0,03	0,05
Vlhkosť v % max.	0,13	0,13	0,13
Ø hrúbka granúl v mm	2,5 ± 0,5	2,5 ± 0,5	2,5 ± 0,5
Veľkosť granúl v mm	4 × 4	4 × 4	4 × 4
Žltosť	0,13 ± 0,05	0,10 ± 0,05	0,10 ± 0,05

Minimálne množstvo dodávaného granulátu vyrobeného za rovnakých technologických podmienok ja 10 ton. Dodávaný je vo veľkoobjemových vreciach typu ‹Šumperk uložených na otvorených paletách o hmotnosti 1000 kg ± 5%. Záručná doba spracovateľnosti je 6 mesiacov od prijatia zásielky na sklad odberateľa. Skladuje sa v zásobníkoch z nerezového materiálu.

Das PET-Schnitzel wird geliefert als
- halbmatt (PM)
- mikromatt (MM)
- glänzend (L)

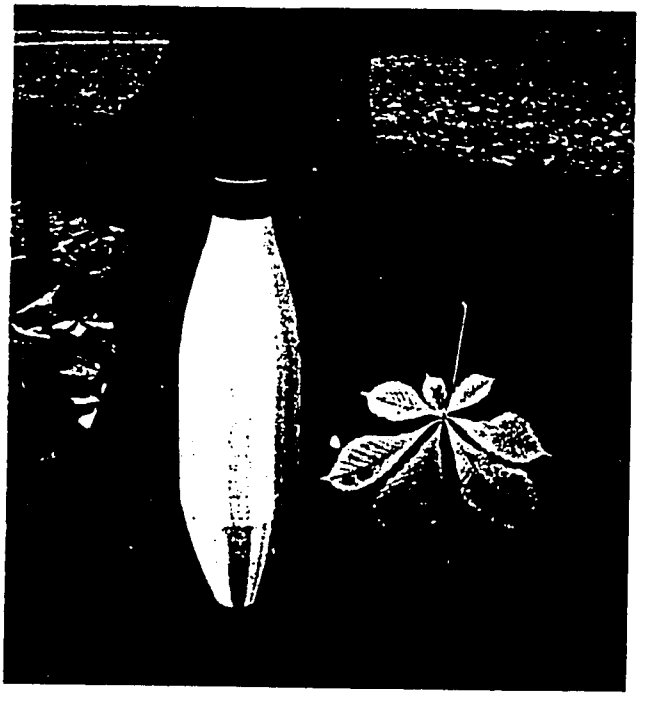
	PM	MM	L
Titandioxidgehalt in %	0,5	0,05	–
Relativ viskozität	1,66 ± 0,012	1,8 ± 0,04	1,67 ± 0,024
Ascheinhalt in %	0,5 ± 0,003	0,07 ± 0,03	0,05
Feuchtigkeit in % max.	0,13	0,13	0,13
Ø Schnitzeldicke in mm	2,5 ± 0,5	2,5 ± 0,5	2,5 ± 0,5
Schnitzelgrösse in mm	4 × 4	4 × 4	4 × 4
Gelbe des Schnitzels	0,13 ± 0,05	0,10 ± 0,05	0,10 ± 0,05

Kleinstmögliche Lieferung des Schnitzels, das in gleichen technologischen Bedingungen hergestellt wurde, beträgt 10 Tonnen. Es wird in grossinhaltigen Säcken Typ „Šumperk", die auf geöffnete Paletten bis Masse 1000 kg ± 5 % kommen, geliefert.
Die Verarbeitbarkeitsgarantie beträgt 6 Monate nach der Aufnahme der Sendung ins Lager des Kunden. Es wird in Silos aus rostfreiem Material gelagert.

Гранулат ПЭТФ поставляем в следующих качествах:
- полуматовый (ПМ)
- микроматовый (ММ)
- блестящий (Л)

	ПМ	ММ	Л
Содержание титандиоксида в %	0,5	0,05	–
Релативная Вязкость	1,66 ± 0,012	1,8 ± 0,04	1,67 ± 0,024
Содержание золи	0,5 ± 0,003	0,07 ± 0,03	0,05
Максимальная влажность %	0,13	0,13	0,13
Ø толщина зерна мм	2,5 ± 0,5	2,5 ± 0,5	2,5 ± 0,5
Размеры зерна мм	4 × 4	4 × 4	4 × 4
Желтизна	0,13 ± 0,05	0,10 ± 0,05	0,10 ± 0,05

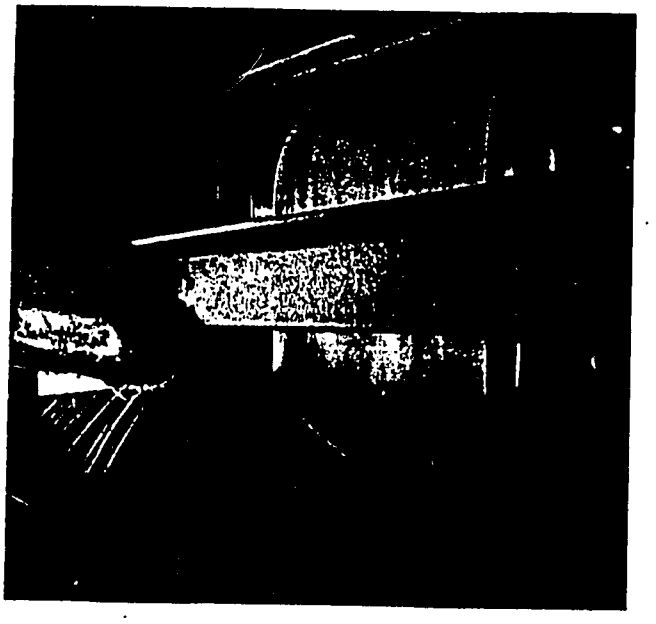
Минимальное поставляемое количество в разных технологических условиях полученного гранулята является 10 метрических тонн.
Поставки осуществляют в крупно-объемных мешках типа „Шумперк", которые кладутся на открытые палеты с массой 1000 кг ± 5 %.
Гарантия разрабатываемости предоставляется покупателю в продолжение 6 месяцев ото дня приема посылки на склад.
Складывание: в резервуарах из нержавеющего материала.



PETP chips are supplied
- semi-matt (PM)
- micro-matt (MM)
- bright (L)

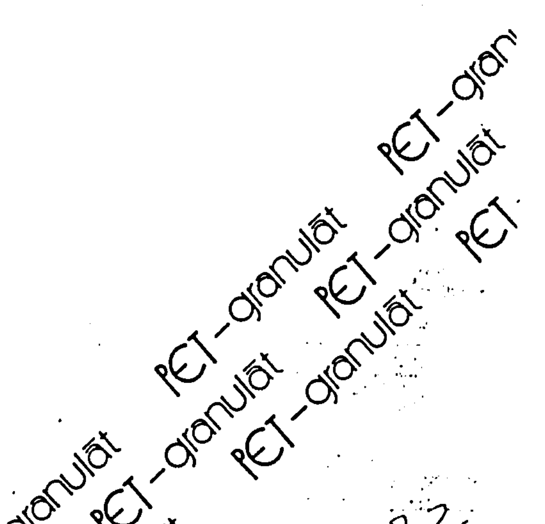
	PM	MM	L
Titandioxide content %	0,5	0,05	–
Relative viscosity	1,66 ± 0,012	1,8 ± 0,04	1,67 ± 0,024
Ash content %	0,5 ± 0,003	0,07 ± 0,03	0,05
Moisture max. %	0,13	0,13	0,13
Thickness of the chips mm	2,5 ± 0,5	2,5 ± 0,5	2,5 ± 0,5
Size of the chips mm	4 × 4	4 × 4	4 × 4
Yellowness of the chips	0,13 ± 0,05	0,10 ± 0,05	0,10 ± 0,05

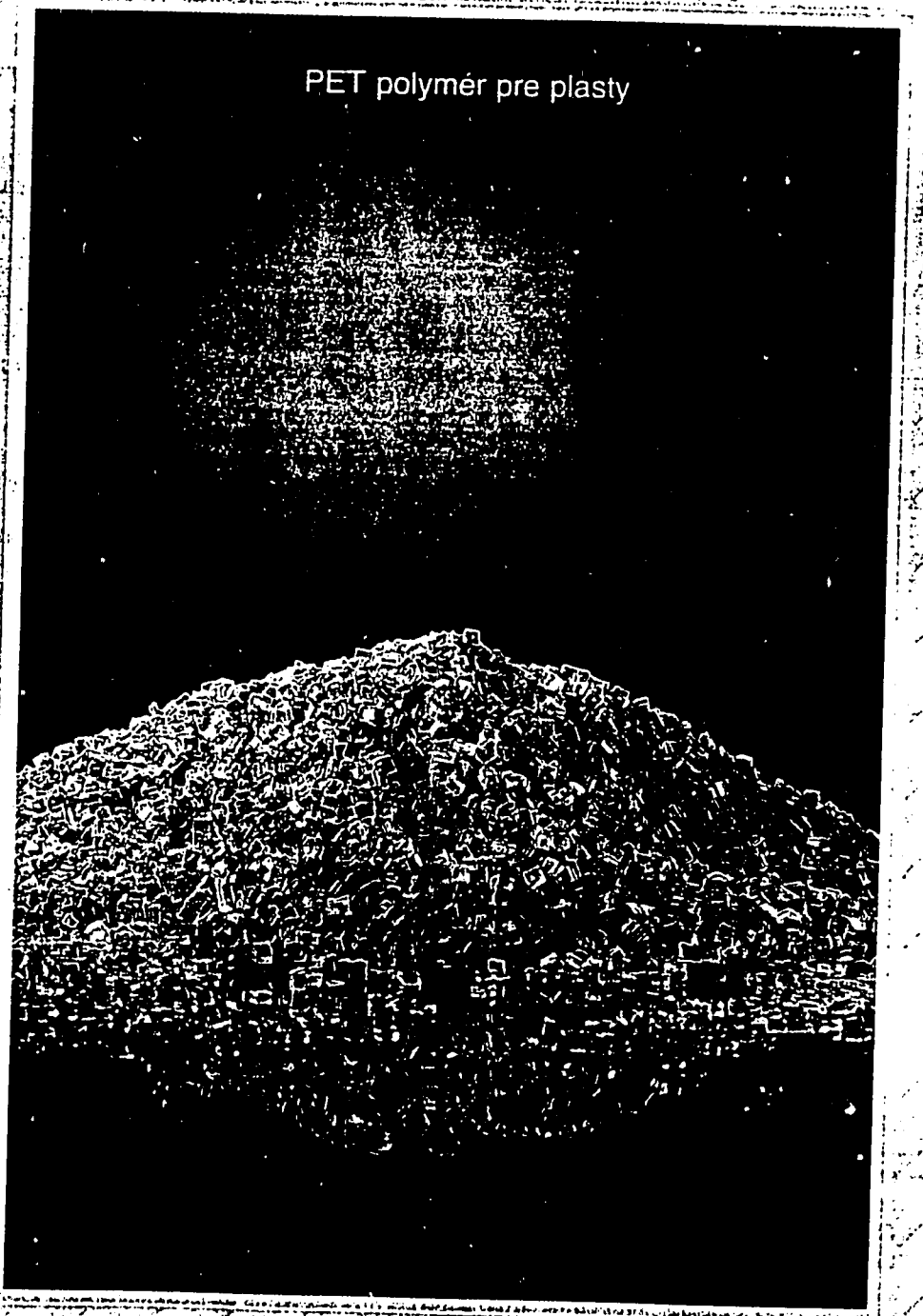
The lowest suppliable quantity of the chips made in equal technical conditions is 10 metric tons. Delivery is carried out in big volumen bags type "Šumperk", which are laid on open palletts weighing 1000 kg ± 5 %.
Warranty for processability: 6 months after storage by costumer is granted.
To be storaged: in stainless containers.

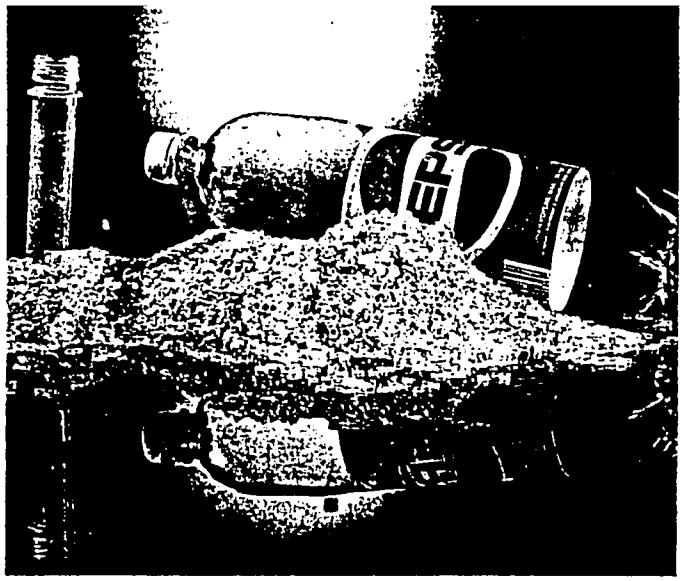


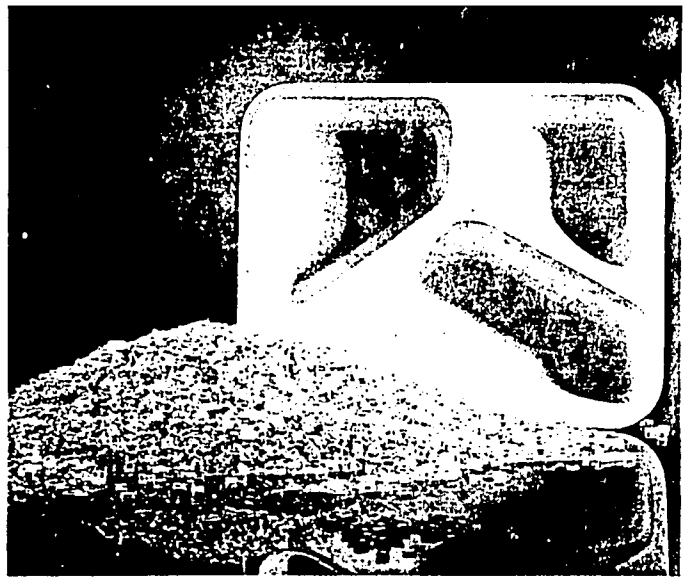
Zostavil: Jozef Spáčil
Grafická úprava: Ivan Karásek
Foto: Peter Karásek a Milan Brtva
Vydal: Slovenský hodváb Senica n. p. v Nakladateľstve Pravda
Vytlačila: Pravda, TK KSS, tlačiarenské závody Pravda, závod 01

Telegramy: Slovenský hodváb Senica
Telefóny: 2751–7
Ďalekopis: 09123 SLhd c
PSČ: 905 35
ŠBČS pobočka – Senica




PET polymér pre plasty





Slovenský hodváb Senica výrobca PET polyméru pre vlákna rozšíril ponuku o polymér pre plastikárske výrobky. Doporučuje jeho použitie hlavne vo výrobe:
- vyfukovaných PET fľaší
- liatych PET fólií pre vákuové tvarovanie obalov vhodných pre tepelnú úpravu jedál
- BO PET fólií pre technické aplikácie hlavne v elektronike a reprografii a pre potravinárske účely.

Výrobky z tohto polyméru sa vyznačujú vysokou funkčnosťou a atraktívnosťou, pri styku s potravinami nemenia ich vôňu a chuť pri teplotách od –40 °C do 220 °C, sú tvarovo stále, odolné voči chemikáliam a mnohými ďalšími prednosťami, ktoré ocení každý užívateľ.

SLOVENSKÝ HODVÁB SENICA known as fiber PETP polymer producer enlarges its offer by PETP polymer for plasticizers.
It can be recomended for following applications:
- blowing bottles from PETP polymer melt
- making PETP foils by pressure casting of its melt and by vacuum shaping of dishes for warming of earlier refrigerated foods
- BO-PETP foils for industrial applications particularly in the electronic and reprographic industries, as well as for foodstuff packaging purposes.

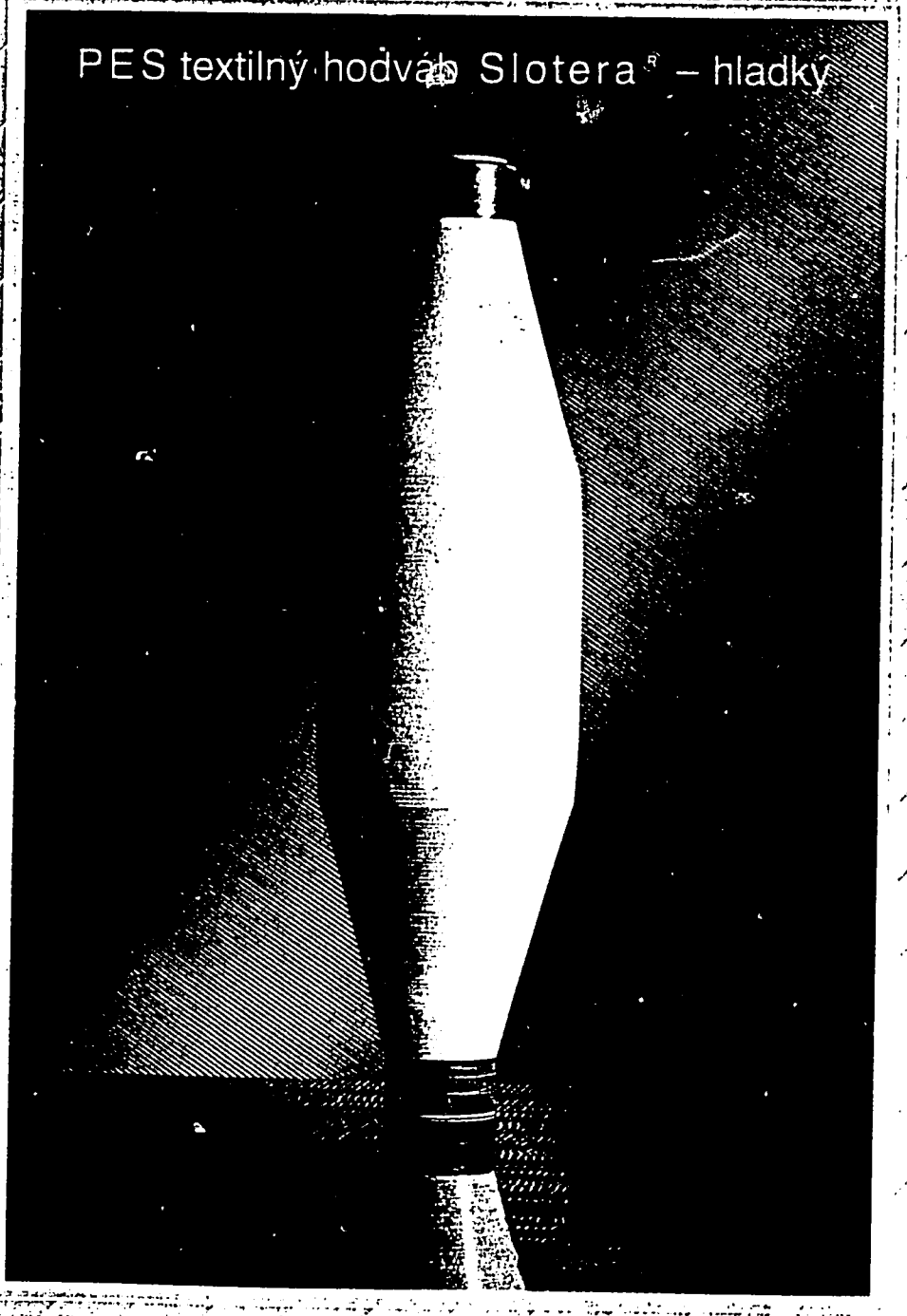
Products made from this polymer present high functionality and attractivity at the same time. In connection with foods they do not change their flavour and taste at temperatures ranging from –40 to 220 centigrades, maintainig their shape and being chemical-resisting and finally still possessing many other advantages, which could be appreciated by any user.

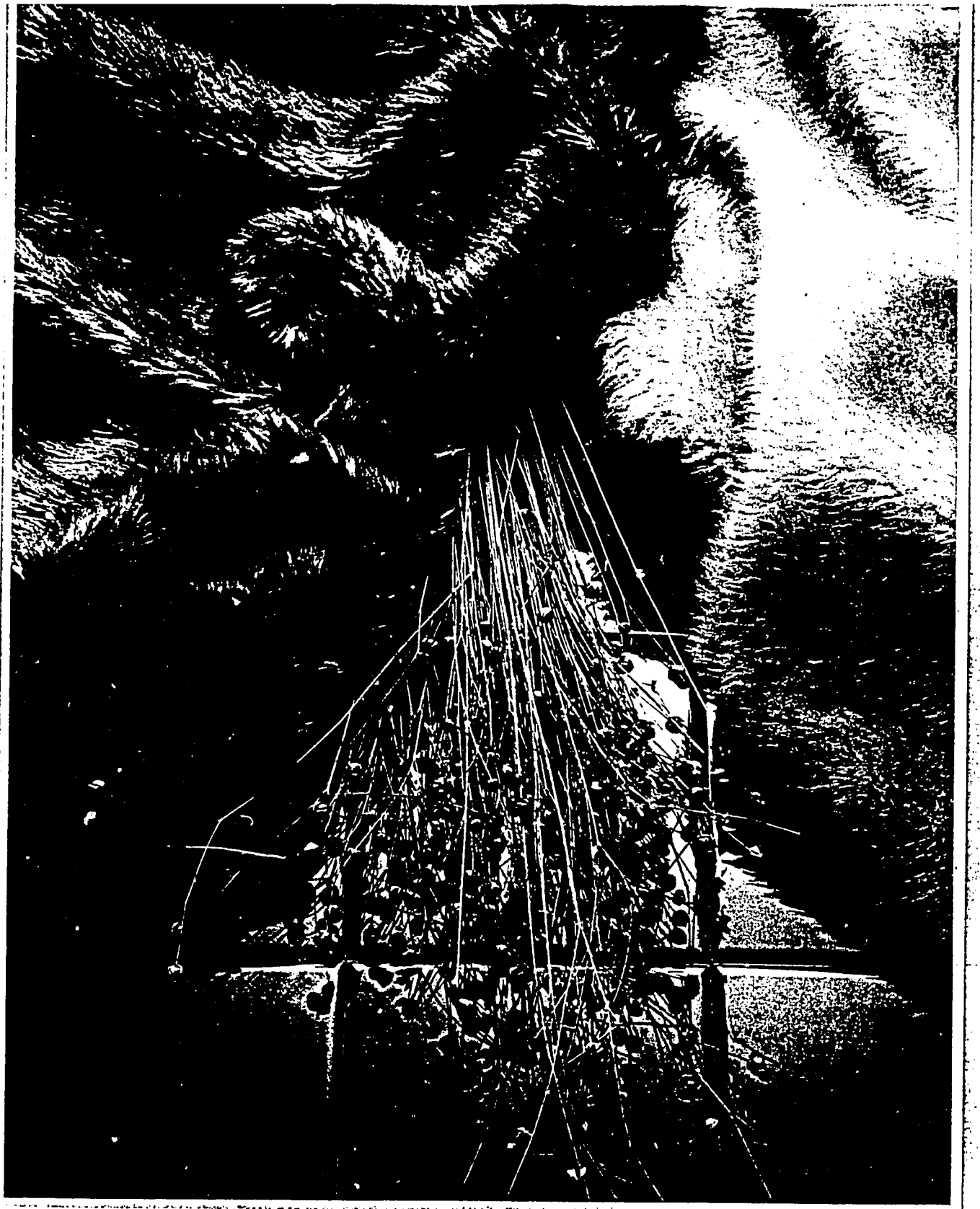
SLOVENSKÝ HODVÁB SENICA – Hersteller vom PET-Polymer für Fasern erweitert sein Angebot um PET-Polymere die für Preßstoffverarbeitung dienen.
Nachstehende Herstellanwendungen werden empfohlen:
- für geblasene PET-Flaschen
- druckgegossene Folien für Vakuumformierung von Packungen die für Wärme-Aufbereitung der Gerichte geeignet sind
- BO PET-Folien, die für technische Anwendungen, hauptsächlich in der Elektronik-Industrie und Druckerei sowie auch für Packung von Lebensmitteln geeignet sind.

Die Artikel, die aus diesem Polymer hergestellt werden, zeichnen sich durch hohe Funktionsfähigkeit und Attraktivität aus. Beim Kontakt mit Lebensmitteln ändern sie nicht deren Aroma und Geschmack bei Temperaturen von –40 °C bis +220 °C.
Sie sind Formbeständig, resistent gegen Chemikalien und besitzen weitere Vorteile, welche bei jedem Benutzer hochgeschätzt werden.

СЛОВЕНСКИЙ ХОДВАБ г. СЕНИЦА производитель ПЭТ-полимера для волокон расширяет свой ассортимент ПЭТ-полимера как пластмассы для разных изделий.
Рекомендуются нижеуказанные аппликации:
- выдувание ПЭТ бутылок
- отливание полиэфирной фолии для вакуового формирования подходящих упаковок-блюд для термической отделки
- БО-ПЭТ фолии с аппликацией в электронической и репрографической промышленностях и с упаковочной аппликацией для продовольственных продуктов.

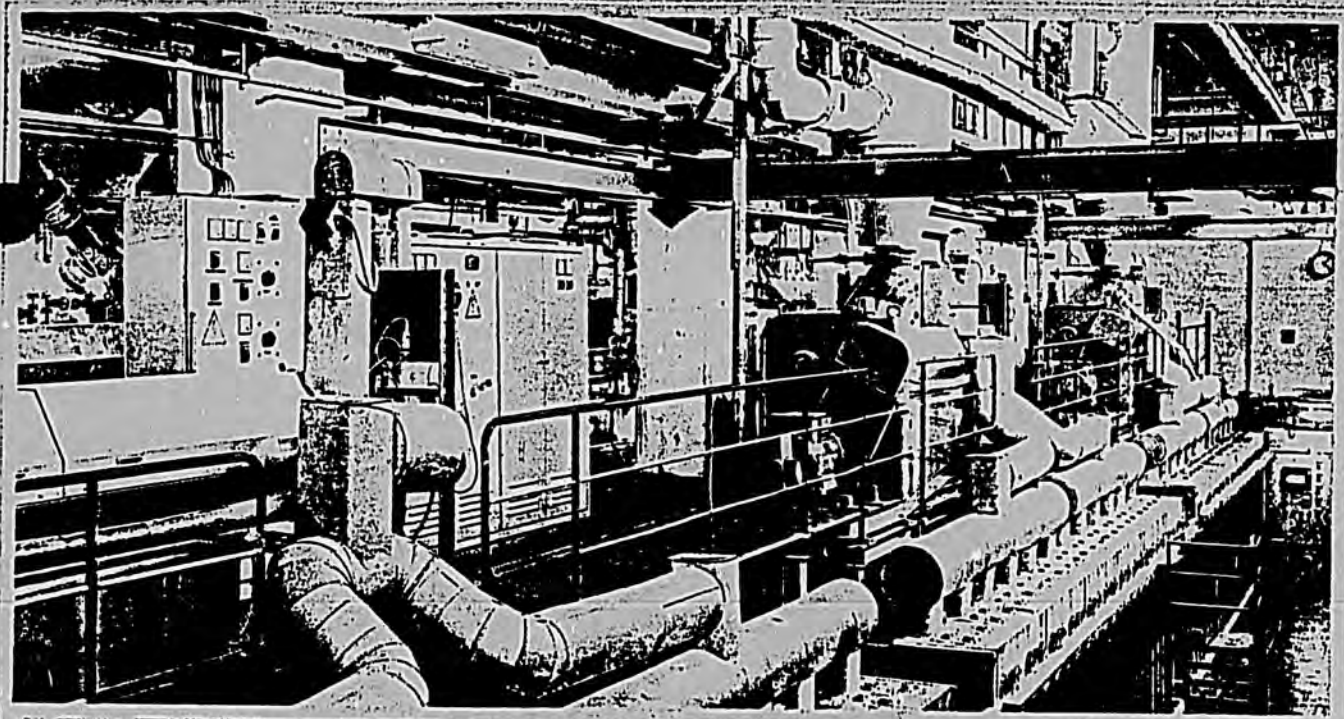
Изделия из указанного полимера отличаются высокой функциональностью и атрактивностью.
При соприкосновении с продовольственными продуктами они не изменяют ни аромата ни вкуса выдержая температуры от –40 °C до +220 °C, не изменяют своей формы и стойки по отношению к химическим веществам и обладают дальнейшими преимуществами, которые будут оценены любим потребителем.

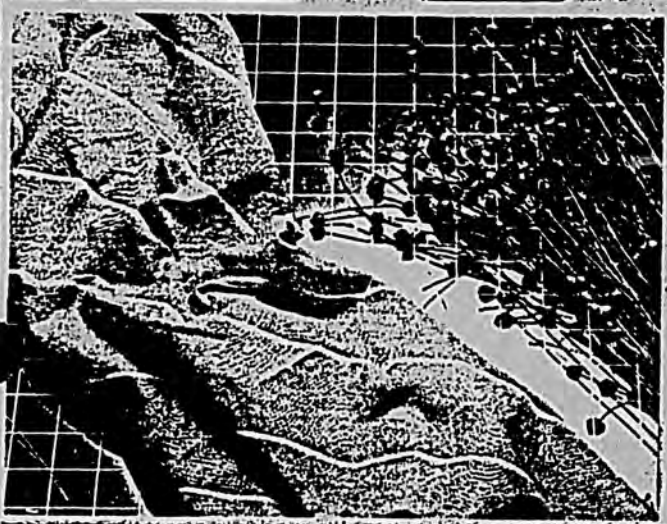

PES textilný hodvab Slotera® – hladký



PES textilný hodváb sa vyrába klasickou technológiou. Vlákno sa zvlákňuje pri odťahových rýchlostiach 1000–1400 m/min. Aby získalo vlákno vlastnosti textilného hodvábu je potrebné vlákno dĺžiť. Pri tomto procese pôsobením vonkajšej sily pri zvýšenej teplote sa makromolekuly polyetylénteréftalátu orientujú v smere rovnobežnom s osou vlákna. Vlákno sa predĺži na 3–4-násobok pôvodnej dĺžky, zvýši sa pevnosť, zníži ťažnosť a získajú sa ďalšie výhodné vlastnosti. Vzniká hladký bezzákrutový hodváb na kopsoch (potáčoch), ktorý už možno textilne spracovávať. Klasická technológia umožňuje výrobu hladkého PES hodvábu v širokom rozsahu jemnosti (od 50 dtex do 250 dtex), ale aj v širokom rozsahu sortimentných úprav podľa spôsobu použitia:

- hladký polomat (PM)
- hladký polomat prevírený vzduchom (PM ÚVT)
- hladký polomat so zvýšenou pevnosťou (PM ZP)
- hladký mikromat vysokopevný nízkozmrštivý (MM NZ)
- hladký mikromat profil (MM PR)





PES textilný hodváb – hladký (PM)

Гладкий полиэфирный текстильный шелк (ПМ)

PES – glatte Filamentgarn (PM)

PES – Flat Textile Filament Yarn (PM)

Dodávaný je v menovitých jemnostiach:

- 50 dtex f 12
- 84 dtex f 24
- 110 dtex f 36
- 167 dtex f 36

Hodváb je vhodný na výrobu záclonovín, nábytkových textílií, hodvábnických šatoviek a tkanín pre vrchné ošatenie. Spracovávaný môže byť prakticky na všetkých typoch stavov, ktorými je vybavený čsl. textilný priemysel. Použitý môže byť do osnov i do útku.

Поставляют его в следующих номинальных линеарных плотностях:

- 50 дтекс ф 12
- 84 дтекс ф 24
- 110 дтекс ф 36
- 167 дтекс ф 36

Этот шелк годится для производства гардинных материалов, мебельных текстилий, шелковидных одежных тканей и тканей для верхней одежды. Разработка возможна на всех типах ткацких станков, которыми оснащена чехословацкая текстильная промышленность. Применять его возможно так в качестве основы как тоже в качестве утка.

Geliefert werden folgende Nenntiter:

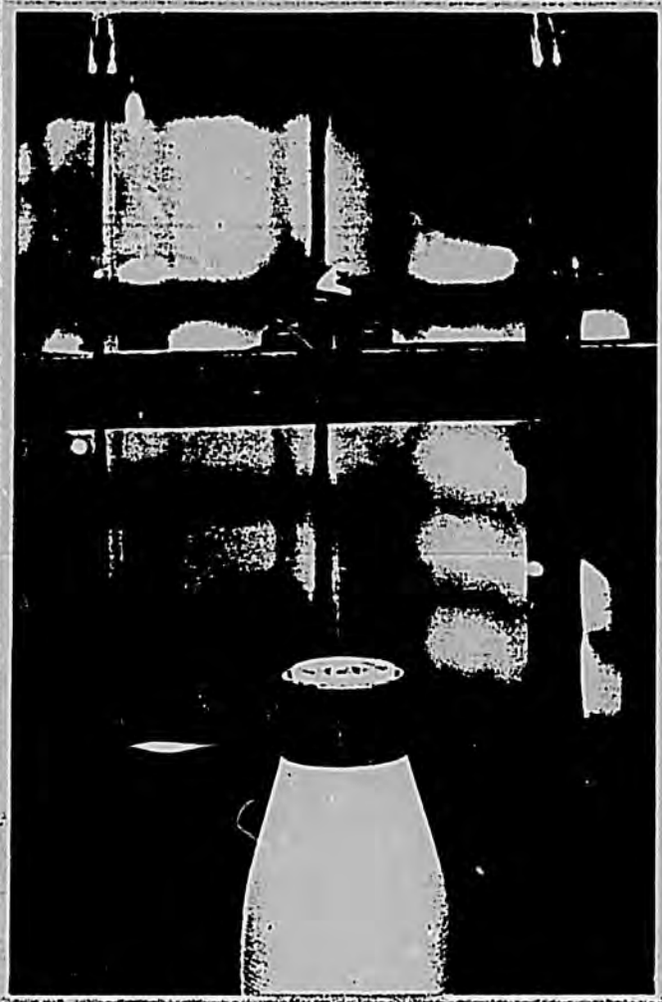
- 50 dtex f 12
- 84 dtex f 24
- 110 dtex f 36
- 167 dtex f 36

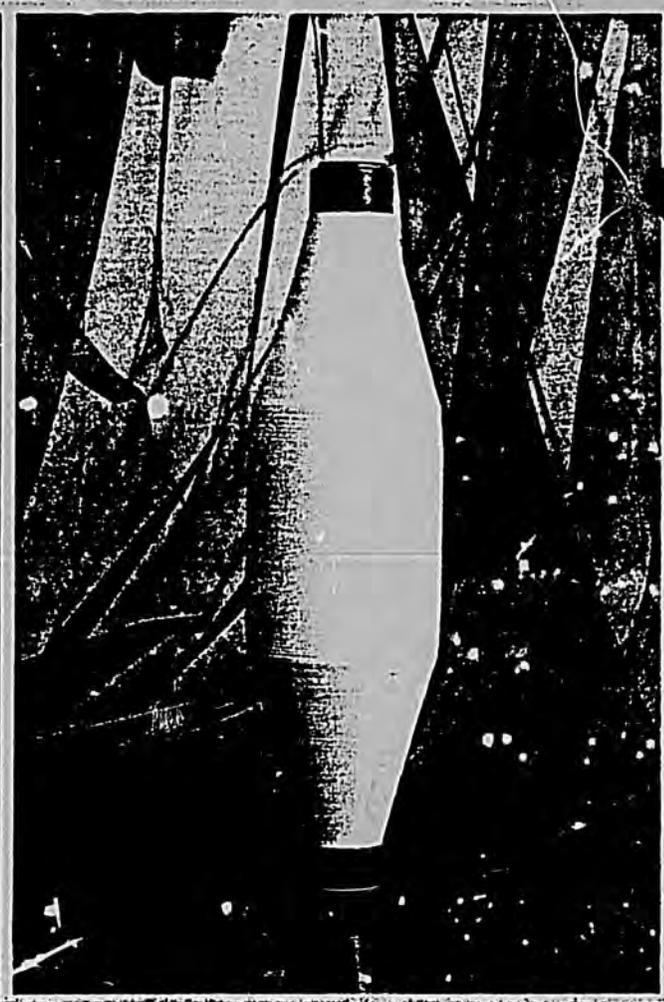
Des Garn eignet sich für – Herstellung von Gardinenstoffen, Möbelüberzugstoffen, seidenartigen Bekleidungsstoffen und Geweben für Aussenbekleidung. Sie kann praktisch an allen Webstühlen, die die tschechoslowakische Textilindustrie besitzt, verarbeitet werden. Sie kann sowohl als Kett- als auch Schussfaden eingesetzt werden.

The polyester flat textile filament yarn (PM) is supplied in the following rated titres:

- 50 dtex f 12
- 84 dtex f 24
- 110 dtex f 36
- 167 dtex f 36

This filament yarn is fit for making curtains, furniture textiles, silky dress fabrics as well as woven fabrics for outer clothing. It can be practically processed on all types of looms, with which the czechoslovak textile industry is equipped and may be used both as warp and weft.





PES prevírený vzduchom (PM ÚVT)

ПЭ – продуваный потоком турбулентного воздуха (ПМ УВТ)

Glatte Luftverwirbelte (PM ÚVT)

Flat Air-entangled (PM ÚVT)

Dodávaný je v menovitých jemnostiach:

– 50 dtex f 12
– 84 dtex f 24

Pri výrobe hladkého PM je na dížiacom stroji Barmag SZ-5 zaradený miesto vodiča prevírovací adapter a dížené vlákno potom mení svoj charakter na vlákno prevírené vzduchom. Priemerný počet prevírených miest na meter je min. 25. Používa sa ako náhrada hladkého zákrutového hodvábu. Vhodný je hlavne na výrobu záclon.

Поставляют его в следующих номинальных линеарных плотностях:

– 50 дтекс ф 12
— 84 дтекс ф 24

В выработке гладкого ПМ имеется на вытяжной машине Бармаг СЗ-5 вместо нитепроводителя продувочный адаптер и волокно во время вытяжки меняет свой характер как волокно продуванное в регулярных расстояниях турбулентным потоком воздуха. Количество точек продувки в текущем метре минимально 25. Употребляется в замен за гладкий ПЭ-шелк с закруткой. Годится для выработки гардин.

wird in folgenden Nenntitern geliefert:

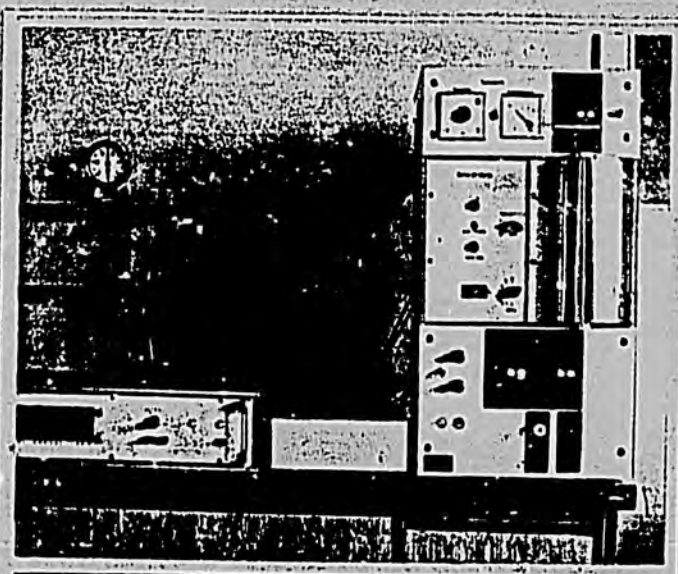
– 50 dtex f 12
– 84 dtex f 24

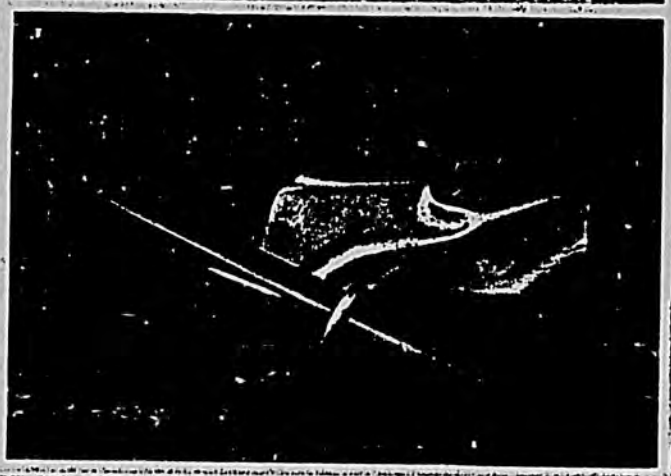
Es kommt zustande so, dass anstatt eines Fadenführers an der Barmag SZ-5 Streckmaschine ist ein Verwirbelungs-Adapter angebracht und der gestreckte Faden ändert seinen Charakter durch die Verwirbelung in gleichmässigen Abständen. Die durchschnitliche Anzahl der Vervirbelungpunkte beträgt mindestens 25 pro meter. Sie wird als Ersatz für glatt-gedrehte PES-Garn angewendett und eignet sich vornehmlich für Gardinenherstellung.

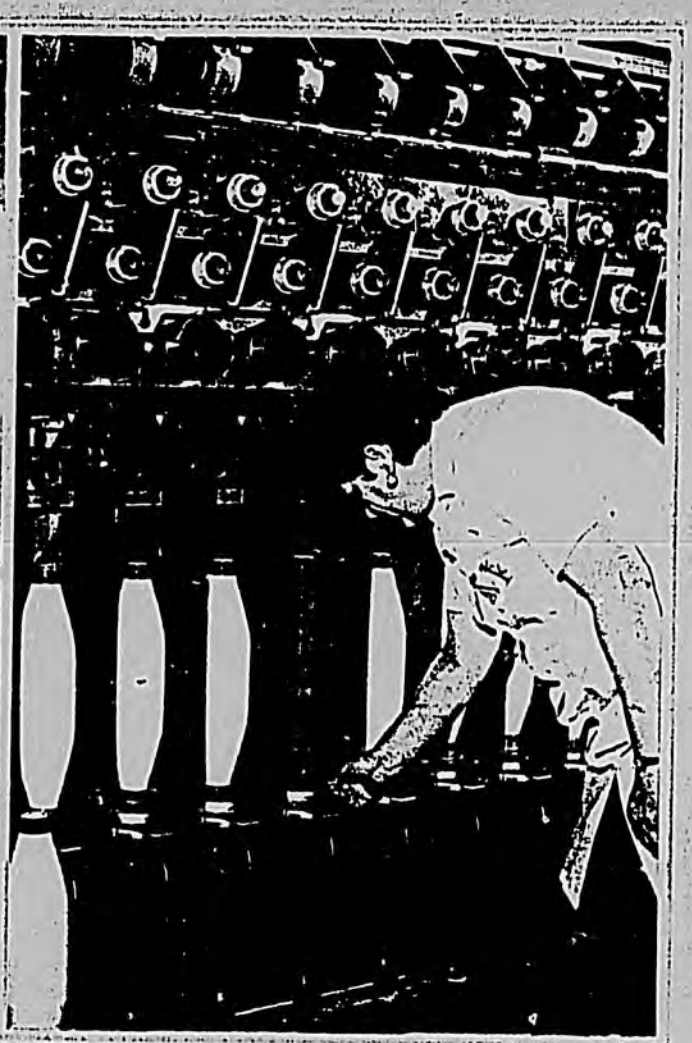
Air-entangled flat polyester flat filament yarn (PM ÚVT) is supplied in following rated titres:

– 50 dtex f 12
– 84 dtex f 24

On processing the flat PM there is on the Barmag SZ-5 draw twister instead of the thread quide an entanglement adaptor and the stretched thread changes its feature to become an entagled yarn. The minimum entanglement density is 25 E/m. It is used as substitute for a flat twisted filament yarn. It is suitable preferably for curtain making.







S zvýšenou pevnosťou (PM ZP)
С повышенной прочностью (ПМ ЗП)
Garn mit erhöhter Festigkeit (PM ZP)
Flat yarn increased Tenacity (PM ZP)

Dodávaný je v menovitých jemnostiach:

- 67 dtex f 24
- 133 dtex f 36

Hodváb je vhodný na výrobu šijacích nití pre konfekčné spracovanie tkanín a pletením zo syntetických vlákien. Vysoká pevnosť, nízka zrážavosť a dobré elastické vlastnosti zabezpečujú trvanlivosť a dobrý vzhľad švov a významne prispievajú k zvýšeniu kvality textilných výrobkov.

Поставки возможны в следующчих линеарных плотностях:

- 67 дтекс ф 24
- 133 дтекс ф 36

Этот шелк годится для выработки швейных нитей для конфекционной разработки тканей и трикотажи сделанных из синтетических волокон. Высокая прочность и малоусадочность совместно с хорошими элястическими свойствами обеспечивают прочность и хороший внешний вид швов и знаменито способствуют повышать

wird in 2 Nenntitern geliefert:

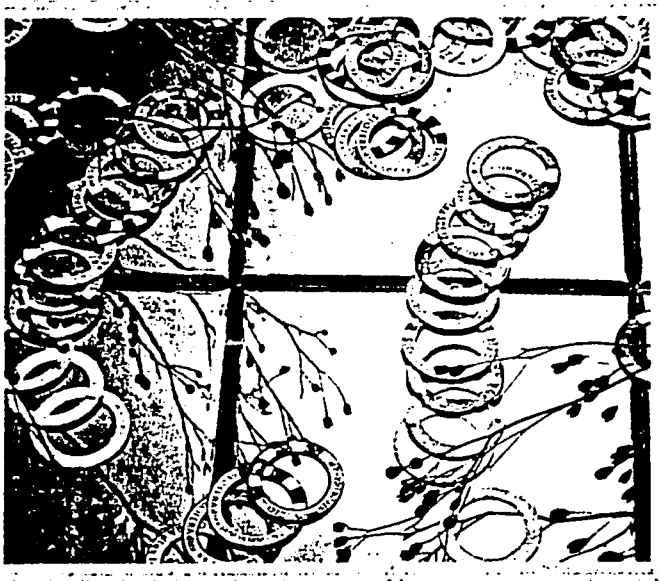
- 67 dtex f 24
- 133 dtex f 36

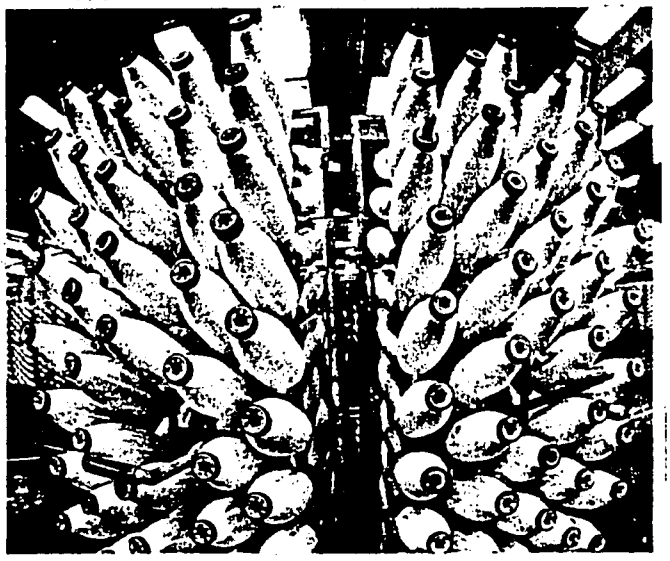
Das Garn eignet sich für Nähgarn-Herstellung in Konfektionsverarbeitung von synthetischen Geweben und Gestrikken. Hohe Festigkeit, niedriger Schrumpf und gute elastische Eigenschaften sichern Dauerhaftigkeit und guten Ausfall von Nahten und bedeutend beitragen der Qualitätserhöhung von Textilartikeln.

The flat polyester textile filament yarn with an increased tenacity (PM ZP) is supplied in following rated titres:

- 67 dtex f 24
- 133 dtex f 36

and is suitable for making sewing threads in ready made clothing production, i. e. of man made fibre woven as well as knitted articles. High tenacity and low shrinkage as well as favourable elastic properties provide durable and good looking seams and thus significantly contribute to increasing





	PM	PM ÚVT	PM ZP	MM NZ	MM PR
Ø pevnosť v klim. stave v cN/dtex	4,1	3,9	5,9	6,8	3,5
Ø ťažnosť v klim. stave v %	23±4	17±4	8±2	do 15	23±4
Odchýlka od výsl. jemnosti v % max.	±3,0	±3,0	±3,0	±3,0	±3,0
Zrážanie za varu v %	8±2	8±2	7±2	do 2.	8±2
Obsah matovacieho prostriedku v %	0,5±0,05	0,5±0,05	0,5±0,05	0,03±0,05	0,5±0,05
Obsah preparácie v % min.	0,7	0,7	0,7	0,5	0,7
max.	1,5	1,5	1,5	1,0	1,5
Počet tech. nutných zákr. na 1 m smer Z max.	30	–	30	30	30
Ø hmotnosť návinu v g min.	1800	1300	250	250	1800
max.	2350	1760	2350	2350	2350

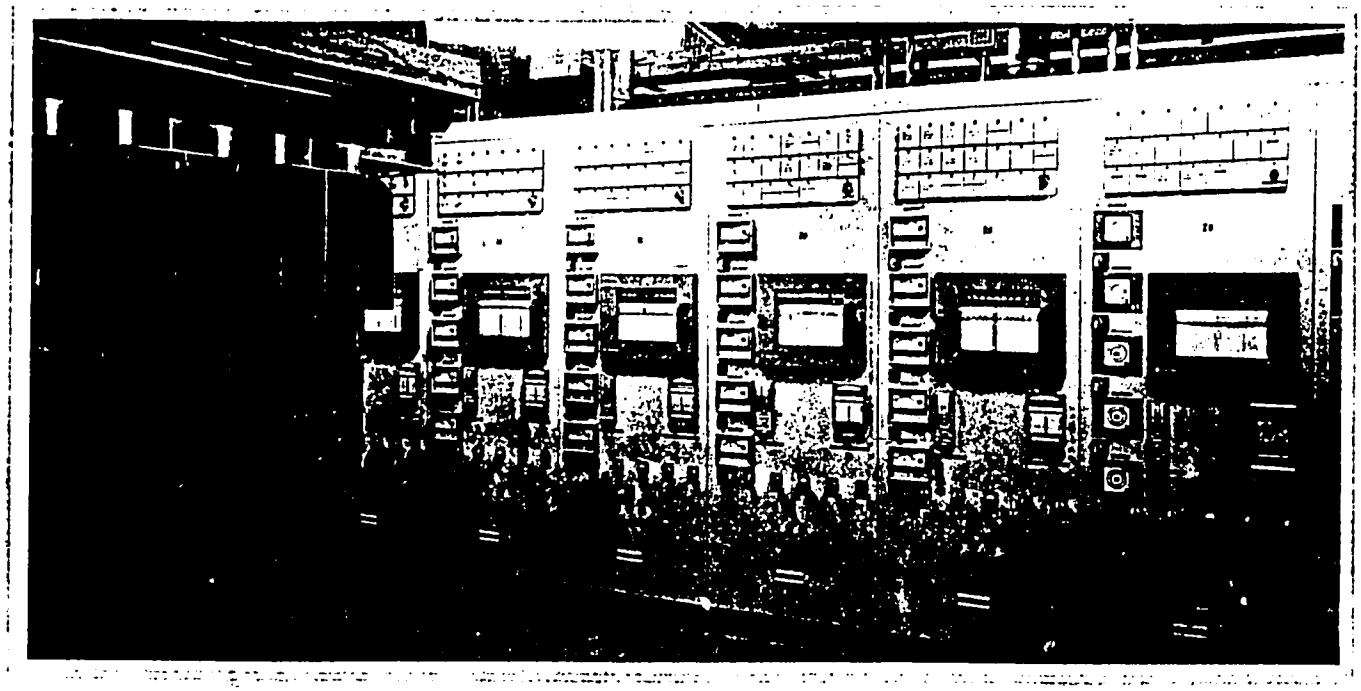
Predloha: valcový kops (potáč) dĺžky 420 mm
Uvedené hodnoty platia pre I. akosť

Hodváb sa dodáva navinutý na kops (potáč). Na hlave každého kopsu je nasadený farebný krúžok s označením menovitej jemnosti, počtu elementárnych vlákien a spôsobu úpravy. Každý kops je samostatne zabalený do ochranného obalu. Kopsy sa ukladajú do kartónov o rozmeroch 600×400×430 mm po 15 ks. Kartóny sa ukladajú na paletu v 3 vrstvách po 4 kartóny.

	Ед. изм.	ПМ	ПМ УВТ	ПМ ЗП	ММ ЗП	ММ ПР
Ø прочность в кондиционированном состоянии	цН/дтекс	4,1	3,9	5,9	6,8	3,5
Ø растяжимость в кондиционированном состоянии	%	23±4	17±4	8±2	до 15±0	23±4
отклонение от кон. титра	%	±3,0	±3,0	±3,0	±3,0	±3,0
Осадка вовремя кипения	%	8±2	8±2	7±2	до 2±0	8±2
Содержание средства мат.	%	0,5±0,05	0,5±0,05	0,5±0,05	0,03±0,05	0,5±0,05
Содержание препарации мин.	%	0,7	0,7	0,7	0,5	0,7
макс.		1,5	1,5	1,5	1,0	1,5
Макс. количество технически неизбежных круток на 1 текущий метр		30	–	30	30	30
Ø масса бобины в граммах мин.		1800	1300	250	250	1800
макс.		2350	1760	2350	2350	2350

Питание: цилиндрический копс, длина 420 мм
Вышеуказанные значения относятся лишь к первому качественному классу.

Шелк поставляют с намоткой на копс. На головку каждого копса насаживают цветной кружок, содержающий следующие данные: – номинальная линеарная плотность, количество филаментов и способ отделки. Каждый копс отдельно запаковывают в хранительную упаковку. Потом копсы укладывают в картон с габаритом 600×400×430 мм – каждый картон = 15 штук копсов. Картоны укладывают в трех слоях по 4 на палету.



		PM	PM ÚVT	PM ZP	MM NZ	MM PZ
Ø Festigkeit in konditioniertem Zustand in cN/dtex		4,1	3,9	5,9	6,8	3,5
Ø Dehnung in konditioniertem Zustand	in %	23±4	17±4	8±2	do 15±0	23±4
Abweichung vom Endtiter max.	in %	±3,0	±3,0	±3,0	±3,0	±3,0
Kochschrumpf	in %	8±2	8±2	7±2	bis 2	8±2
Mattiermittelgehalt	in %	0,5±0,05	0,5±0,05	0,5±0,05	0,03±0,05	0,5±0,05
Preparationsgehalt min.	in %	0,7	0,7	0,7	0,5	0,7
max.	in %	1,5	1,5	1,5	1,0	1,5
Technologisch unvermeidliche Z-Drehungen pro Meter – max.		30	–	30	30	30
Ø Wickelmasse in Gramm min.		1800	1300	250	250	1800
max.		2350	1760	2350	2350	2350

Vorlage: Zylindrischer Kops, Länge 420 mm
Die Angeführten Werten gelten nur für die erste Qualität.

Das Garn wird in Kopsaufmachung geliefert. Auf dem Kopf jedes eizelnen Kopses ist ein farbiger Ring aufgesetzt mit Bezeichnung des N-enntiters, der Filamentenzahl und Ausrüstungsweise. Jeder Kops ist individuell eingetütet in einer Schutzpackung. Die Kopse werden in Kartons eingelegt je 15 Stk/Karton; Kartonabmasse: 600×400×430 mm. Die Kartons werden auf eine Palette in drei Schichten je 4 Kartons aufgelegt.

		PM	PM UVT	PM ZP	MM NZ	MM PR
Ø tenacity in conditioned state	cN/dtex	4,1	3,9	5,9	6,8	3,5
Ø elongation in cond. state	%	23±4	17±4	8±2	up to 15	23±4
Max. deviation from the final titre	%	±3	±3	±3	±3	±3
Shrinkage by boiling	%	8±2	8±2	7±2	up to 2	8±2
Matting means content	%	0,5±0,05	0,5±0,05	0,5±0,05	0,03±0,05	0,5±0,05
Finish content min.	%	0,7	0,7	0,7	0,5	0,7
max.	%	1,5	1,5	1,5	1,0	1,5
Technically inevitable Z-twists – max.	number	30	–	30	30	30
Minimum bobbin weight	grammes	1800	1300	250	250	1800
Maximum bobbin weight	grammes	2350	1760	2350	2350	2350

Supply: cylindrical cops, lenght 420 mm
The quoted values apply for the first quality only.

The filament yarn is supplied wound on cops. A coloured ring is set on the head of each cop, carrying the main dates: – rated titre, filament count and the finish type, as well as final trimming way.
Each cop is wrapped into a protection packing. The cops are laid by 15 pieces into a carton having a dimension of 600×400×430 mm. The cartons come on a palette in 3 layers each containing 4 cartons.

Vysokopevný nízkozmršťivý (MM NZ)

высокопрочный малоусадочный шелк (MM НЗ)

glatt mit hoher Festigkeit und niedrigem Schrumpf (MM NZ)

flat – with High Tenacity and low Shrinkage

Dodávaný je v menovitých jemnostiach:

- 50 dtex f 24
- 76 dtex f 24
- 140 dtex f 36
- 250 dtex f 72

Hodváb sa vyznačuje vysokou pevnosťou a nízkou zrážavosťou. Používa sa na výrobu šijacích nití ako nosná časť (jadro). Vhodný je na konfekčné spracovanie syntetických tkanín a pletenín s vysokou pevnosťou vo šve. Bol vyvinutý v n. p. Slovenský hodváb a je jediným u nás vyrábaným vláknom tohto druhu.

Поставки в следующчих номинальных линеарных плотностях:

- 50 дтекс ф 24
- 76 дтекс ф 24
- 140 дтекс ф 36
- 250 дтекс ф 72

Этот шелк отличается высокой прочностью и малоусадочностью. Употребляют его на выработку швейных нитей в качестве основной части (сердцевины). Годится на конфекционную разработку синтетических тканей и трикотажи, которые нуждаются в высокой прочности швов. Этот шелк является результатом испытательской работы коллектива народного предприятия "Словацкий шелк" г. Сеница и единственным этого типа волокном вырабатыванным в Чехословакии.

wird in folgenden Nenntitern geliefert:

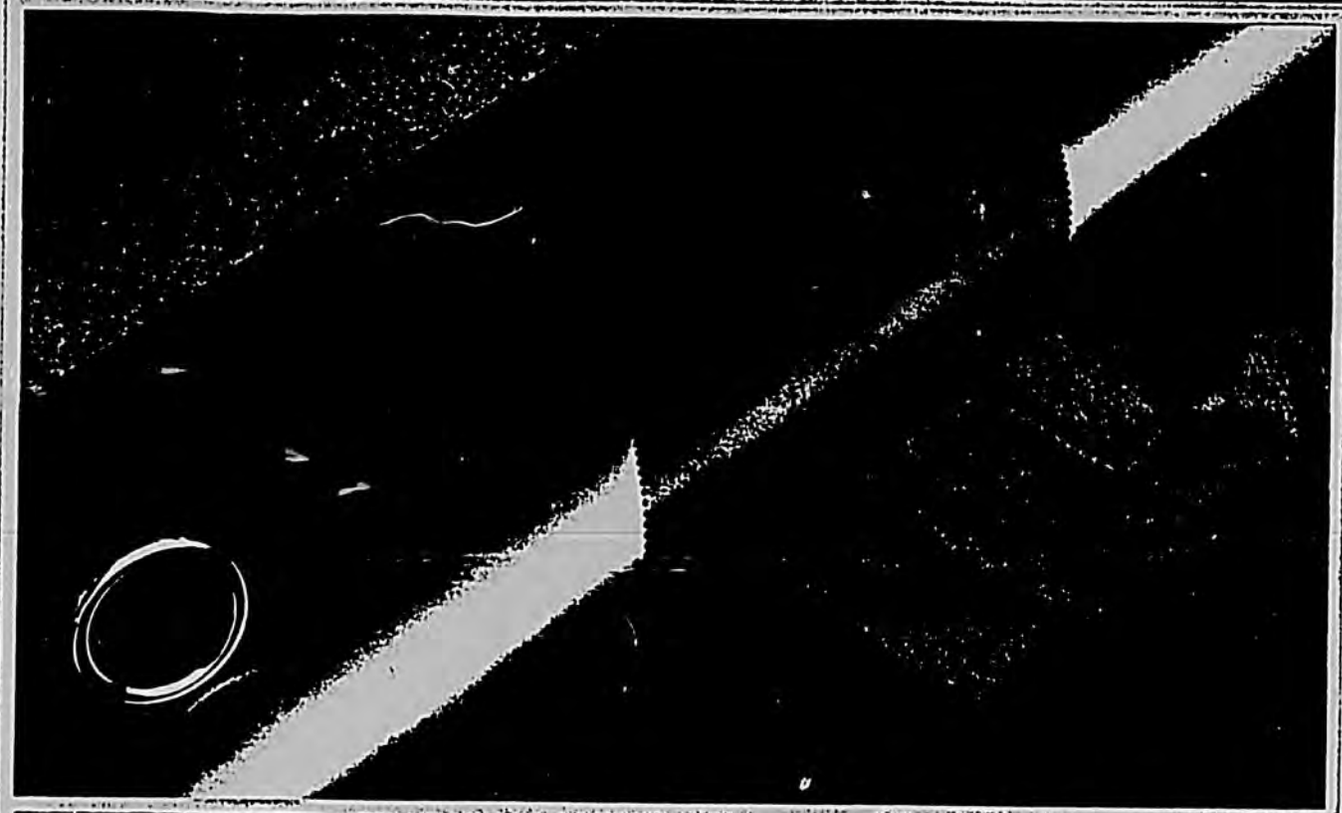
- 50 dtex f 24
- 76 dtex f 24
- 140 dtex f 36
- 250 dtex f 72

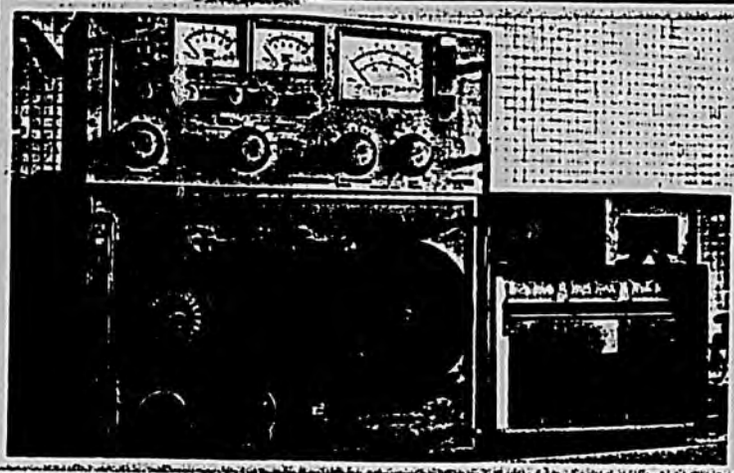
Das Garn zeichnet sich durch hohe Festigkeit und niedrigen Schrumpf aus. Sie wird als Trägermaterial (Kernfaden) für Nähgarnherstellung angewandt. Sie eignet sich für Konfektionsverarbeitung von synthetischen Geweben und Gestrikken, die eine feste Naht benötigen. Sie ist in Nationalunternehmen Slovenský hodváb entwickelt worden und ist die einzige Faser von diesem Typ, die bei uns hergestellt wird.

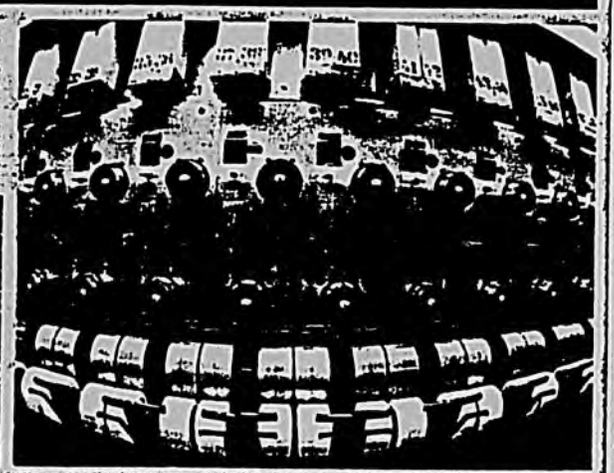
The flat polyester filament yarn with high tenacity and low shrinkage is supplied in following rated titres:

- 50 dtex f 24
- 76 dtex f 24
- 140 dtex f 36
- 250 dtex f 72

They are remarkable by their high tenacity and low shrinkage and are used in sewing threads as the car[illegible] component (the core). They are suitable for the ready m[illegible] textile article industry, where they provide a durable and highly tenacious seam. in synthetic wovens and knittings. This yarn has been developped in the National Enterprise Slovenský hodváb Senica and is the unique type of thread produced in Czechoslovakia.







Hladký profil (MM PR)
Гладкий профилированный шелк (MM ПР)
Glatt profiliert (MM PR)
Flat Filament Yarn – Profiled (MM PR)

Dodávaný je v menovitej jemnosti:

– 150 dtex f 36

Vlákno má priečny rez trojlaločného tvaru na rozdiel od ostatných hladkých vlákien, ktoré majú priečny rez kruhového tvaru. Výrobky z tohto vlákna sa vyznačujú výraznými optickými vlastnosťami, odlišným omakom a vyššou objemnosťou. Uplatnenie nachádza hlavne vo výrobe hodvábnych šatoviek a pre efekty.

Поставки только в номинальной линеарной плотности:

– 150 дтекс ф 36

У волокна трилобальное поперечное сечение в отличие от круглого поперечного сечения остальных гладких волокон. Изделия сделанные из этого волокна отличаются выразительными оптическими свойствами, иной ошулью и увеличенной объемностью. Этот шелк находит применение главным образом в выработке шелковидных одежных материалов и из-за эффектов.

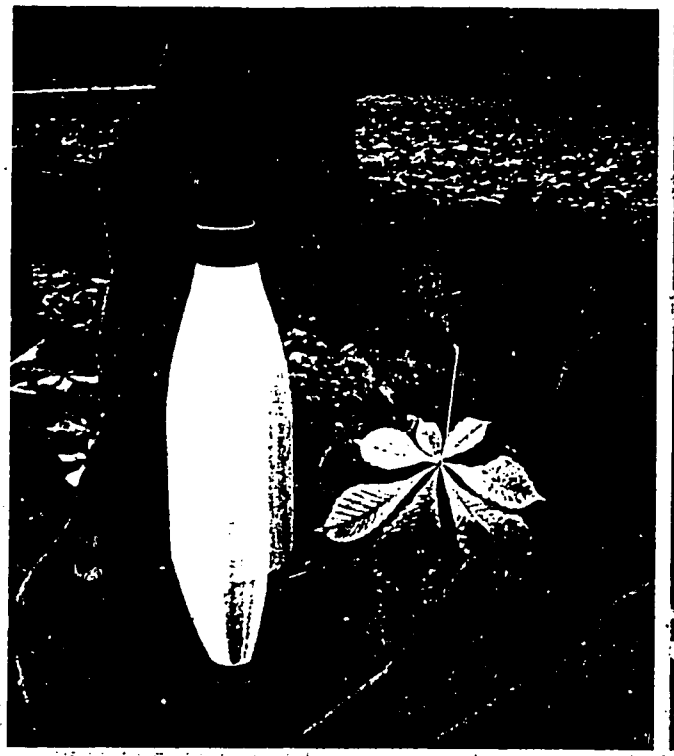
wird im Nenntiter

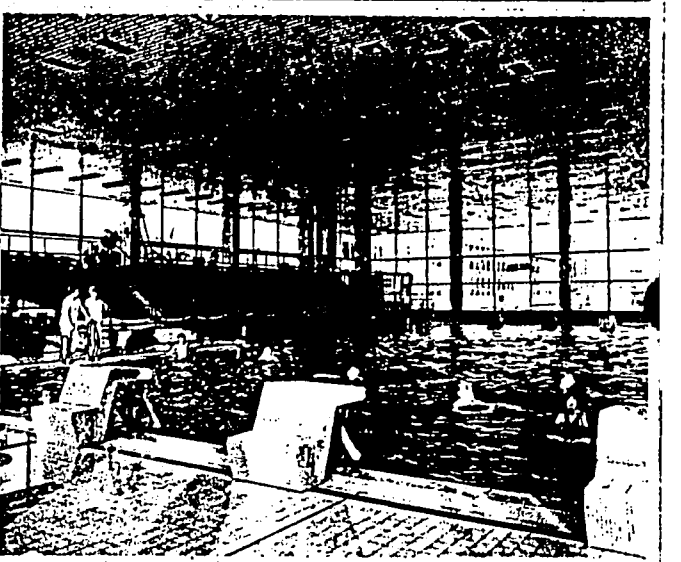
– 150 dtex f 36 geliefert. Die Faser hat einen trilobalen Querschnitt unterschiedlich von sonnstigen fasern die einen runden Querschnit besitzen. Aus diesem Faser hergestellte Produkte zeichnen sich durch ausdrückliche optische Eigenschaften, mit unterschiedlichem Griff und einer höheren Bauschigkeit. Sie findet Anwendung hauptsächlich in der Herstellung von Bekleidungs-Seiden-Stoffen und wegen der Effekte.

The flat profiled polyester filament (MM PR) is supplied in rated titre

– 150 dtex f 36

The fibre cross section has a trilobal shape different from the others having a round cross section. The articles made of this fibre have significant optical properties, a distinct touch and a higher bulk. It finds application mainly in making silky wovens, particularly due to their optical effects.



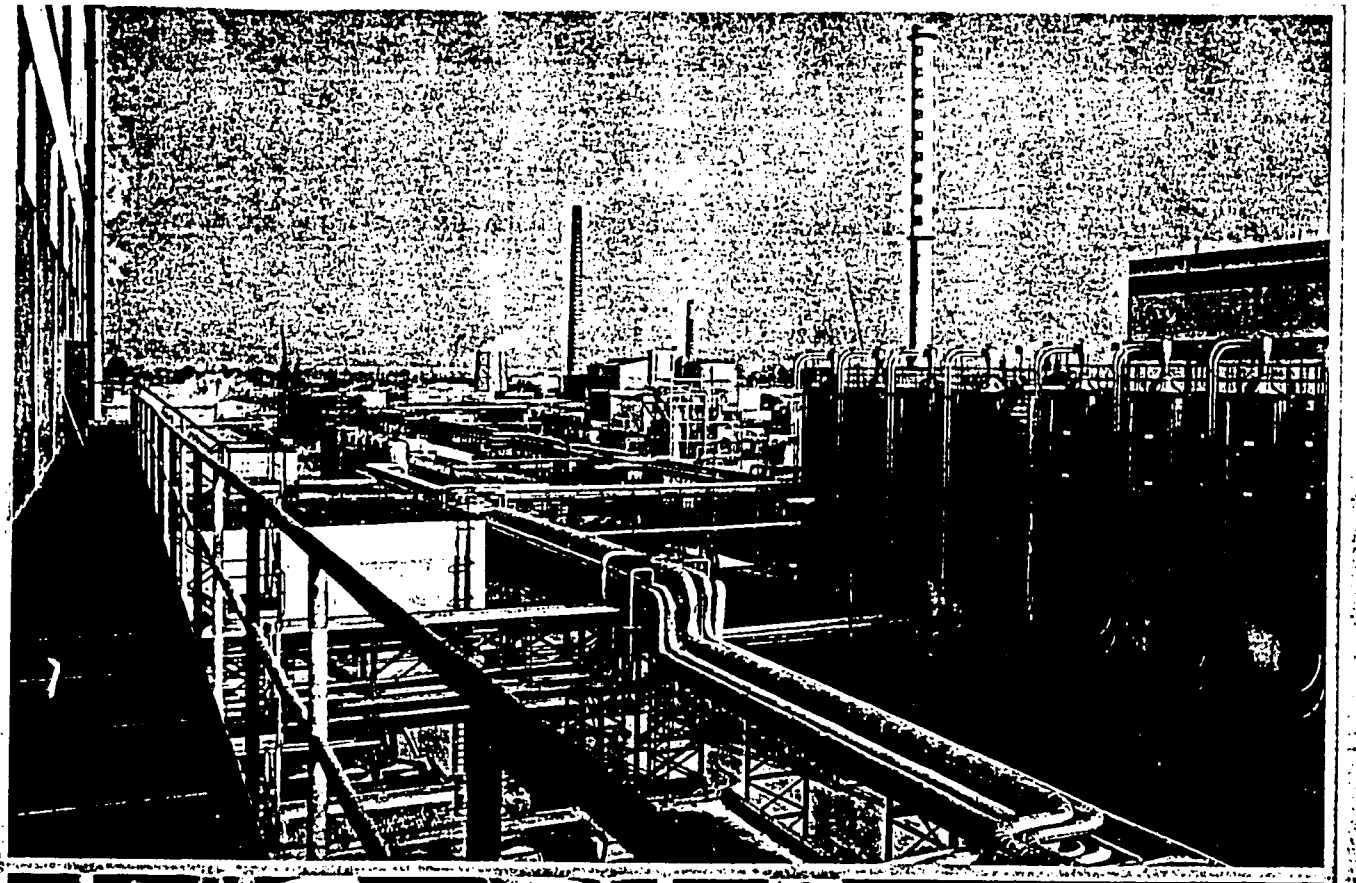


Pre zaistenie dobrých výsledkov spracovateľnosti a vysokej kvality výrobkov je nutné rešpektovať okrem technologických predpisov, ktoré platia pre určitý spôsob spracovania i špecifické vlastnosti polyesterového hodvábu hladkého všeobecne platné:

- pre nízku jemnosť kapilár je nutné manipulovať s hodvábom tak, aby neprichádzalo k narušovaniu elementárnych vlákien,
- pri manipulácii s kopsami nesmie byť uchopený do rúk za vlákno, aby nenastal posun vrchnej vrstvy hodvábu,
- všetky vodiace a brzdiace elementy musia byť nepoškodené, čisté a vlákno sa ich má čo možno najmenej dotýkať,
- dôležitou podmienkou je i správna vlhkosť ovzdušia v prevádzke (65 %) a stála teplota prostredia (20–22 °C),
- dopravovať sa musí v uzavretých, suchých a čistých dopravných prostriedkoch, chránených proti poveternostným vplyvom,
- skladovať sa musí v suchých a čistých priestoroch s teplotou 5–27 °C a musí byť chránený proti priamemu účinku slnečných lúčov.

Для обеспечения хороших результатов обработки и высокого качества изделий требуется кроме соблюдения технологических постановлений для определенного способа обработки, тоже учитывать еще специфические свойства гладкого полиэфирного шелка:

- Из-за низкой тонкости капилляр нужно осторожно обходиться с шелком чтобы не повреждать филяментов.
- Не хватать в руки волоконную поверхность копцов, чтобы не отодвигать верхний слой шелка.
- Все нитепроводные и тормозные элементы должны быть невредимыми, чистыми и волокно должно коснутся них по самой возможной меньшей мере.
- очень важным условием успешной обработки является подходящая влажность атмосфери (65 %) и постоянная температура рабочей среды. (20–22 градусов Цельзиа.)
- Транспортировка должна происходить в закрытых сухих и чистых средствах, защищенных против метеорологических влияний.
- Складывание требует закрытых, сухих и чистых просторов с температурой не уклонящейся от интервала 5–27 градусов,защищенных против прямого действия солнечных лучей.



Für Sicherung guter Verarbeitbarkeitsergebnisse und einer hohen Produktqualität muss man ausser technologischen Vorschriften, die für eine bestimmte Verarbeitungsweise geltend sind, auch die spezifische Eigenschaften der Polyester Glattgarn beachten. Allgemein gilt:

- Wegen einer sehr niedrigen Kappilarenfeinheit ist es nötig mit das garn so zu man ipulieren, dass es zu keiner Störung und Beschädigung der Filamente kommt.
- Wenn man mit Kopsen manipuliert, sollte man darauf achten, dass man keineswegs mit den Fingern die Fasern berührt, damit keine Verschiebung der Oberschicht zustande kommt.
- Alle Elemente der Fadenführung und Bremsung sollen unbeschädigt und sauber sein und die Faser sollte sie möglichst am mindesten berühren.
- Eine wichtige Bedingung der erfolgreichen Verarbeitung ist die Betriebsluft-Feuchtigkeit (die bei 65 %) und ständige Raumtemperatur, die bei 20–22 °C liegen sollte.
- Transportieren des Faserguts sollte man in geschlossenen, trockenen und sauberen Transportmitteln, die über einem Schutz gegen Witterungseinflüsse verfügen.
- Lagern muss man sie in trockenen und sauberen Räumen mit einer Temperatur zwischen 5 und 27 °C, die gegen direkte Einwirkung der Sonnenstrahlen geschützt werden müssen.

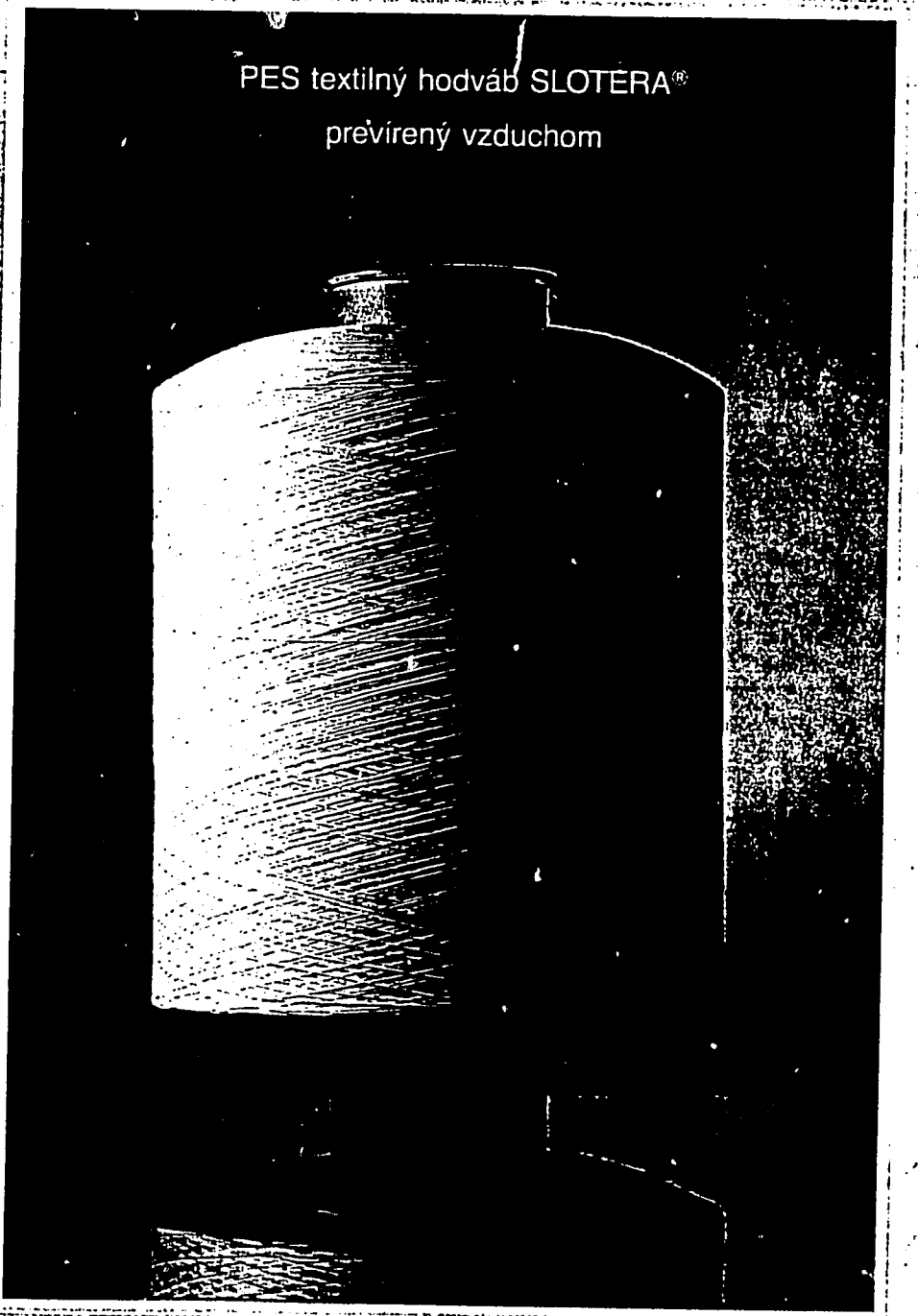
In order to ensure good processability and a high quality of final articles besides technological regulations being in confirmity with each processing method also specific properties of the flat polyester yarn should be taken into account:

- With respect to the fine capillaries care must taken on manipulating the yarn not to cause breakages.
- On manipulating cops care must be taken not to touch filaments with fingers in order to avoid surface layer shifting.
- All the thread quides and braking elements should be without any damage, dirt and the fibre should possibly minimally get in touch with them.
- A very important precondition af succesfull processing is a suitable air humidity (65 % the best) and its constant temperature (20– 22 °C).
- Transportation should be done in closed, dry and clean means of transport provided with protection against weather influences.
- Storage should be carried out in dry and clean spaces with a temperature between 5 and 27 centigrades and protected against immediate effect of sunshine:

Zostavil: Jozef Spačil
Grafická úprava: Ivan Karásek
Foto: Peter Karasek a Milan Brtva
Vydal: Slovenský hodvab Senica n. p. v Nakladateľstve Pravda
Vytlačila: Pravda, TK KSS, tlačiarenské závody Pravda, závod 01

Telegramy: Slovenský hodváb Senica
Telefóny: 2751–7
Ďalekopis: 09123 SLhd c
PSČ: 905 35
ŠBČS pobočka – Senica

Slotera®



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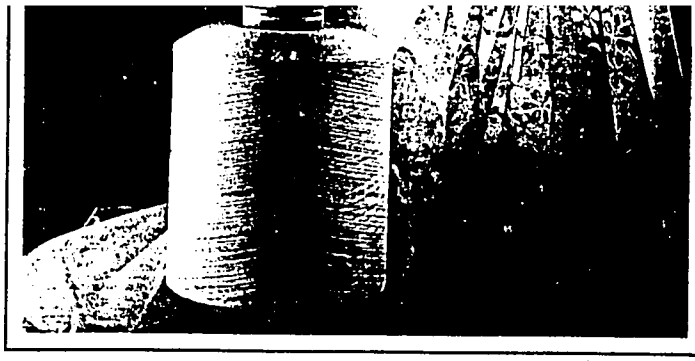
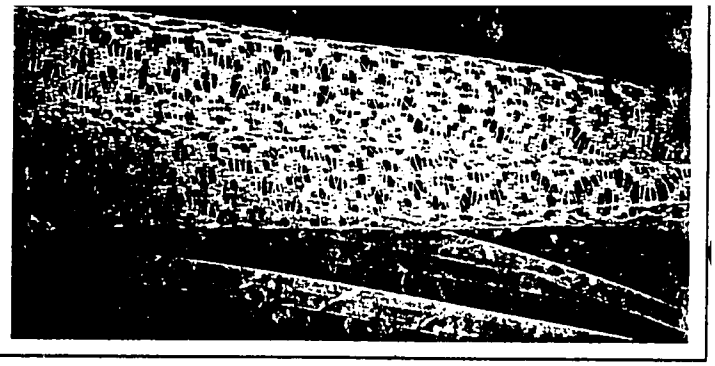




Nové technologické postupy v textilnej výrobe spôsobujú potrebu hľadať nové úpravy vlákna a tým vylepšovať ich vlastnosti. Výroba záclon s novými vzormi vyžaduje si spracovávať i taký PES hodváb u ktorého ani pri prerušovanom odvine sa nepoškodia jednotlivé kapiláry a vlákno má dobrý odvin bez prietrhov. Tieto podmienky spĺňa PES hodváb Slotera® prevírený vzduchom. K výrobe záclon ponúka Slovenský hodváb tento srotiment:

84 dtex f 48×2 PM
150 dtex f 36×2 PM
167 dtex f 36×2 PM

Spôsob dodávky:

a) na valcovej jednoplášťovej papierovej dutinke dĺžky 290 mm, vnútorný ∅ 69 mm, hmotnosť návinu 3000 g s možnosťou jeho zníženia
b) bikónickej plastickej dutinke, dĺžka 230 mm, vnútorný ∅ spodnej časti 72 mm, hmotnosť návinu 900 g

Introducing new technologic processes in the textile industry compels the fiber producer to find adequate new yarn refinements in order to improve the yarn properties or in other words to be able to meet that challenge.
Production of curtains using new fashioned designs needs such polyester filament yarn, that even in condition of interrupted take off maintains the elementary filament undamaged, i. e. without yarn breakage after all. These pretensious conditions are met by air-entanglement of the polyester filament yarn SLOTERA®.
For curtain producers following counts are available in Slovenský hodváb Senica:

84 dtex f 48×2 PM
150 dtex f 36×2 PM
167 dtex f 36×2 PM

The yarn can be supplied packaged as follows:

a) on cylindric single shell paper tubes:
   Length: 290 mm, ID: 69 mm
   Package weight: 3000 grams, with a possibility of reduction if required.
b) on biconic plastic tubes:
   Length: 230 mm
   ID of the lower part 72 mm
   Package weight: 900 grams

Die neuen technologischen Vorgänge in der Textilindustrie haben unter den Faserherstellern den Bedarf ausgelöst nach neue Verfeinerungen zu suchen, die eine Ausbesserung von Fadeneigenschaften darunter vorerst die Festigkeit mitbringen können.
Die Gardinenherstellung mit neuen modernen Mustern braucht solche Polyestergarne zu verarbeiten, die sogar bei unterbrochenem Ablauf keine Filamentschädigungen zulassen und demzufolge der Ablauf ohne einzigen Fadenbruch zustande kommt.
Diese Bedingung wird im Falle des luftverwirbelten Polyestergarns SLOTERA® erfüllt.
Für Gardinenherstellung bietet Slovenský hodváb folgendes Feinheitssortiment an:

84 dtex f 48×2 PM
150 dtex f 36×2 PM
167 dtex f 36×2 PM

Lieferungsform:

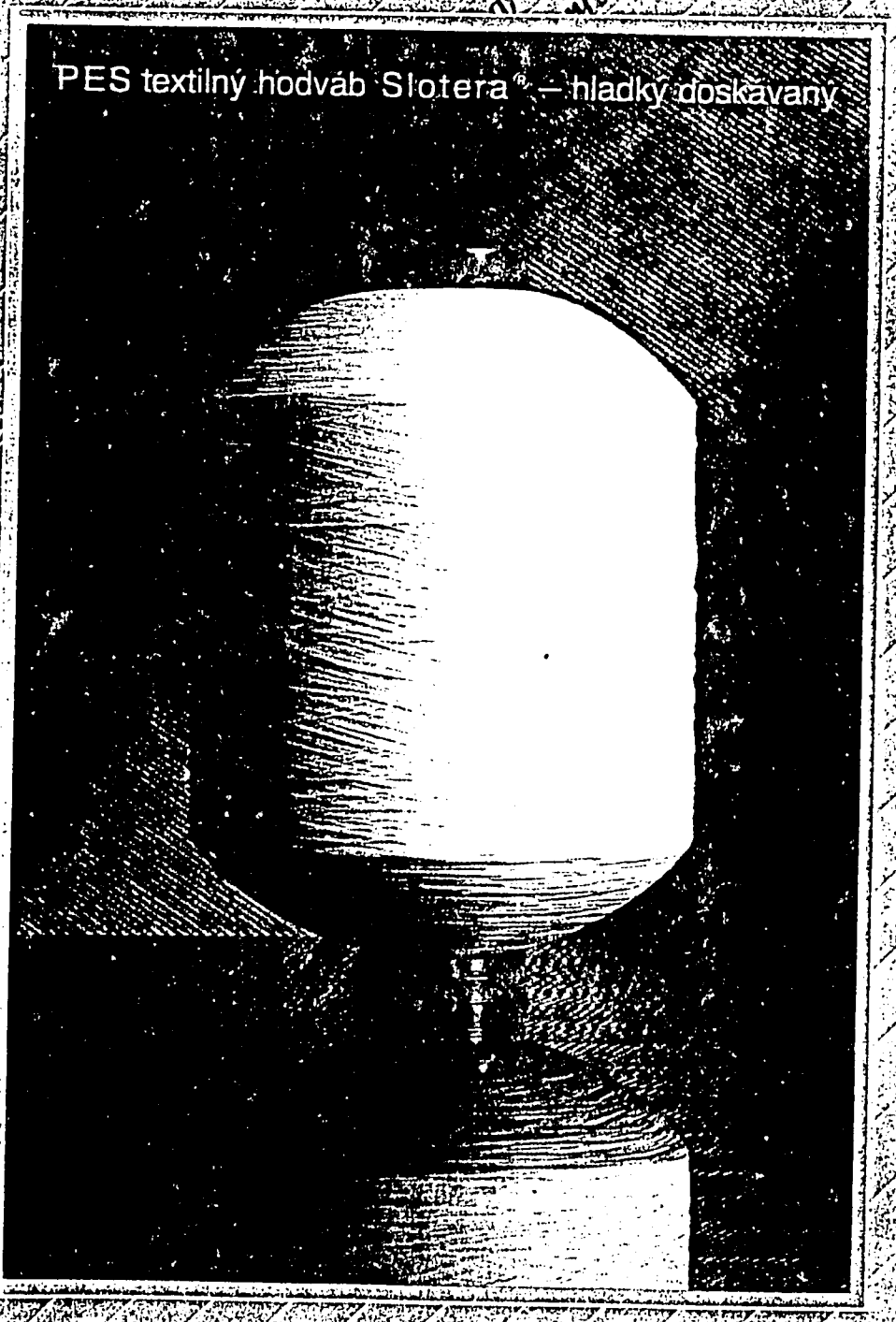
a) auf einem zylindrischen einfachen Mantel-Papierhülse, Länge: 290 mm, Innendurchmesser: 69 mm.
   Wickelgewicht: 3000 g mit einer Reduzierungsmöglichkeit
b) auf einer bikonischen Plasthülse, Länge 230 mm
   Innendurchmesser des Unterteils: 72 mm
   Spulengewicht: 900 g

Новые технологические процессы в текстильной промышленности вынуждают нитепроизводителей искать такие отделки нитей, которые обладают свойствами улучшающими производство. То касается прежде всего отмотки и прочности нити.
Производство занавесок с новыми модерными узорами требует работать с континуальными нитями у которых даже при частых прекрашениях отмотки не повреждаются филаменты в следствие чего нить отматывается гладко без прорывов. Вот такие условия исполняются ПЭ шелком СЛОТЕРА® продуванным воздухом.
Для производства занавесок рекомендует СЛОВЕНСКИЙ ХОДВАБ г. СЕНИЦА нижеуказанный ассортимент:

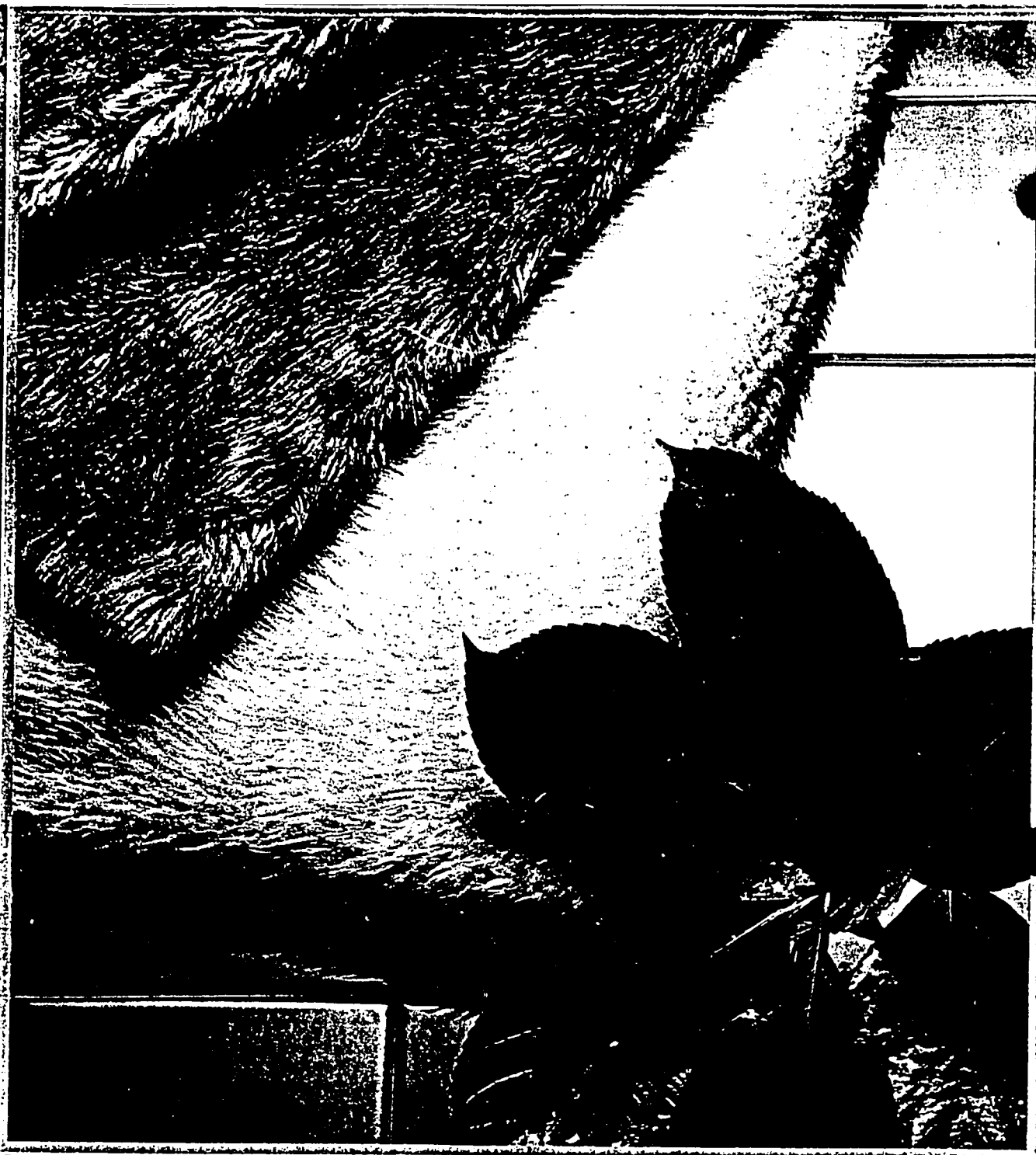
84 дтекс ф 48×2 ПМ
150 дтекс ф 36×2 ПМ
167 дтекс ф 36×2 ПМ

Форма поставки:

а) на цилиндрических одноплащевых бумажных гильзах длиной 290 мм, и внутренним диаметром 69 мм, вес мотка – 3000 граммов с возможностью редукции
б) на биконический пластмассовых гильзах, длиной 230 мм, внутренним диаметром нижней части 72 мм, вес бобины



Slotera®



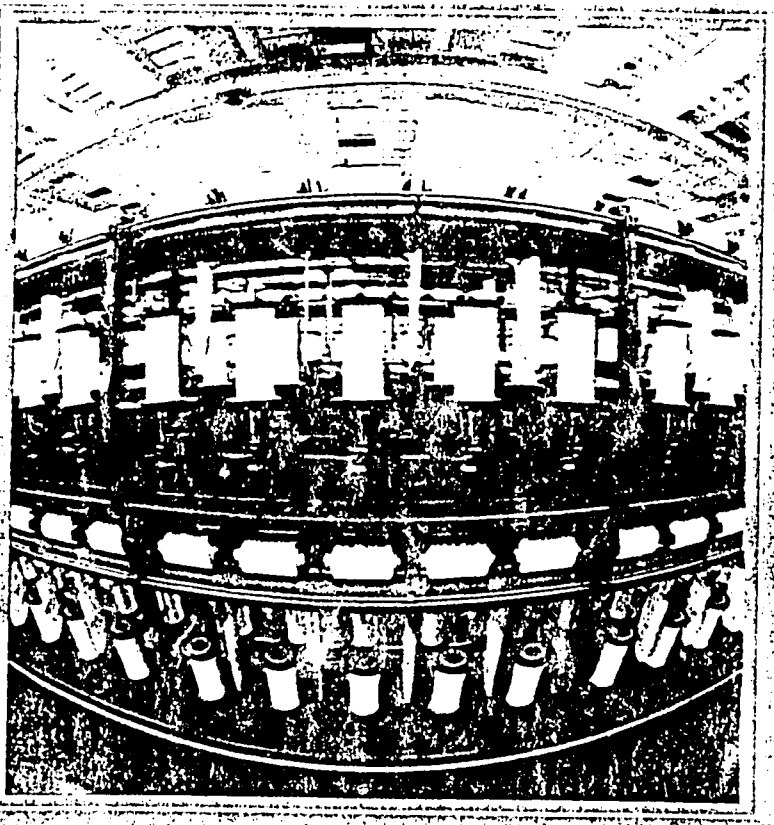
PES textilný hodváb SLOTERA® – hladký doskávaný

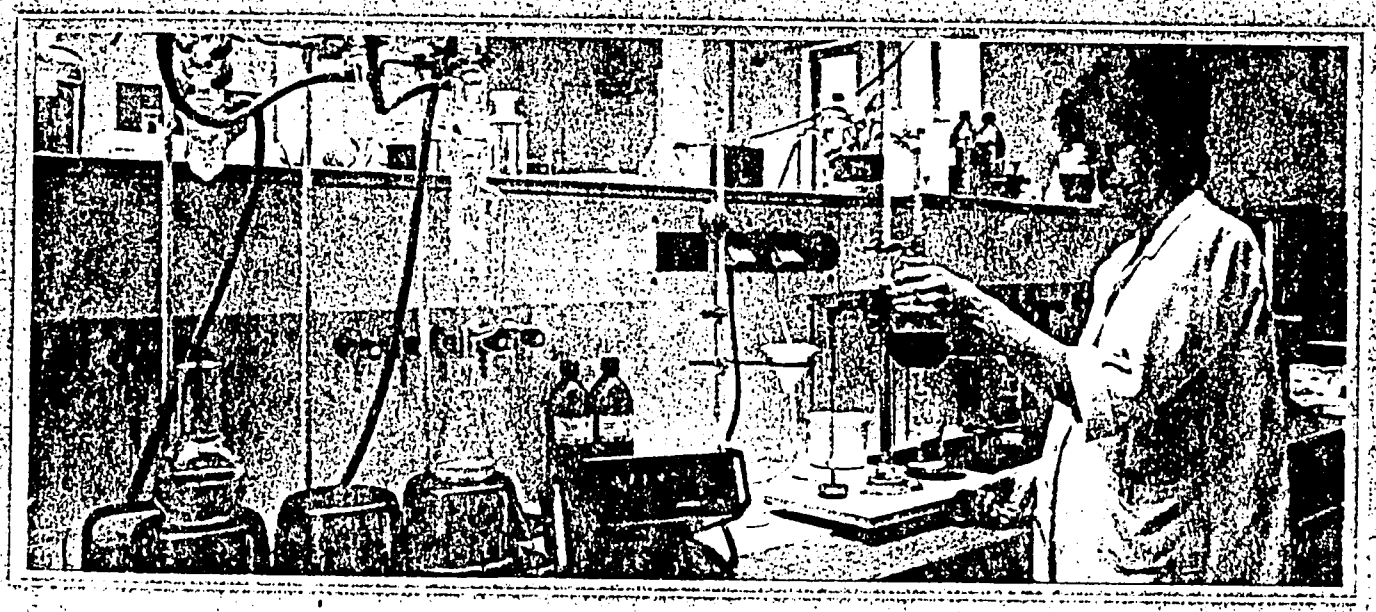
Гладкий полиефирный текстильный шелк SLOTERA® с доскутом

Polyester Filamentgarn SLOTERA® – glatt nachgezwirnt

Polyester Filament Yarn SLOTERA® with additional twist

Pre niektoré spracovateľské technológie je nutné dať hladkému hodvábu zákrut. Vlákno sa musí najprv previnúť, aby sa pripravila vhodná stavba návinu pre proces skania. Potom sa previnuté vlákno otáča na etážových vretenových skacích strojoch Ratti TRN-t-180 za súčasného navíjania na valcovú cievku. Pomer otáčok vretena a navíjacej rýchlosti udáva počet zákrutov na meter. Pri tomto procese sa tvorí špirálový tvar u jednotlivých elementárnych vlákien, pričom vo vlákne pôsobia ohybné a torzné sily, spôsobujúce živosť vlákna. Do 200 z/m sa tieto sily rušia ustaľovaním vlákna. U vyšších zákrutov sa umŕtvovanie torzných síl uskutočňuje tepelným spracovaním (fixáciou) pri teplote 106 °C a vlákno sa zároveň zmrští. V konečnej fáze sa na vonkajšiu vrstvu vlákna nanáša finálna preparácia. Súčasná technológia umožňuje dať hladkému hodvábu 160–900 z/m.





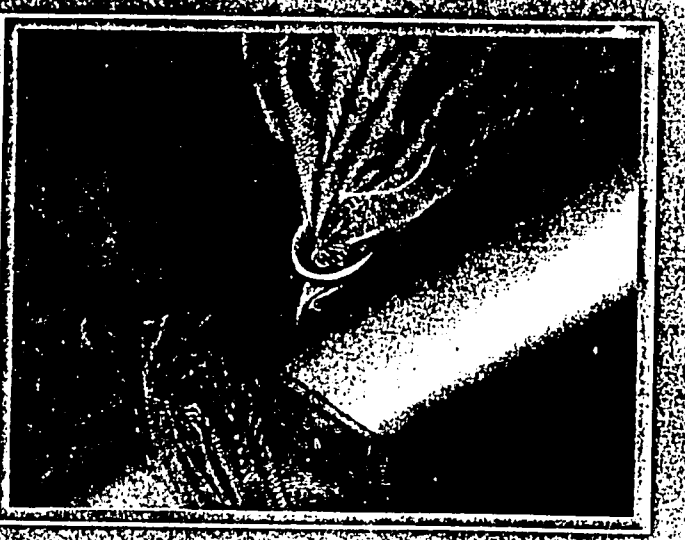
	50/12/300 84/24/400 167/36/300	50/12/900	167/36/160
Ø pevnosť v klim. stave v cN/dtex	3,8	3,8	4,0
Ø ťažnosť v klim. stave v %	28 ± 5	31 ± 5	19 ± 4
Odchýlka od výslednej jemnosti v %	+ 7	+ 8	− 1,5
	+ 14	+ 15	+ 4,5
Zrážanie za varu v %	2	2	6 ± 2
Obsah matovacieho prostriedku v %		0,5 ± 0,05	
Obsah preparácie v % min.	1,4	1,4	0,7
max.	3,8	3,8	1,5

Škvrny a odtiene sú nepripustné

Hmotnosť návinu je u		
	50 dtex f 12 900z	400 – 800 g
	84 dtex f 23 400z	1200–1800 g
	ostatné	1000–1500 g

Predloha: Plastická valcová cievka, dĺžka 197 mm, vnútorný Ø 45 mm

Uvedené hodnoty platia pre I. akosť.



		50/12/300 84/24/400 167/36/300	50/12/900	167/36/160
Ø прочность в кондиционированном состоянии	цН/дтекс	3,8	3,8	4,0
Ø растяжимость в кондиционированном состоянии		28 ± 5	31 ± 5	19 ± 4 %
Отклонение от финальной линеарной плотности		+7 +14	+8 +15	−1,5 % +4,5
Усадка вовремя кипения	%	2	2	6 ± 2
Содержание средства матирования	%		0,5 ± 0,05	
Содержание препарации	% мин.	1,4	1,4	0,7
	% макс.	3,8	3,8	1,5

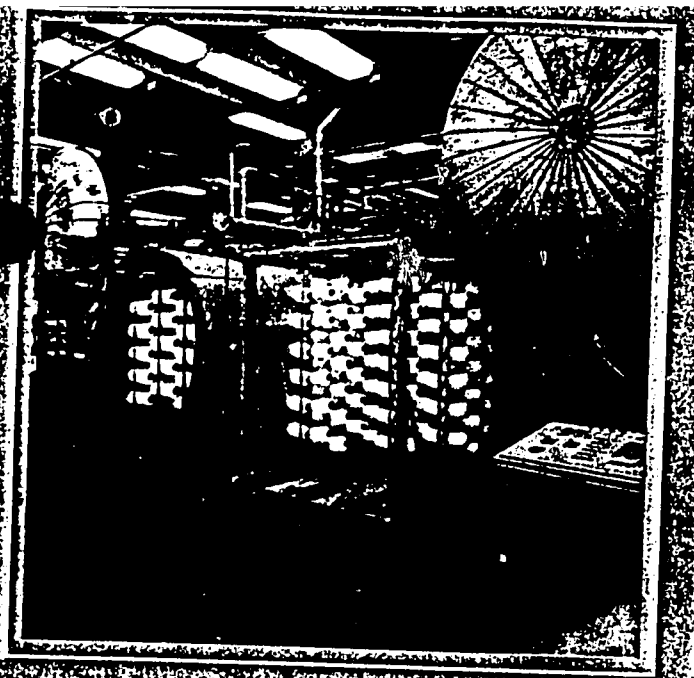
Пятна и оттенки не допустимы.

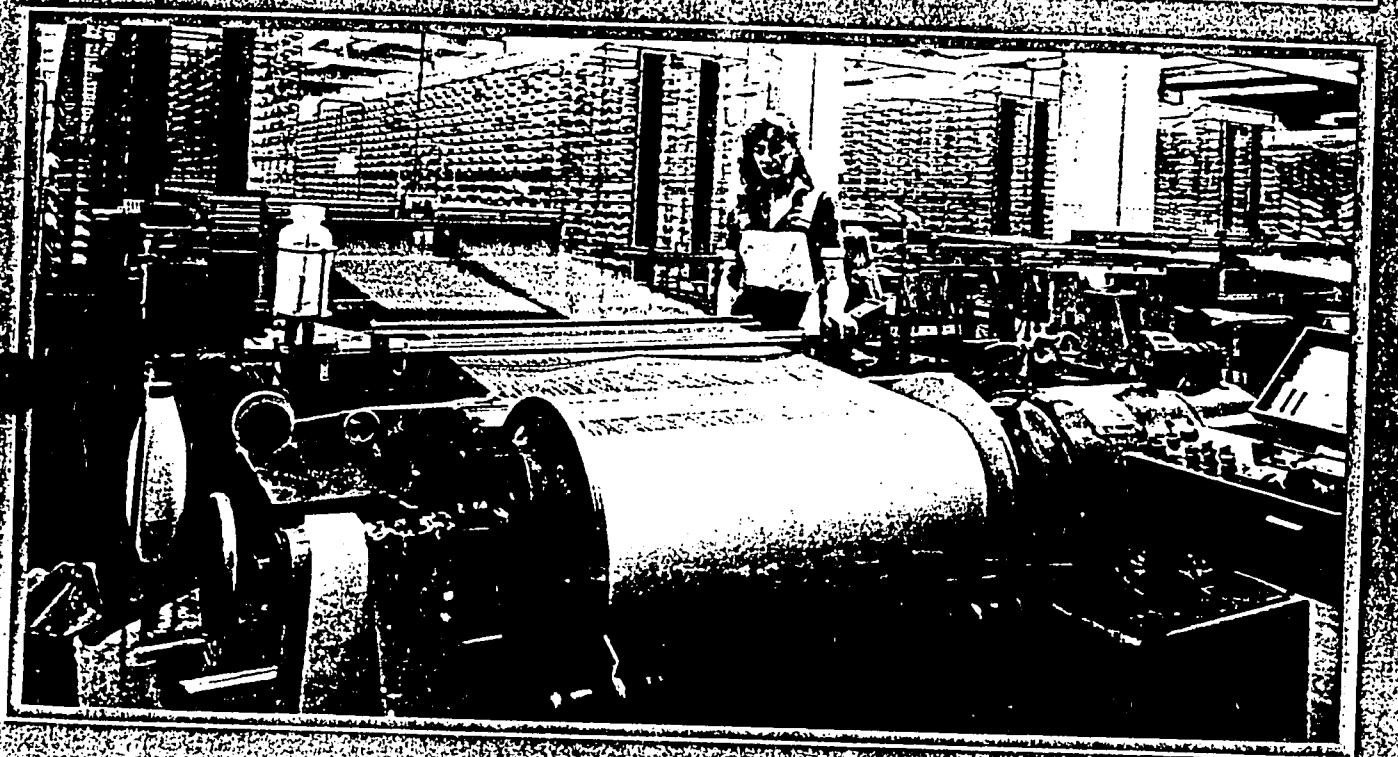
Масса бобины:

50 дтекс ф 12 900з.	400– 800 граммов
84 дтекс ф 23 400з.	1200–1800 граммов
прочие	1000–1500 граммов

Питание: цилиндрическая гильза из пласта, длина 197 мм Ø 45 мм.

Вышеуказанные значения относятся на продукт первого качественного класса.





		50/12/300 84/24/400 167/36/300	50/12/900	167/36/160
Ø Festigkeit in konditioniertem Zustand	in cN/dtex	3,8	3,8	4,0
Ø Dehnung in kond. Zustand	in %	28 ± 5	31 ± 5	19 ± 4
Abweichung vom Endtiter	in %	+7 +14	+8 +15	−1,5 +4,5
Kochschrumpf	in %	2	2	6 ± 2
Mattiermittelgehalt	in %		0,5 ± 0,05	
Präparationsgehalt in %	min.	1,4	1,4	0,7
	max.	3,8	3,8	1,5

cke und Farbabtönungen sind nicht zulässig

Wickelmasse

50 dtex f 12 900D	400– 800 gramm
84 dtex f 23 400D	1200–1800 gramm
sonstige	1000–1500 gramm

Vorlage: auf zylindrischer Hülse, ID = 45 mm, Länge 197 mm

Die angeführten Werte gelten nur für die 1. Qualität.

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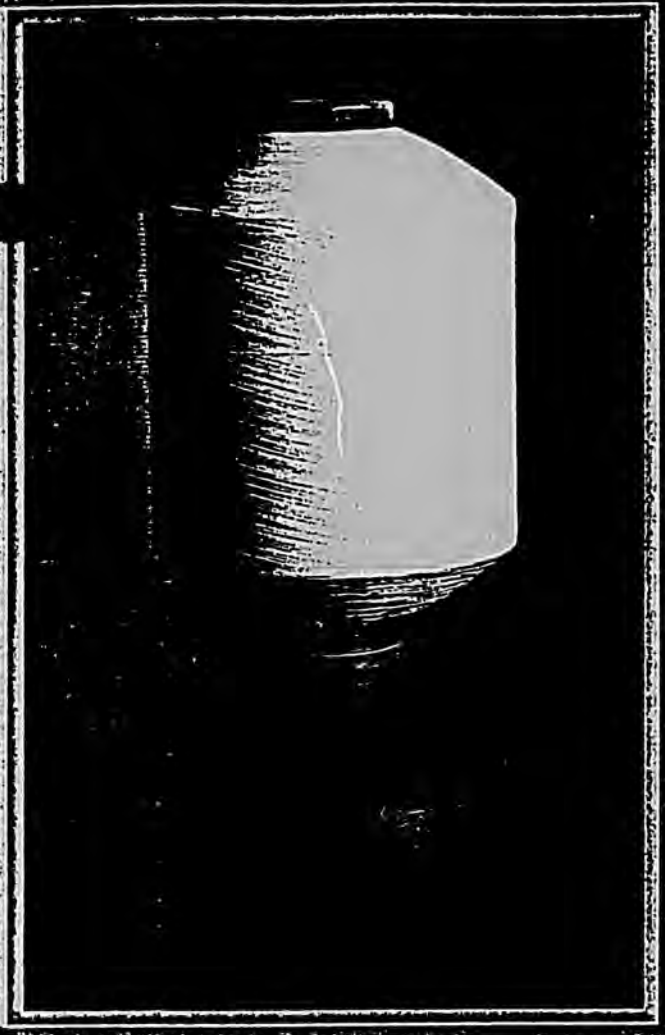
	Unit	50/12/300 84/24/400 167/36/300	50/12/900	167/36/160
Tenacity in conditioned state	cN	3,8	3,8	4,0
Elongation in conditioned state	%	28 ± 5	31 ± 5	19 ± 4
Deviation from the final titre	%	+ 7 + 14	+ 8 + 15	− 1,5 + 4,5
Boiling Shrinkage	%	2	2	6 ± 2
Content of Matting Means	%		0,5 ± 0,05	
Finish Content	min. %	1,4	1,4	0,7
	max. %	3,8	3,8	1,5

Stains and Shades are inadmissible

Weight of Bobbins:	
at 50 dtex f 12 900 T	400– 800 grammes
at 84 dtex f 23 400 T	1200–1800 grammes
other	1000–1500 grammes

Supply: on plastic cylindrical tube, Lenght 197 mm, ID Ø = 45 mm.

The quoted values apply for the first class quality only.



Materiál je vhodný na výrobu záclon, damských šatovlek, ako spevňujúca vložka do posteľnej bielizne, na výrobu plyšov. Uplatnenie nachádza aj pre technické účely, ako opletací prvok pri výrobe káblov.

Pre zabezpečenie dobrej spracovateľnosti hodvábu je nutné dodržiavať niektoré zásady:

- Zvýšenú čistotu pri manipulácii a textilnom spracovaní.
- pred vlastným spracovaním je treba materiál kondicionovať bez ochranných obalov cca 48 hodín.
- materiál treba spracovávať v klimatizovanom prostredí.
- doporučuje sa používať vodice a brzdy zo synterkorundových zliatin, ktoré musia byť hladké a čisté, aby nepríchádzalo k rozvláknenia.
- pri vedení vlákna je potrebné vyhýbať sa ostrým uhlom.
- pri snovaní musia byť snované nite rovnobežné a rovnomerne napnuté.

Материал пригоден для выработки гардин, дамских одежных материалов в виде укрепляющей вставки в постельное белье, а также для выработки плюшов.

Тожат находит аппликацию в технических применениях напр. в виде оплетающего материала при выработке кабля.

Для обеспечения хорошей обратываемости шелка нужно придерживаться некоторых принципов:

- соблюдать экстремную чистоту при манипуляции и текстильной обработке.
- перед собственной обработкой подчинять материал кондиционировке около 48 часов, прежде устранив хранительную упакобку.
- Разработка материала должна происходить в кондиционированной среде.
- Рекомендуется применять нитепроводители и нитетормозы из синтеркорундовых сплавов. Требуется их гладкость и чистота, чтобы вовремя разработки волокна не раскручивались.
- При нитепровожении нужно избегать острых углов.
- Для снования требуется параллельность и равномерная натянутость сновальных нитей.

Das Material eigne sich für Herstellung von Gardinen, Damenkleidungsstoffen, gewebe- und Gestricke, als Verstärkungseinlage in der Bett-Wäsche, für Plüschwarenherstellung. Anwendung findet sie sogar in der elektrotechnischen Industrie als Umstrickelement in der Kabelproduktion.

Um eine gute Verarbeitbarkeit des Garnes zu sichern ist es nötig, einige Grundsätze einzuhalten:

- eine erhöhte Sauberkeit bei der Manipulation und textiler Verarbeitung.
- vor eigentlicher Verarbeitung ist das Material ohne Verpackung cca 48 Stunden zu konditionieren.
- Das Material soll im konditionierten Zustand verarbeitet werden.
- Es werden Fadenführer und Fadenbremsen aus Sinterkorundlegierungen mit glatter und reiner Oberfläche für textile Verarbeitung empfohlen, damit sich keine Zerfaserung ereignet.
- Bei der Fadenführung sollte man scharfe Winkel vermeiden.
- Beim Schären sollen die Fadenscharen parallel laufen und die Fäden gleichmässig gespannt werden.

The material is suitable for making curtains, fabrics for dresses, as reinforcing inlet into bed linen as well as for making plush. But it finds industrial application as well, e.g. for round-knitting of cables.

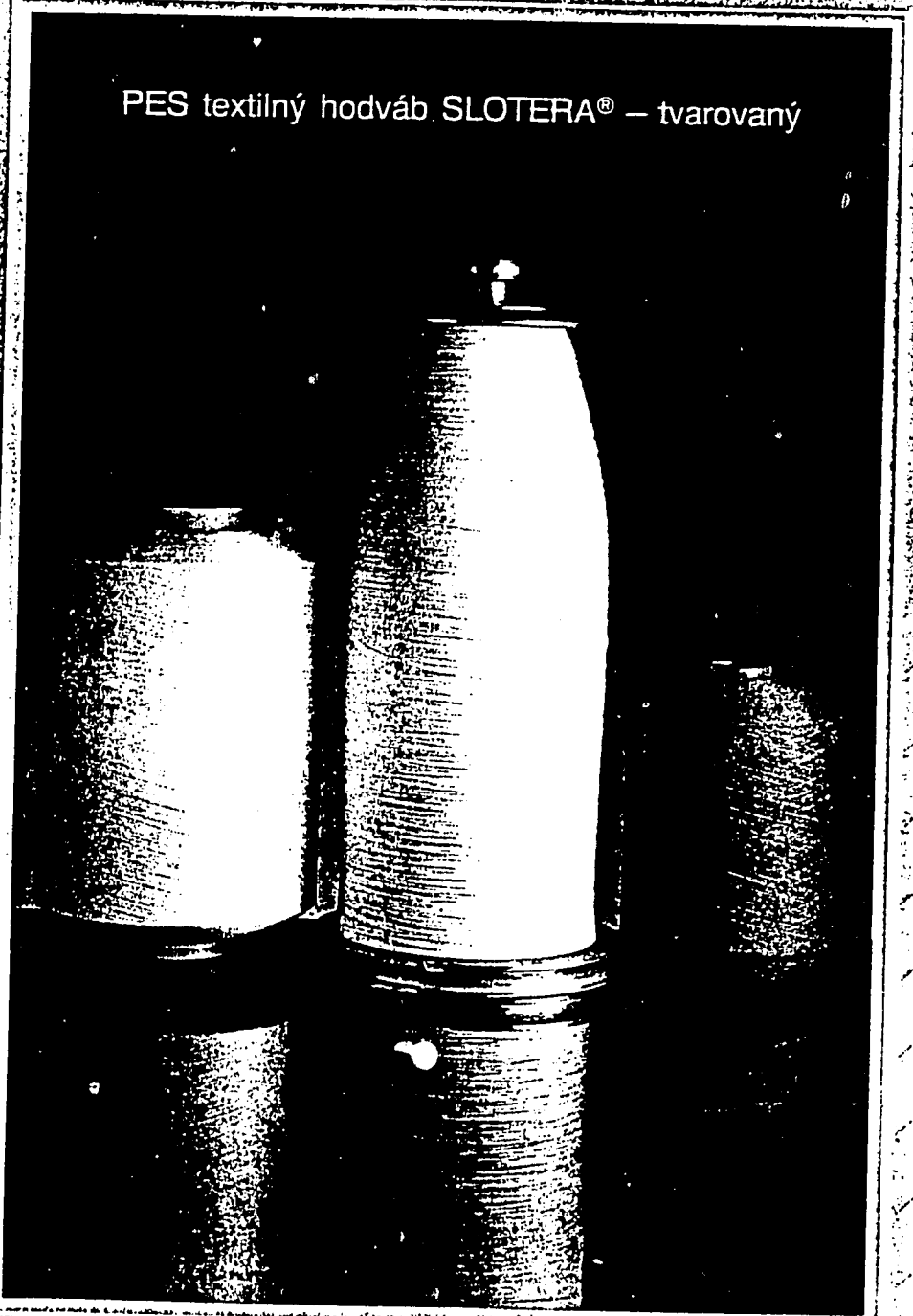
In order to provide good processability for the filament yarn one has to keep to several principles:

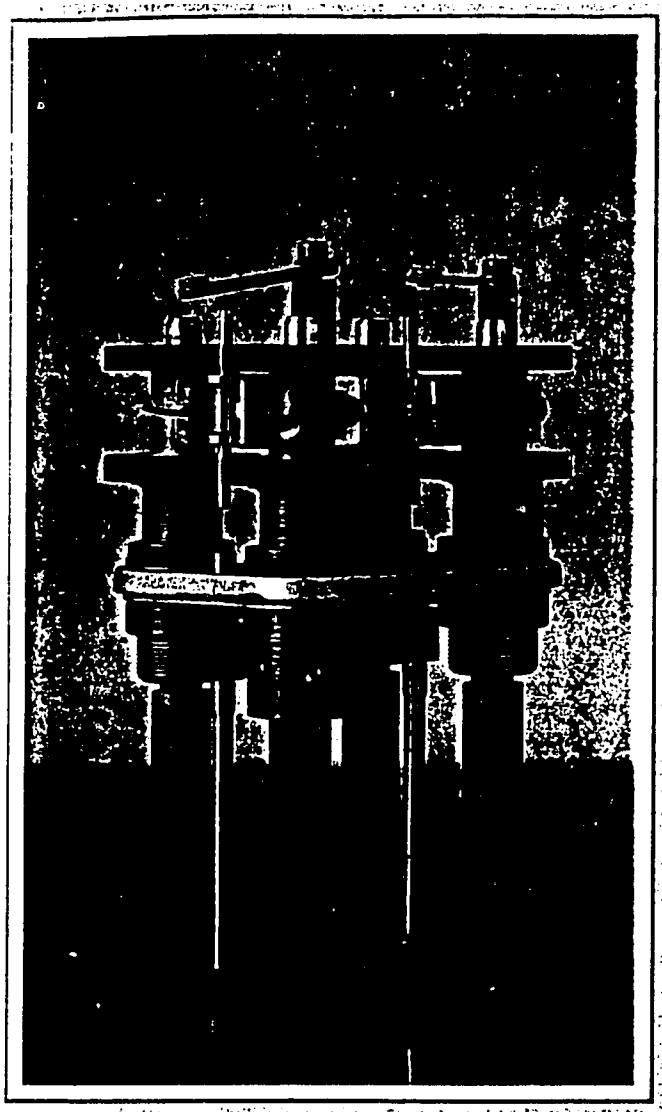
- On manipulating with the cop material and its processing an extreme cleanliness should be maintained.
- Before processing, itself, the material has to be submitted to conditioning (of course unpacked) for about 48 hours.
- During processing the material needs an air conditioned atmosphere too.
- We recommend to apply for quiding as well as braking the thread only out of sintercorundum made threadquides and brakes with highly smooth and clean surfaces. In order to prevent outfraying filaments of the thread.
- Of great importance is to avoid sharp angles in quiding the thread.
- In warping the threads must run parallelly and with equal tension.

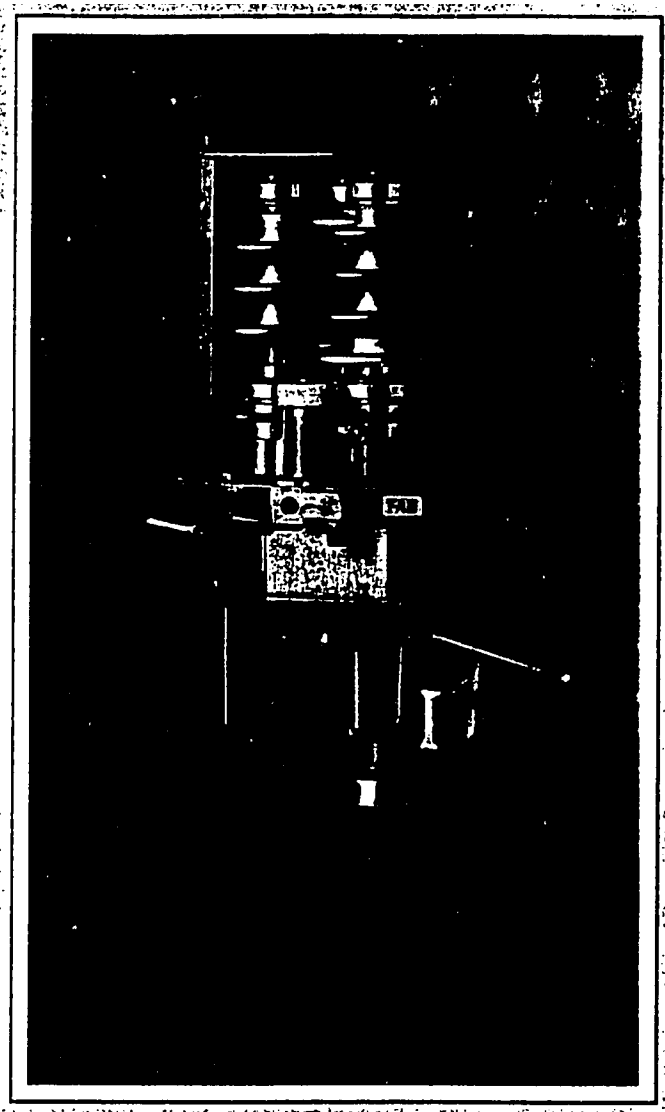
Zostavil: Jozef Spačil
Grafická úprava: Ivan Karasek
Foto: Peter Karasek a Milan Brtva
Vydal: Slovenský hodvab Senica n. p. v Nakladateľstve Pravda
Vytlačila: Pravda, TK KSS, tlačiarenské závody Pravda, závod 01

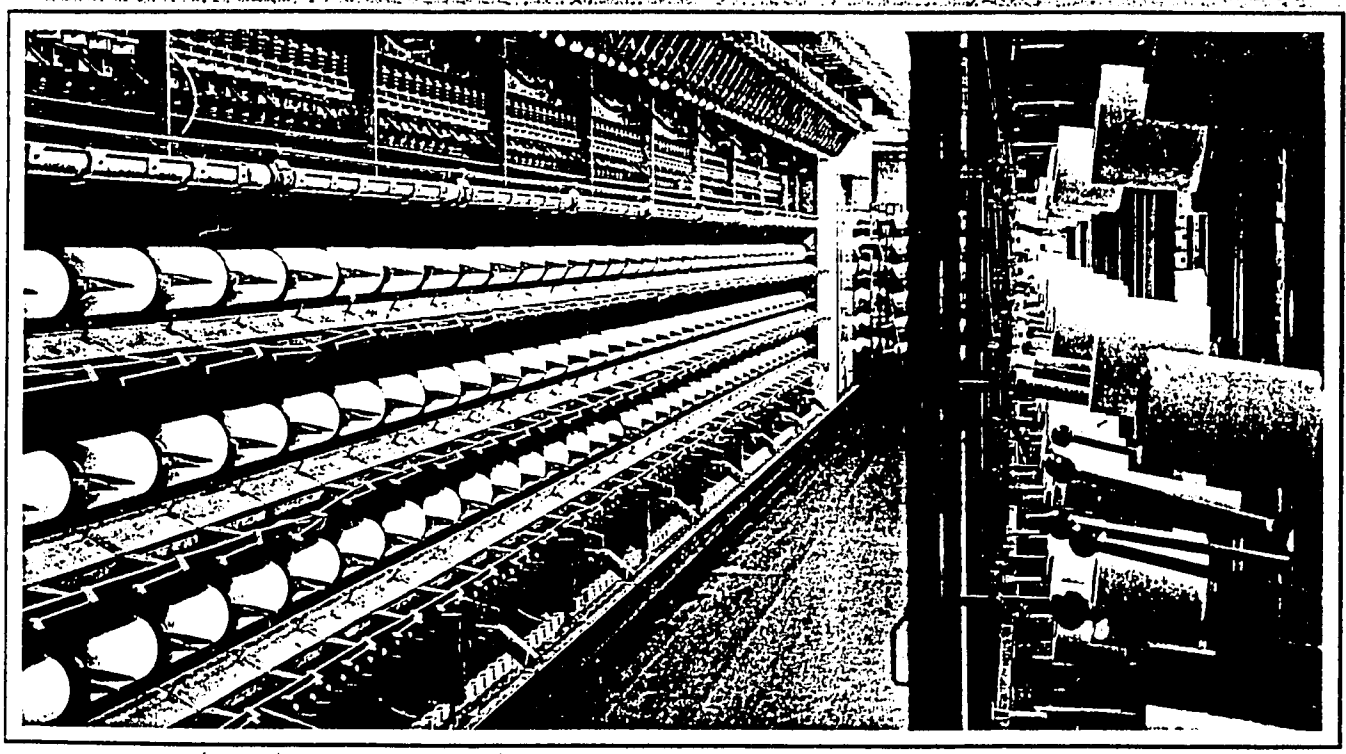
Telegramy: Slovenský hodvab Senica
Telefóny: 2751–7
Ďalekopis: 09123 SLhd c
PSČ: 905 35
ŠBČS pobočka – Senica

Slotera®


PES textilný hodváb SLOTERA® – tvarovaný



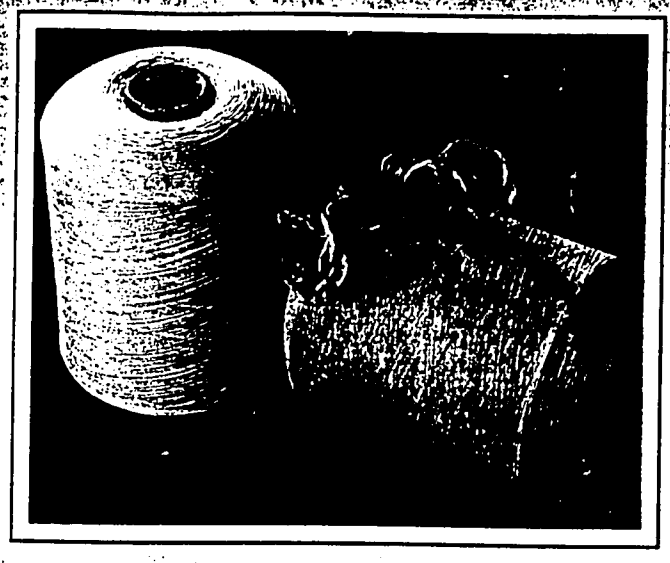




Tvarovanie je úprava vlákna pri ktorom získava vlákno celý rad nových výhodných vlastností. Dochádza tu vlastne k deformácii a k zmene geometrického tvaru vlákna. Vlákno sa zobjemní. Menia sa pri tom fyzikálno-mechanické hodnoty (FMH). Tvarovanie sa uskutočňuje na princípe falošného zákrutu, ktorý je kvalitatívne a ekonomicky najvýhodnejší. PES hodváb SLOTERA® sa tvaruje:

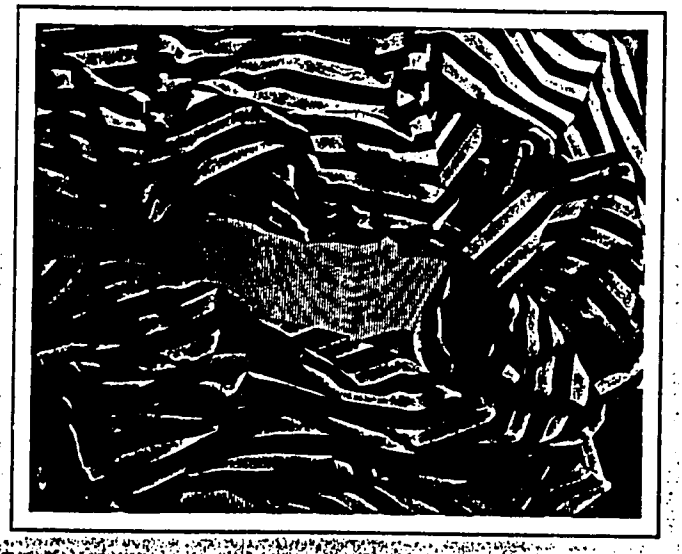
- vretienkovým spôsobom z hladkého vlákna (T4)
- vretienkovým spôsobom z POY vlákna (T4R)
- frikčným spôsobom z POY vlákna (T6)

Dnešný spotrebiteľ požaduje také textilné výrobky, ktoré sa príjemne nosia a ich údržba si nevyžaduje veľa práce. Tieto podmienky spĺňajú výrobky z polyesterového hodvábu predovšetkým z tvarovaného nízkorozťažného. Dominantné postavenie v Československom textilnom priemysle má polyesterový textilný hodváb SLOTERA® vyrábaný v širokom sortimente úprav v Slovenskom hodvábe Senica.

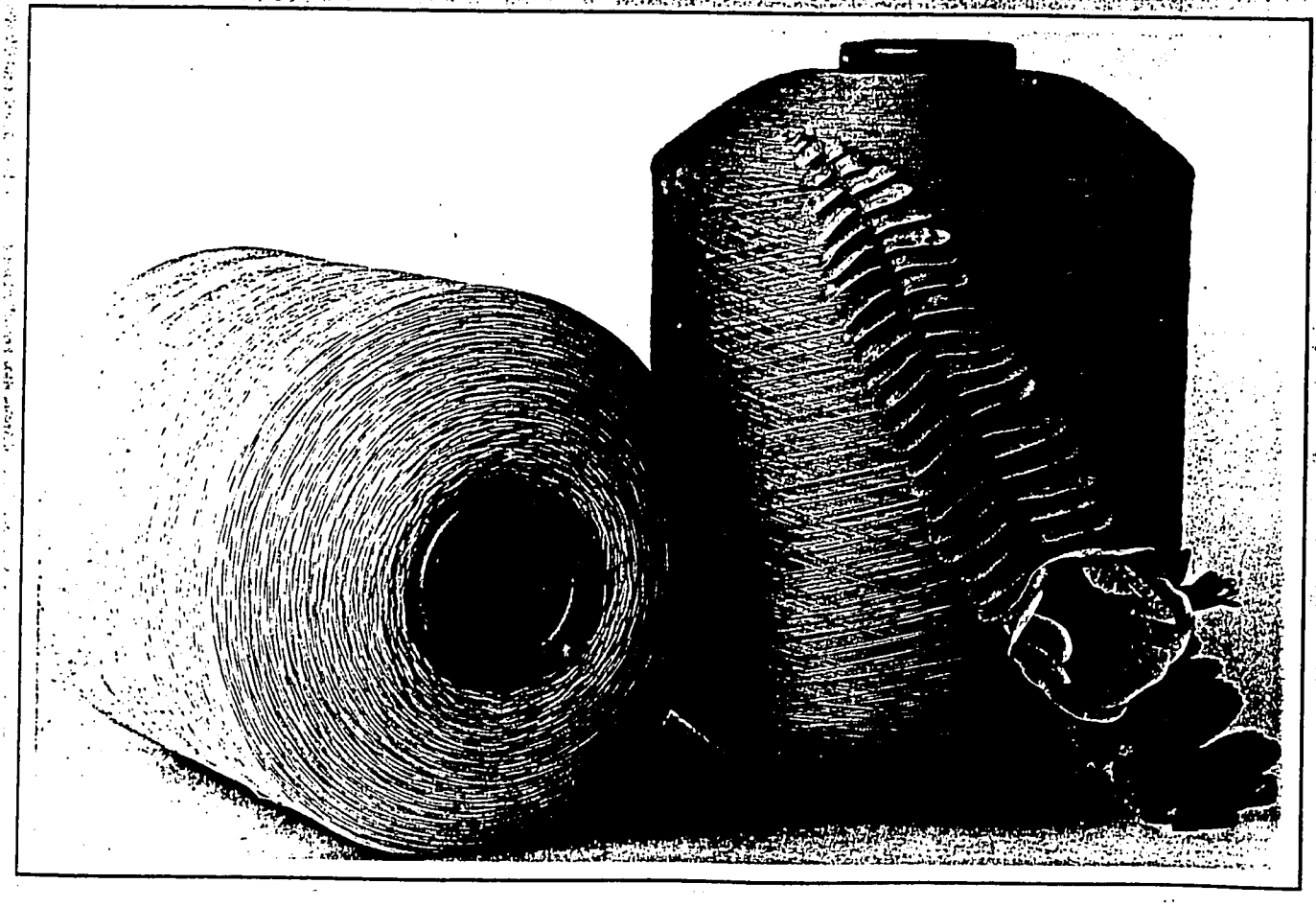


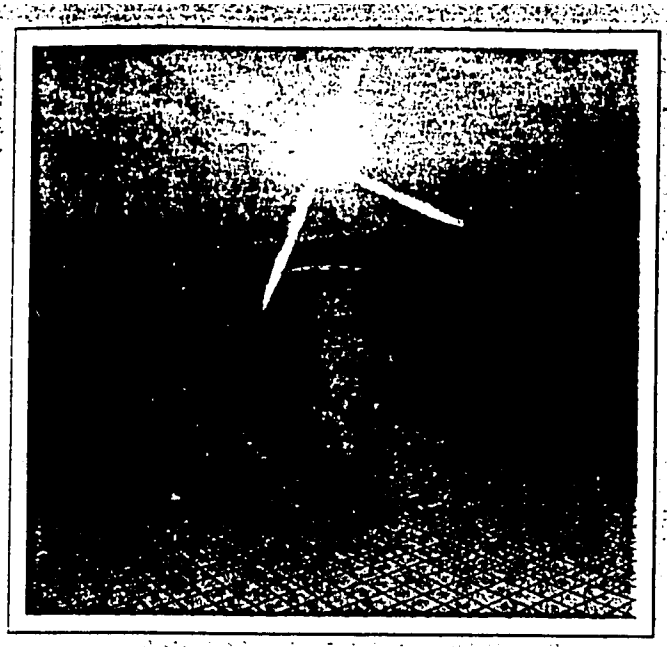
Was der heutige Textilverbraucher fordert von den Textilartikeln ist ein Tregekomfort und eine anspruchslose Pflege. Beide diese Anforderungen werden vornehmlich bei den Artikeln aus Polyester-Textilgarn mit einer niedrigen Dehnbarkeit erfüllt. Unter den gängigen Textilgarnen in der tschechoslowakischen Textilindustrie gehört die führende Position dem Polyestergarn „Slotera®", das in einem weitem Ausrüstungssortiment in dem Slovenský hodváb in Senica hargestellt wird!

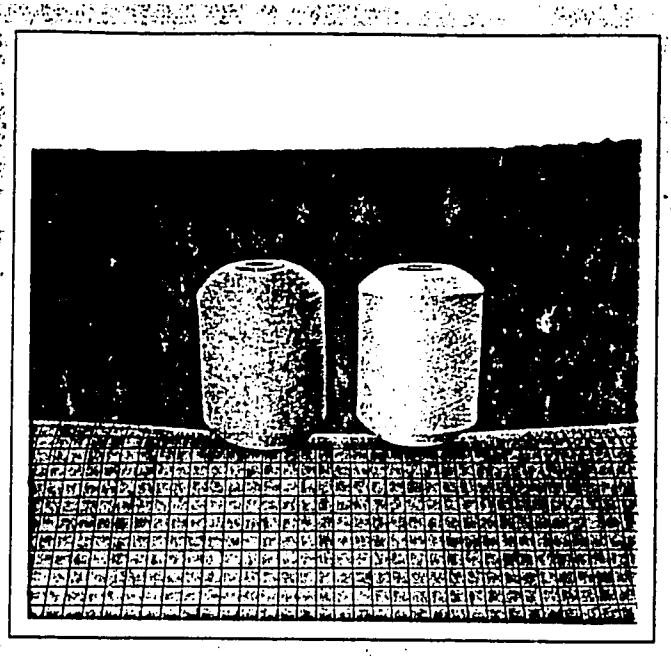
The textile user of today demands from textile articles to possess a comfortable wear and a plain care.
Both these demands are ensured in textile articles particularly made of polyester textile yarn of low elongation. Among the customary textile Yarns in the czechoslovak textile industry the leading position belongs to polyester yarn „Slotera®" produced in the Slovenský hodváb in Senica in a wide range of dressing processes.

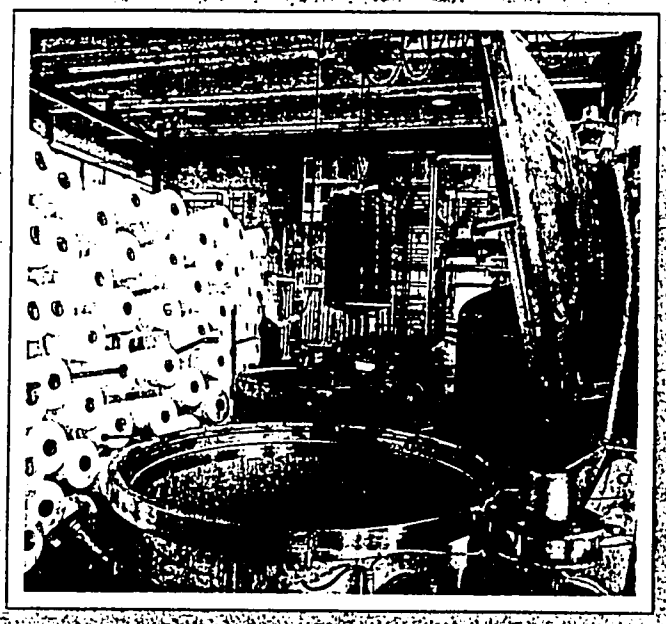


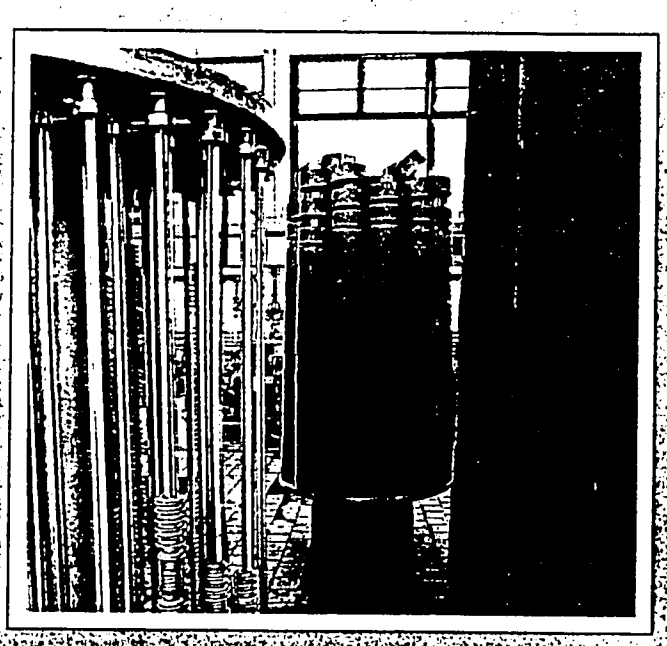
Настоящий потребитель требует от текстильных изделий, чтобы у них была приятная носка и не очень требовательная забота.
Обе эти требования исполняются в текстильных изделиях выработанных именно из полиэфирной текстильной нити с малой растяжимостью. Между ходкими текстильными нитями в чехословацкой текстильной промышленности принадлежит ведущее место полиэфирной нити „СЛОТЕРА®", которую вырабатывает в довольно широком ассортименте отделок Словенский ходваб, г. Сеница.

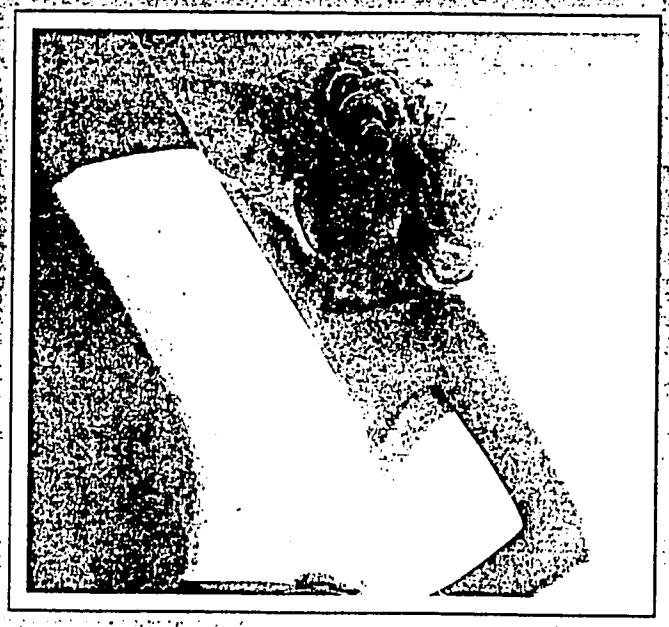








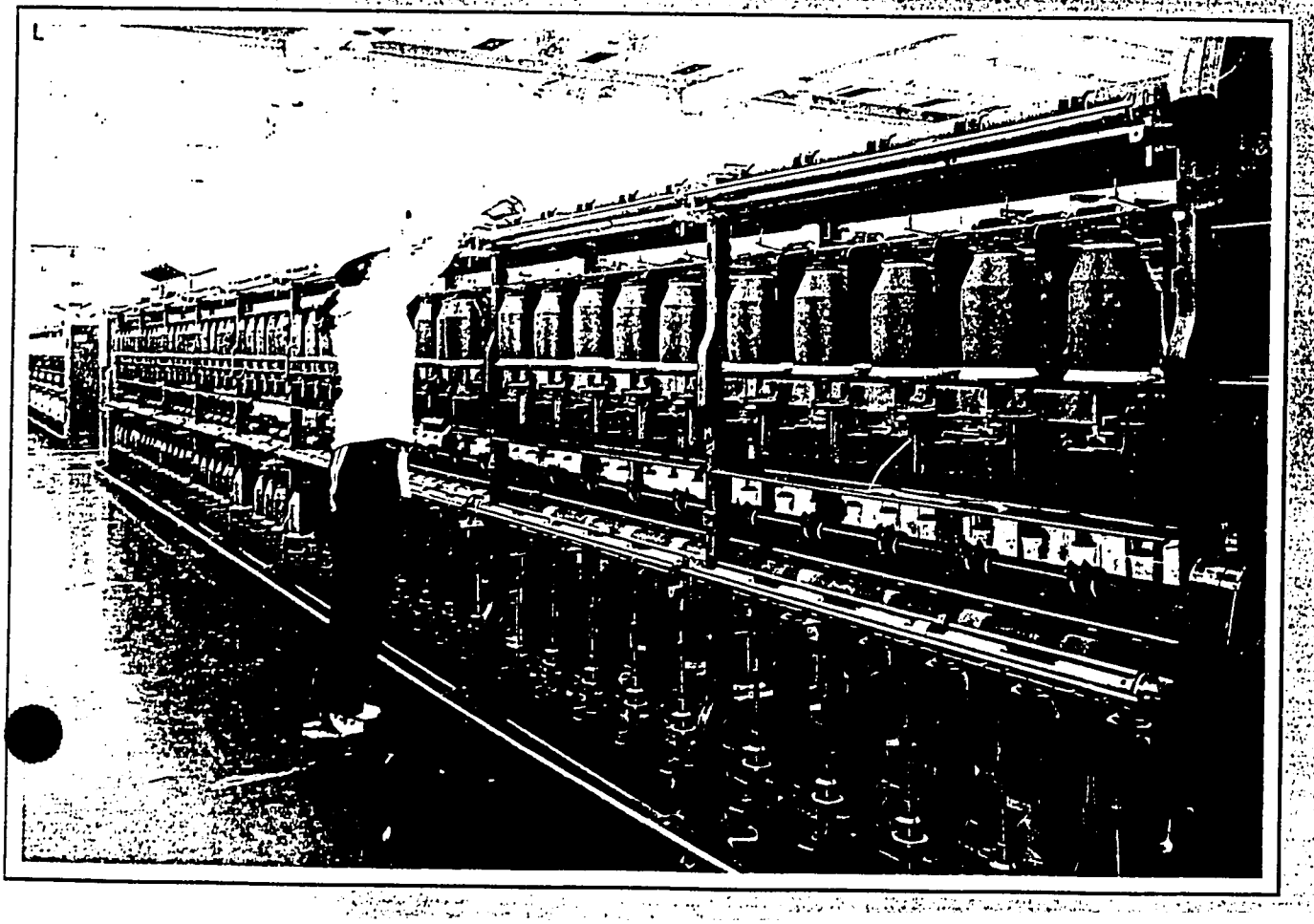




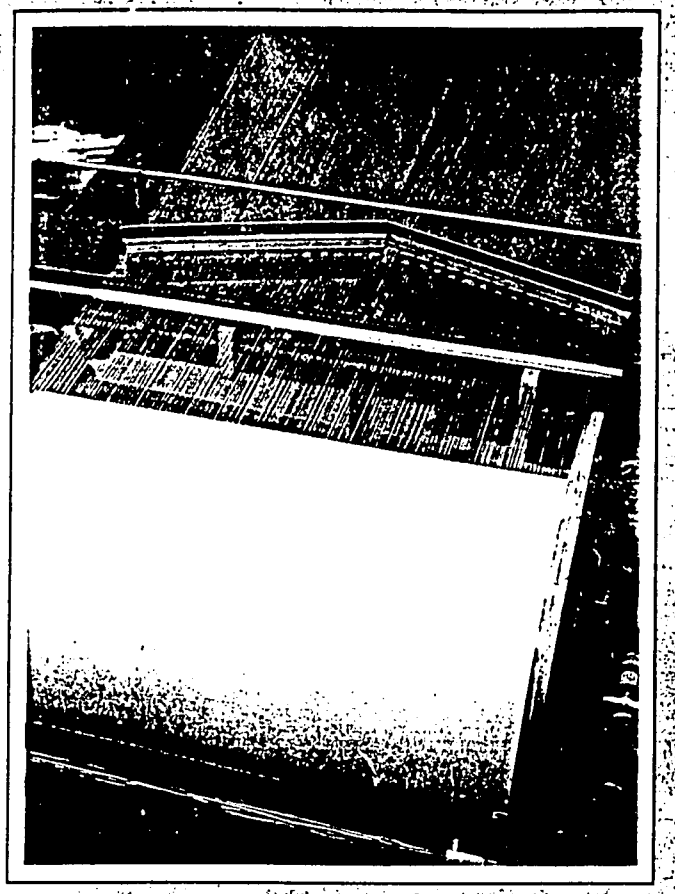
Hodváb má po tvarovaní charakter vysokorozťažného vlákna. Táto vysoká rozťažnosť sa pri zachovaní zobjemnenia potláča tepelnou fixáciou. Časť materiálu sa potom pred konečnou textilnou úpravou farbí. Veľkosť farebnej partie sa pohybuje v rozsahu 260 – 500 kg podľa sortimentu. Vlákno je farebné v širokom rozsahu farebných odtieňov podľa farebnice.

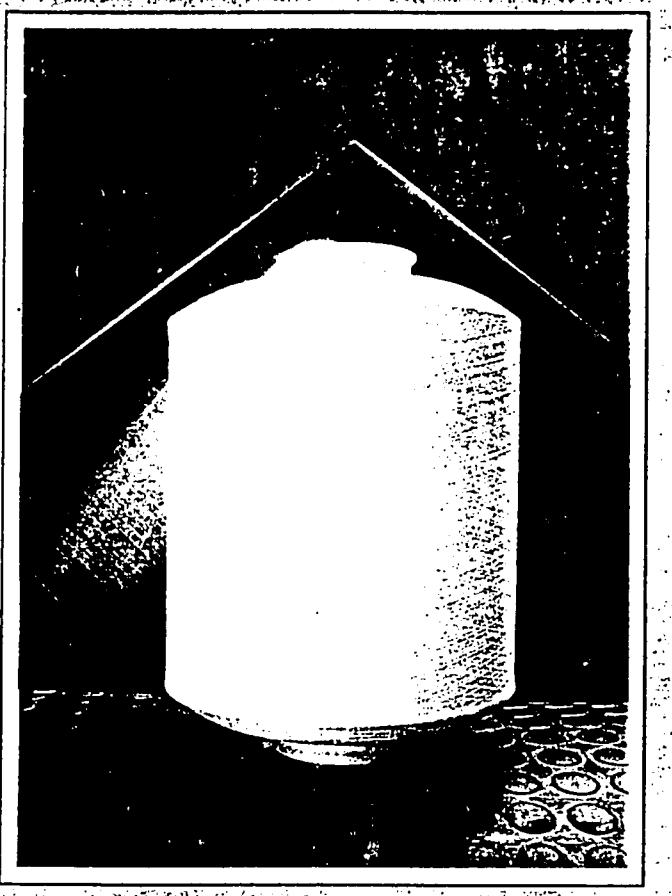
Pri konečných textilných úpravách sa už nemenia FMH vlákna. Ďalšou úpravou získava vlákno len nové funkčné vlastnosti. Jednou z konečných úprav je súkanie. Vlákno sa prevíja na kónické cievky so skosenými čelami bez dodatočného zákrutu.

Inou formou textilnej úpravy je prevíjanie a skanie. Účelom prevíjania je príprava vhodnej stavby návinu pre proces skania. Pri skaní vlákno získava zákrut v smere S, jednotlivé elementárne vlákna priľnú k sebe, čím sa zmenšuje možnosť ich poškodenia. Zákrut sa doskáva na 90 z/m.
Pri obidvoch spôsoboch textilnej úpravy sa v záverečnej fáze úpravy nanáša na vlákno preparácia.

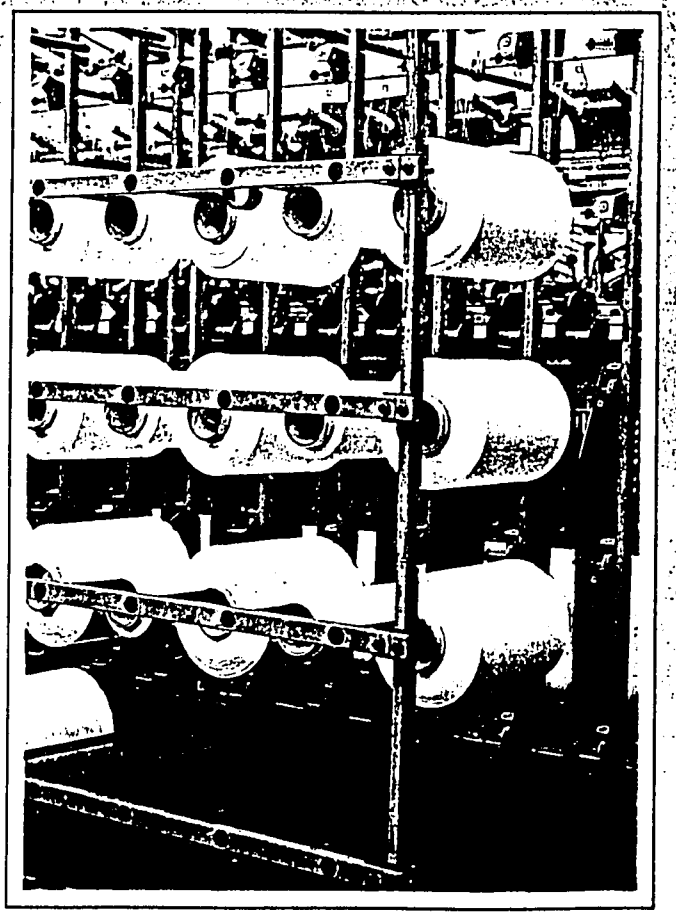


Pre niektoré spôsoby spracovania v textilnom priemysle ešte hodváb snoveme s požadovaným počtom nití. Hodváb snoveme na 30" cievky s maximálnym počtom 800 nití.
Iným spôsobom konečnej úpravy je združovanie na združovaco-skacích strojoch, kde sa viac vláken (max. 8) združuje na 1 cievku za súčasného skania.





Časť materiálu sa tvaruje frikčným spôsobom z POY vlákna. Pri tomto technologickom procese odpadávajú následné textilné úpravy a vlákno získava priamo na stroji konečný tvar návinu i s potrebnými FMH pre spracovanie v textilnom priemysle.



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Vyrábaný sortiment:
Вырабатываемый ассортимент:
Hergestelltes Sortiment:
Assortment produced:

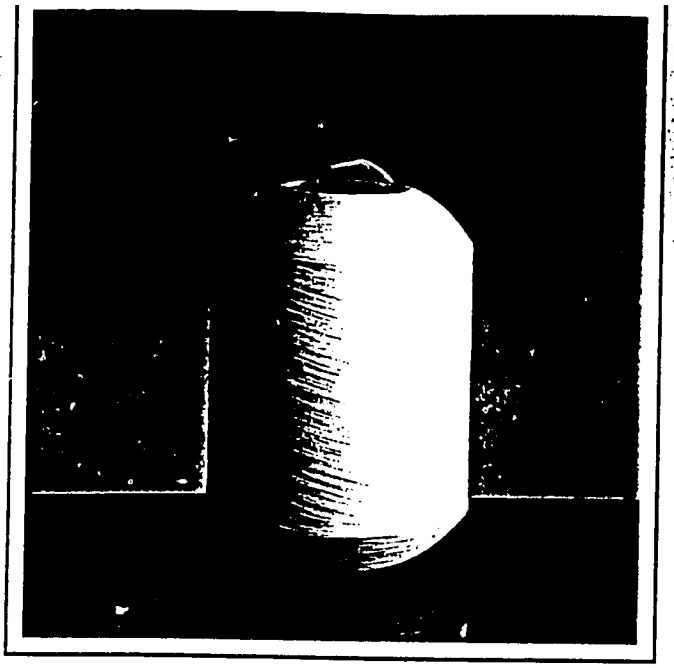
Textilná úprava Вид текстильной отделки Textilausrüstunsart Kind of the textile finishing	Spôsob značenia	d t e x – дтекс									
		50/24 x 1 PM	84/24 x 1 PM	84/48 x 1 PM	110/36 x 1 PM	110/48 x 1 PM	150/36 x 1 MM prof.	150/48 x 1 PM	167/36 x 1 PM	167/36 x 2 PM	200/48 x 2 PM
prevíjanie a skanie Перемотка и скручивание Umwinden und Zwirnen Rewinding and twisting	S 90 C 90				x f		x		s f s	x f s	
tvarovanie frikčné Фрикционное текстурирование Friktionstexturieren Friction Texturing	t0 T6 т0 T6	x	x	x	x f	x			x f s		
skanie Перемотка Umwimden Rewinding	t0 т0						x	x f	x f	x f	x f
združovanie Объединение Fachen Associating	ZDR ЗДР								x f	x f	x f

x – bez farbenia
без крашения
ohne färbung
without dyeing

f – farebný
крашенный
gefärbt
dyed

s – snovaný
снованный
geschärt
warped

		T4		T4R		T6	
		x	f	x	f	x	f
priemerná pevnosť v ťahu Средняя прочность в тяге Durchschnittliche Zugfestigkeit Average tensile strength	cN/dtex цН/дтекс	3,2	3,0	2,8	2,6	2,9	2,8
stupeň skaderenia (KK) Степень петляния (KK) Kräuselungskontraktion (KK) Looping Contraction (CC)	%	20±2	15±2	17±2	16±2	20±2	7±2



S 90
Stavba návinu: valcový so skosenými čelami
Hmotnosť návinu: max. 900 g
Predloha: jednoplášťová, valcová plastická dutinka, dĺžka 197 mm, vnútorný Ø spodnej časti 45 mm

C 90
Структура намотки: цилиндрическая с косыми лицами
Масса намотки: максимально 900 г
Орудие приема: одноплащевая цилиндическая пластмассовая гильза, длина 197 мм, внутренний диаметр нижней части 45 мм

Wickelaufbau: zylindrisch mit abgeschrägten Stirnen
Wickelgewicht: max 900 g
Vorlage: zylindrische Einmantelhülse aus Kunststoff, Länge 197 mm, ID des Unterteils 45 mm.

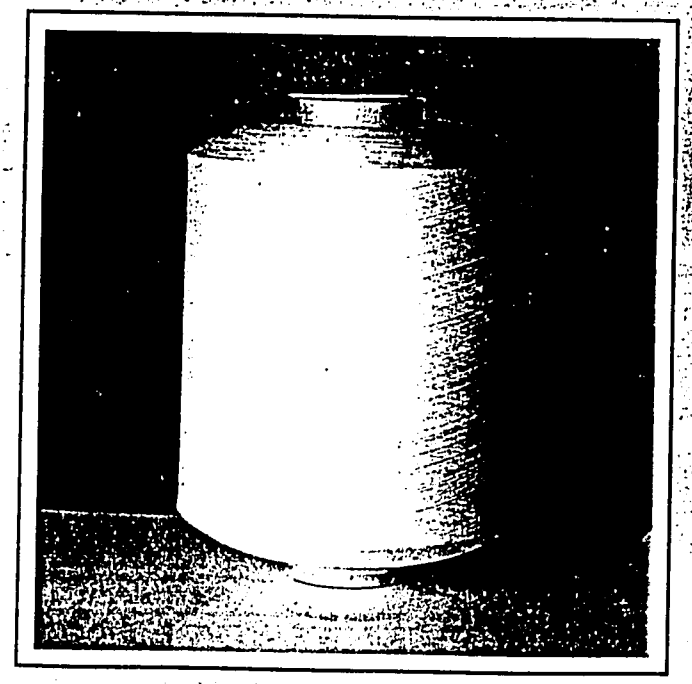
S 90
Form of the package: cylindric with bevelled faces
Weight of the package: maximum 900 g
Receiver: cylindric singlemantled plastic tube, length 197 mm, ID of the lower part 45 mm

t0
Stavba návinu: kónický so skosenými čelami
Hmotnosť návinu: max. 900 g
Predloha: kónická plastická dutinka, dĺžka 230 mm, vnútorný Ø spodnej časti 72 mm

т0
Структура намотки: коническая с косыми лицами
Масса намотки: максимально 900 г
Орудие приема: коническая, пластмассовая гильза, длина 230 мм, внутренний диаметр нижен части 72 мм

t0
Wickelaufbau: konisch mit abgeschrägten Stirnen
Wickelgewicht: max. 900 g
Vorlage: konische Kunstoffhülse, Länge 230 mm, ID des Unterteils 72 mm

t0
Form of the package: conic with bevelled faces
Weight of the package: maximum 900 g
Receiver: conic plastic tube, length 230 mm, ID of the lower part 72 mm



t0 T6
Stavba návinu: valcový so skosenými čelami
Hmotnosť návinu: max. 3250 g
Predloha: valcová jednoplášťová papierová dutinka, dĺžka 290 mm, vnútorný Ø spodnej časti 69 mm

т0 Т6
Структура намотки: цилиндрическая с косыми лицами
Масса намоткы: максимально 3250 г
Орудие примера: цилиндрическая одноплащевая бумажная гульза, длина: 290 мм, внутренний диаметр нужней части 69 мм

t0 T6
Wickelaufbau: zylindrisch mit abgeschrägten Stirnen
Wickelgewicht: max. 3250 g
Vorlage: zylindische Einmantelpapierhülse, Länge 290 mm, ID des Unterteils 69 mm.

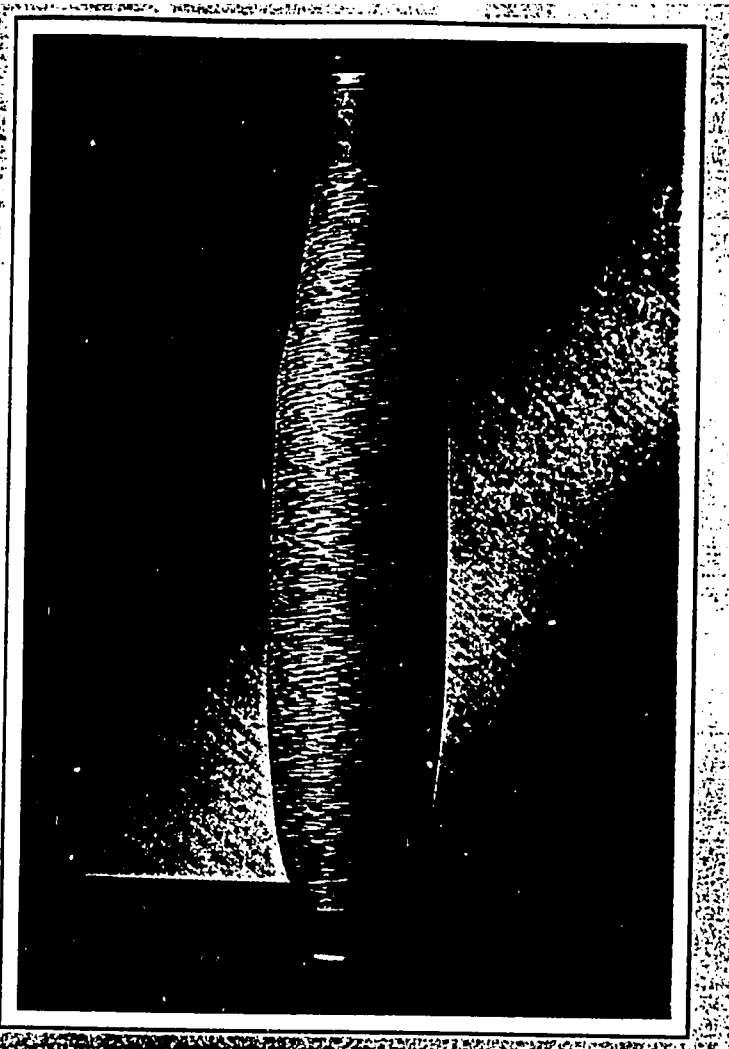
t0 T6
Form of the package: cylindric with bevelled faces
Weight of the package: maximum 3250 g
Receiver: cylindric singlemantled paper tube, length 290 mm, ID of the lower part 69 mm

ZDR
Hmotnosť návinu: max. 1200 g
Počet združovaných nití: max. 4
Predloha: kops Barmag, dĺžka 420 mm, priemer 50 mm

ЗДР
Масса намотки: максимально 1200 г
Количество объединяемых нитей: максимально 4
Орудие примера: копс Бармага, длина 420 мм, диаметр: 50 мм.

ZDR
Wickelgewicht: max. 1200 g
Anzahl von zum Fachen kommenden Fäden: max. 4
Vorlage: Barmag-Kops, Länge 420 mm, Ø = 50 mm

ZDR
Weight of the package: max. 1200 g
Number of threads being associated: max. 4
Receiver: Barmag cops, length 420 mm, Ø = 50 mm

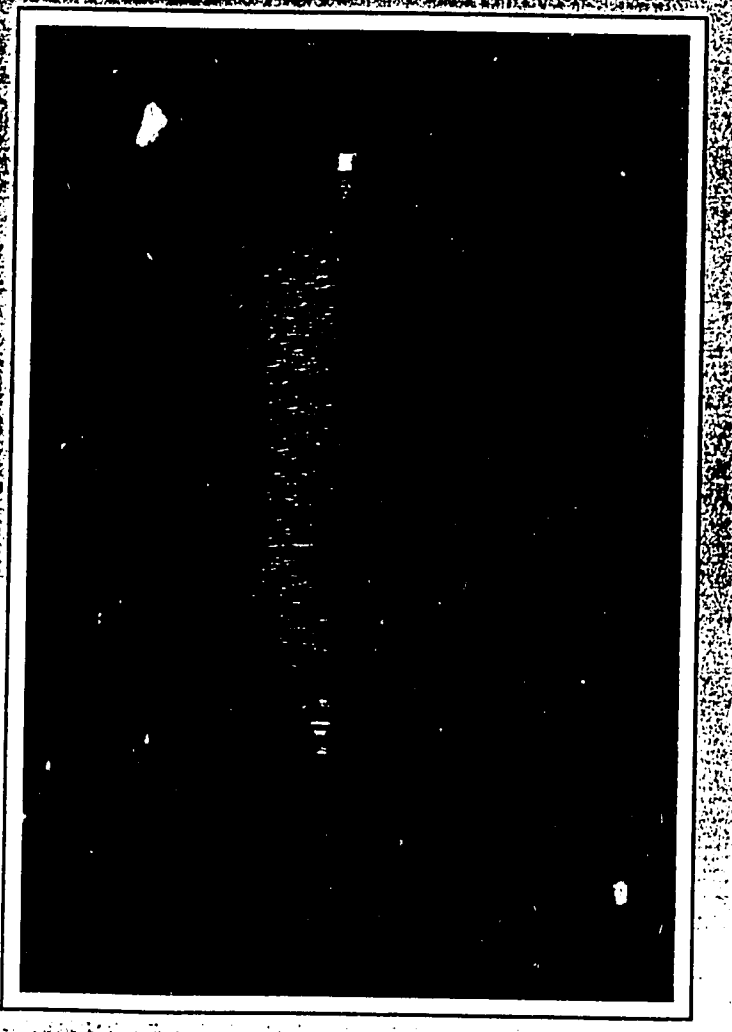


Hmotnosť návinu: max. 1200 g
Počet združovaných nití: max. 4
Predloha: kónická plastická dutinka, dĺžka 230 mm, vnútorný Ø spodnej časti 72 mm

Масса намотки: максимально 1200 г
Количество объединяемых нитей: наксимально 4
Орудие приема: коническая пластмассовая гильза, длина: 230 мм, внутренний диаметр нижней части 72 мм

Wickelgewicht: max. 1200 g
Anzahl von zum Fachen kommenden Fäden: max. 4
Vorlage: konische Kunststoffhülse, Länge 230 mm, ID des Unterteils 72 mm

Weight of the package: max. 1200 g
Number of threads being associated: max. 4
Receiver: conic plastic tube, length 230 mm, ID of the lower part = 72 mm

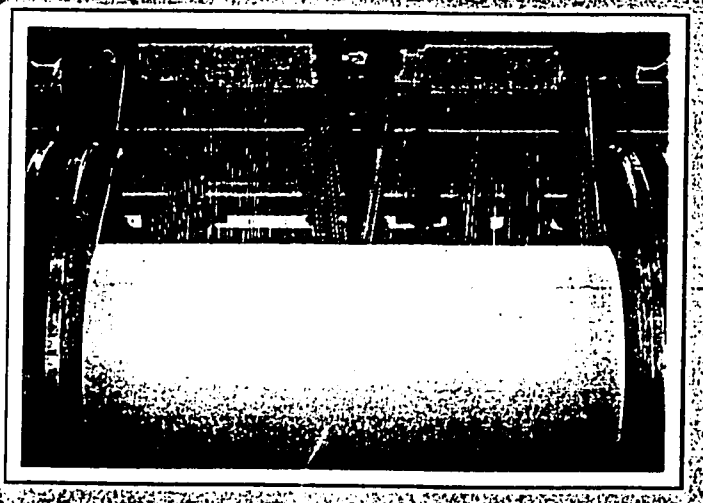


Hmotnosť návinu: max. 4000 g
Počet združovaných nití: max. 8
Predloha: hliníková fľašková cievka, výška 457 mm, horná príruba Ø 140 mm, spodná príruba Ø 204 mm, vnútorná vzdialenosť prírub 390 mm.

Масса намотки: максимально 4000 г
Количество объединяемых нитей: максимально 8
Орудие приема: Алуминиевая бутылькообразная бобина, высота 457 мм
Верхний фланц: диаметр 140 мм
Нижний Фланц: диаметр 240 мм
Вбутреннее расстояние Фланцов 390 мм.

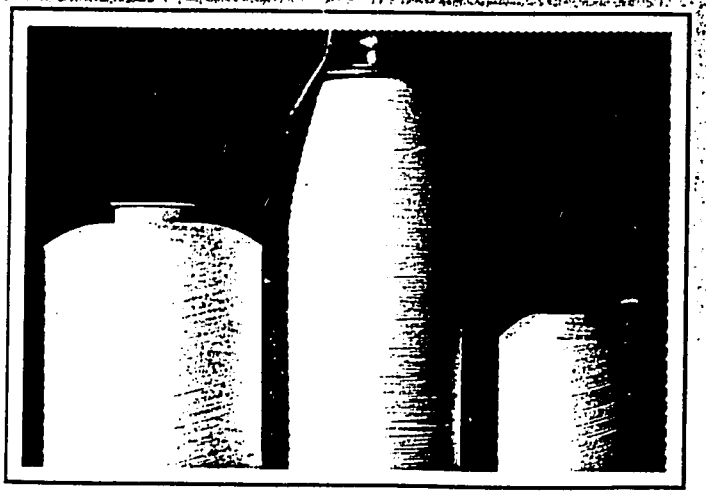
Wickelgewicht: max. 4000 g
Anzahl von zum Fachen kommenden Fäden: max. 8
Vorlage: Aluminium Flaschenspule, Höhe 457 mm
Oberflansch Ø = 140 mm, Unterflansch Ø = 204 mm,
Innenabstand zwischen den Flanschen 390 mm.

Weight of the package: max. 4000 g
Number of threads being associated: max. 8
Receiver: aluminium bottle spool, Height 457 mm
Upper flange Ø 140 mm, lower flange Ø 204 mm,
Inner distance between the flanges 390 mm



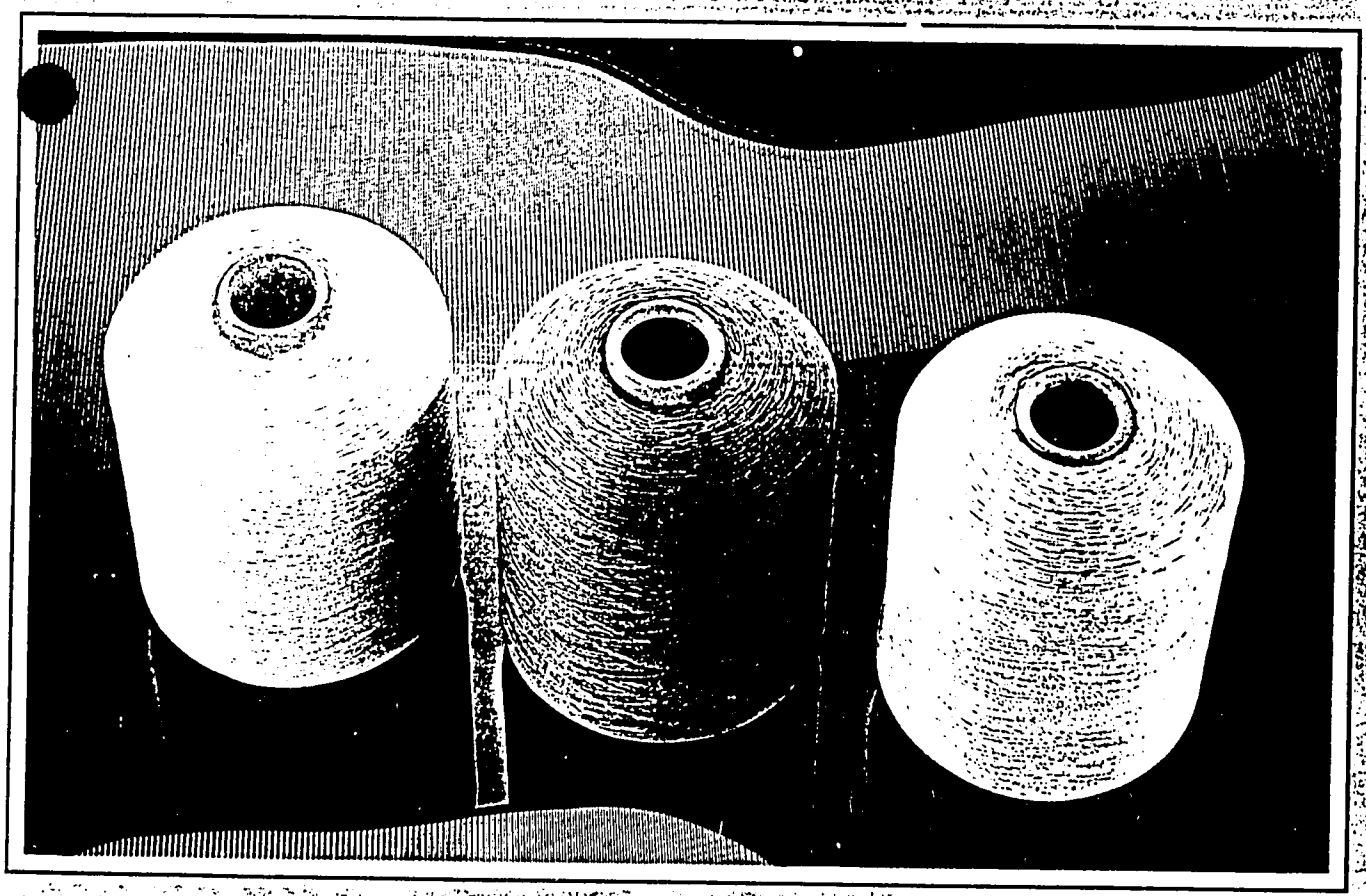
OV
Hmotnosť návinu: max. 55 kg
Predloha: 30" osnovaný val, dĺžky 710 mm
šírka snovania 640 mm
Ø kotúčov 535 mm
Ø vrtania dutinky 70 mm

OB
Масса намотки: мащ. 55 кг
Орудие пирема: Навой – шириной с 30Є, длина: 710 мм
сирина снования 640 мм
диаметр дисков 535 мм
внутренний диаметр гильзы 79 ММ: 70 мм



OV
Wickelgewicht: max. 55 kg
Vorlage: Kettenbaum 30", Länge 710 mm
Schärweite 640 mm
Scheibendurchmesser 535 mm
Innendurchm. der Hülse 70 mm

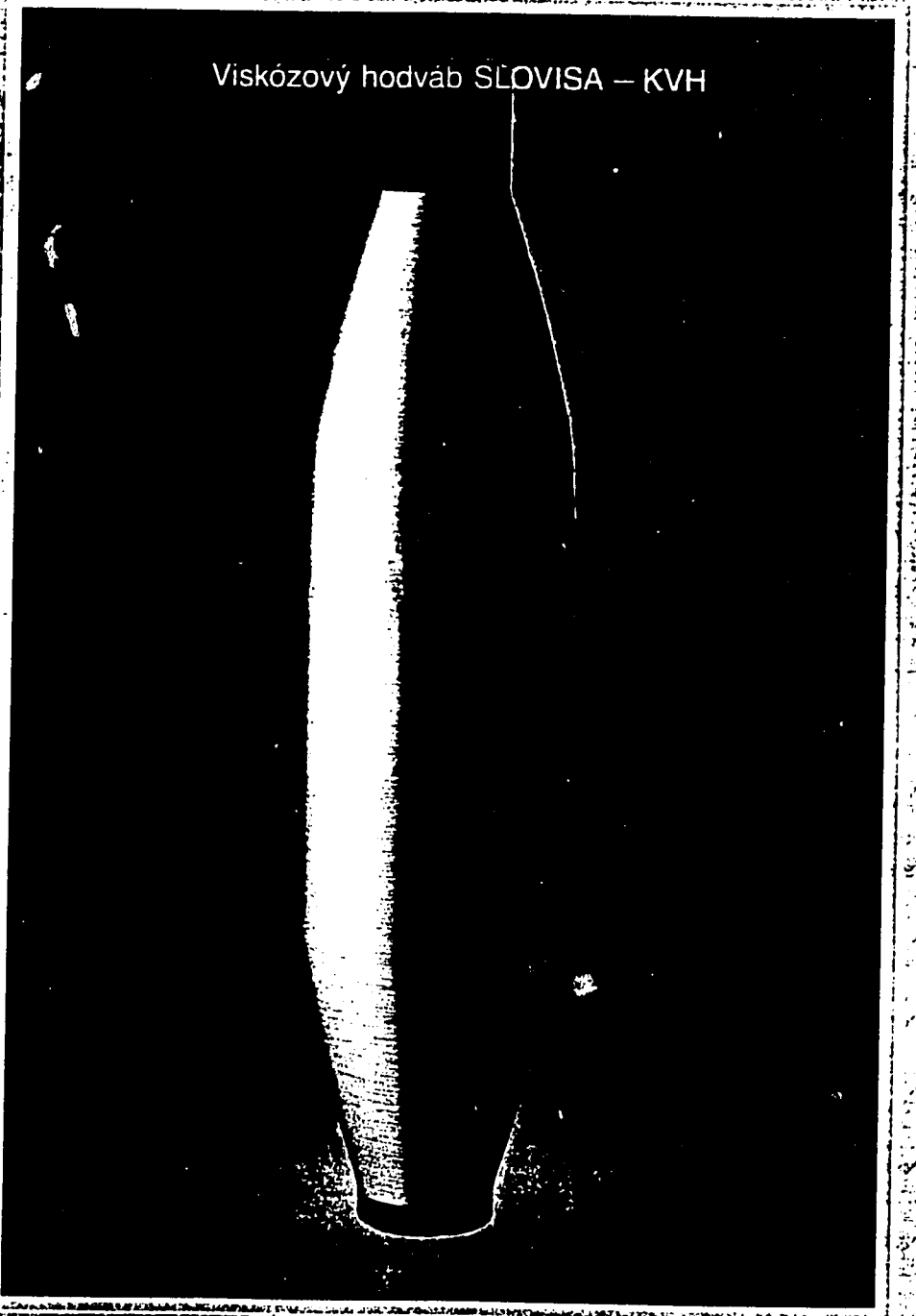
OV
Weight of the package: max. 55 kg
Receiver: Warp beam 30", length 710 mm
Warping width 640 mm
Warp mill diameter 535 mm
Tube ID 70 mm

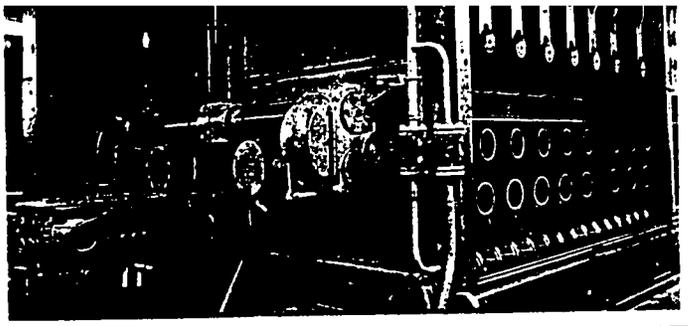


Textilný bodváb svojím rozsahom použitia patrí k najuniverzálnejším vláknam. Tvarovaním získava vyššiu elasticitu, objemnosť a lepšie tepelnoizolačné vlastnosti. Široké uplatnenie nachádza v pletiarskom priemysle pri výrobe vrchného ošatenia, pulóvrov a nábytkových textílií. V tkáčskej technológii sa uplatňuje pri výrobe od ľahkých blúzkovín a šatoviek až po ťažké tkaniny v štruktúre saténov a krepov. Dôležité zastúpenie má i v kravatovom programe. V kombinácii s bavlnou je vhodný i na výrobu tkanín bavlnárskeho a vinárskeho charakteru pre pánske a dámske vrchné ošatenie a pre nábytkové a dekoračné tkaniny.

Zostavil: Jozef Spáčil
Grafická úprava: Ivan Karásek
Foto: Peter Karásek, Milan Brtva, Peter Šimončík
Vydal: Slovenský hodvab Senica v Nakladateľstve Pravda
Vytlačila: Pravda, TK KSS, tlačiarenské závody Pravda, závod 01
Telegramy: Slovenský hodvab Senica
Telefóny: 2751-7
Ďalekopis: 09123 SLhd c
PSČ: 905 35
ŠBCS pobočka – Senica

Slotera®


Viskózový hodváb SLOVISA – KVH



Viskózový hodváb Slovisa vyrábaný v Slovenskom hodvábe Senica na báze kontinuálnej výroby (KVH) tvorí novú skupinu vláken v sortimentnej skladbe výrobcu.
Tento typ vlákna má podstatne lepšiu spracovateľnosť. Znížením jednotkovej jemnosti sa zvýšila aktívna plocha vlákna. Spôsobuje to rýchlejšiu sorpciu vlhkosti, vlákna majú vyššie krycie schopnosti a zvýšila sa ich pevnosť.
Vyrábaný sortiment:

79 dtex f 25
124 dtex f 25
156 dtex f 30

Hodváb možno dodávať v lesklom ale i matnom vyhotovení.
Predloha: valcový kops dĺžky 420 mm
Hmotnosť návinu: 1500 g
Počet zákrutov: 90 z/m
V prípade špecifických požiadaviek je možnosť dodávať KVH ako klasický hodváb na kónických cievkach, snovaný na 30" osnovných cievkach do 800 nití alebo i s vyšším počtom zákrutov.

Viscose rayon Slovisa KVH is produced in Slovenský hodváb Senica based on continuous production equipment (KVH) and represents a new group of filament yarns within the producer's assortment.
This type of viscose filament yarn exhibits an essentially better processability by decreasing of the individual filament titre.
By decreasing of the above titre the active surface area increased, that makes the moisture to be absorbed more rapidly and effectively by the yarn. Moreover the yarn covering performance becomes more perfect and its tenacity increases.
The yarn is available in following counts:

79 dtex f 25
124 dtex f 25
156 dtex f 30

The rayon can be supplied in bright as well as in dull (mat) types:
Supply package: cylindric cops, length 420 mm
Package weight: 1500 grams
Twist level: 90 T/m
In the case that a specific KVH rayon is demanded, it can be also available having the classic rayon shape i.e. that of conic bobbins or of a warp on a 30" beam with 800 ends (threads) or of a bobbin with a higher twist level.

Die von SLOVENSKÝ HODVÁB SENICA hergestellte Viskose-Seide SLOVISA-KVH basiert auf einer Continue-Produktion die als KVH bezeichnet wird. Sie bildet eine neue Fasergruppe innerhalb des bestehenden Warensortiments des Herstellers.
Dieser Fasertyp bietet eine wesentlich bessere Verarbeitbarkeit. Durch Minderung des Einzeltiters vergrössert sich die Faseroberfläche, was letzten Endes eine schnellere Feuchteabsaugung sowie auch ein besseres Deckungvermögen und höhere Festigkeit zur Folge hat.
Das hergestellte Feinheitssortiment besteht aus:

79 dtex f 25
124 dtex f 25
156 dtex f 30

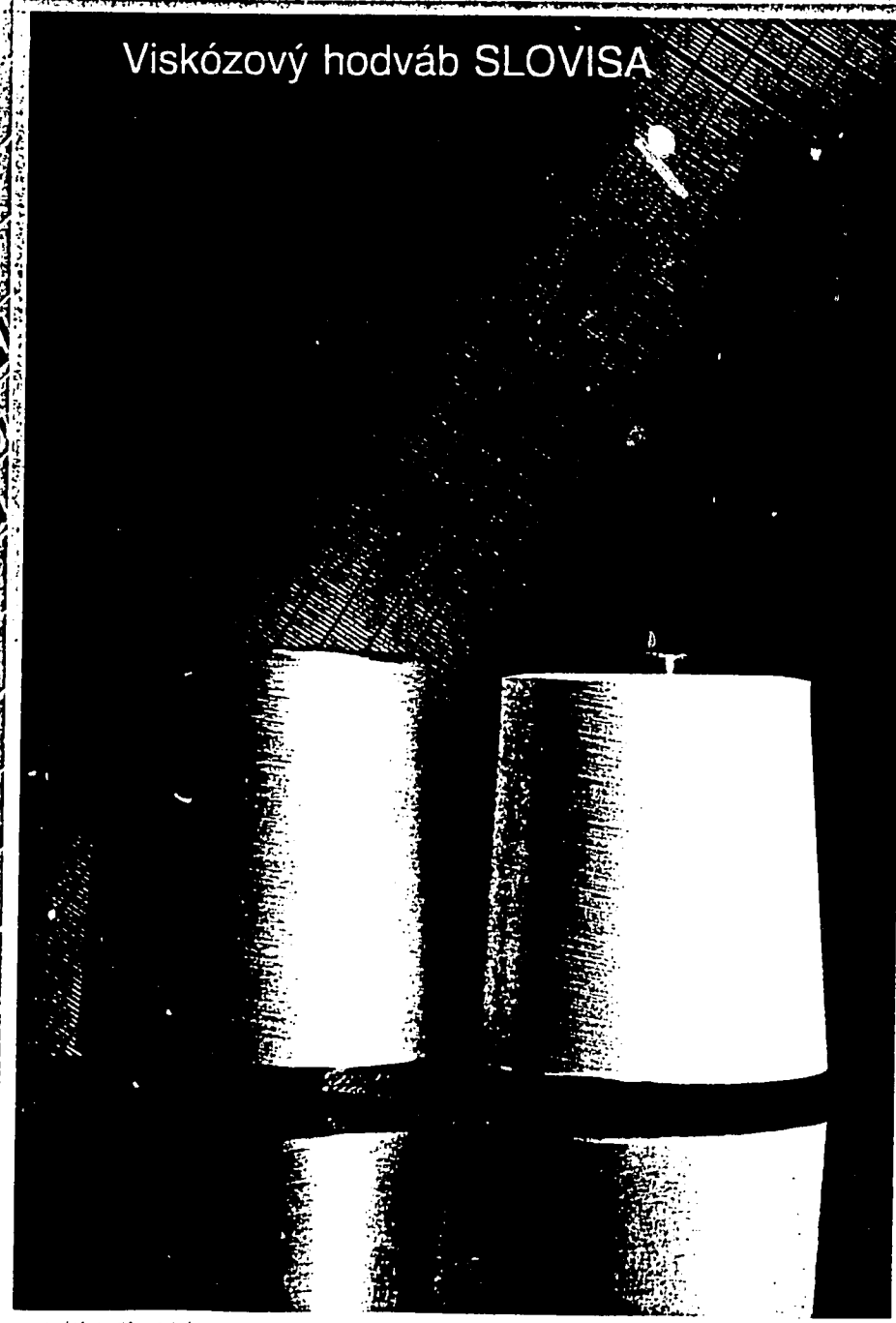
SLOVISA KVH ist in Glanz- und Mattausführung lieferbar.
Vorlagen: Zylindrische Kops, Länge 420 mm
Spulengewicht: 1500 g
Drehungszahl: 90 D/m
Falls Kundenseits ergeben sich spezifische Forderungen bieten wir SLOVISA KVH, auch wie es bei klassischer Seide üblich ist, auf konische Spulen aufgespult, oder auf 30" Kettbaum mit 800 Fäden, oder mit grösserer Drehungszahl pro Meter zu liefern.

Вискозный шелк СЛОВИСА-КВХ изделие фирмы СЛОВЕНСКИЙ ХОДВАБ, г. СЕНИЦА вырабатывается континуальным способом (КВХ) и тотчас представляет новую группу волокон в ассортиментном составе изделий.
Этот тип волокна позволяет существенно лучшую обрабатываемость. Возможно сказать что с понижением единичной тонкости в тоже время повысилась деятельная поверхность шелка. Это обстоятельство способствует отсасыванию влажности высшей скоростью и нити обладают лучшей покрываемостье – обе свойства относятся к гигиене ношения. Но нити СЛОВИСЫ-КВХ тоже прочнее других вискозных нитей.
Предлагается следующий ассортимент:

79 дтекс ф 25
124 дтекс ф 25
156 дтекс ф 30

Поставляются двое осуществления – блестящее и матное.
Форма поставки: цилиндрический копс, длиной в 420 мм
Вес копса: 1500 граммов
Круток на 1 метр: 90 кр./м
В случае требования конических бобин можно тоже удовлетворить клиента. Возможно получить тоже готовые основы СЛОВИСА-КВХ на 30" основных шпулях с 800 нитей.
Тоже можно поставлять нити с больше чем 90; крутками на текущий метр по желанию клиента.

Viskózový hodváb SLOVISA

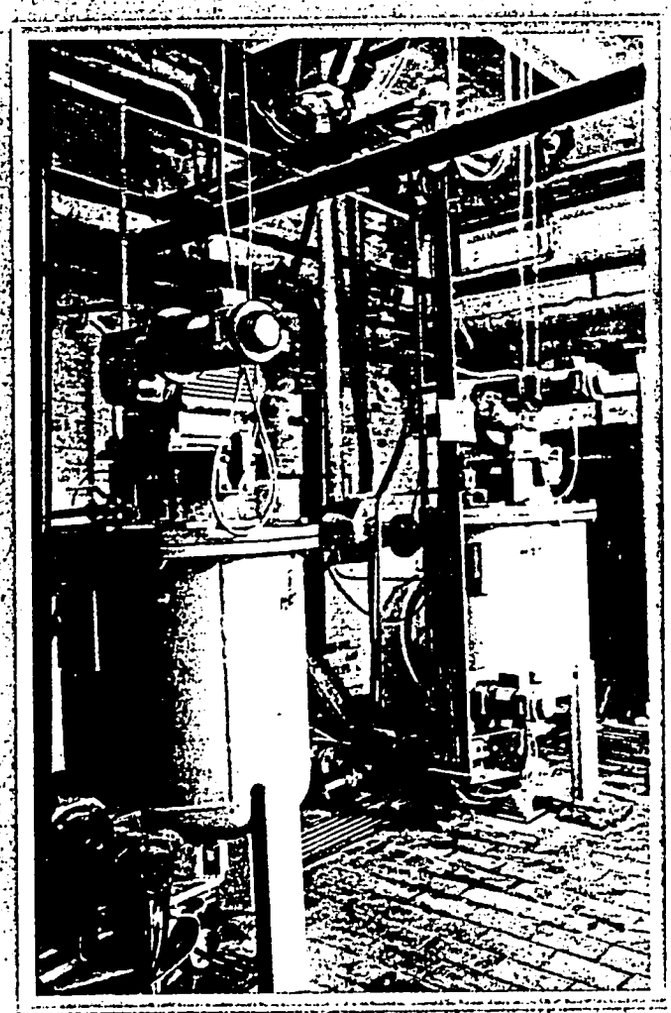


Od prvej myšlienky angličana Hoocka o možnosti výroby umelého vlákna po dnes vyrábaný viskózový hodváb prešlo už vyše 300 rokov. Najstarším výrobcom viskózového hodvábu v Československu je Slovenský hodváb, národný podnik v Senici. Do povedomia našej verejnosti sa dostáva pod názvom SLOVISA.

От первого появления идеи вырабатывать исскуственное волокно в голове Англичанина Гооцка миновало уже более чем 300 лет по сегодняшнее производство вискозных волокон.
В ЧЕхословакии был первым продуцентом вискозного шелка завод „Словацкий шелк" в городе Сеница.
В сознание нашего общества вступает этот шелк под названием „СЛОВИСА"

Seit dem urersten Einfall des Engländers Hoock Kunstfasern herstellen können bis zur Gegenwart der Viskosefaserproduktion sind schon mehr als 300 Jahre vergangen. In der Tschechoslowakei die älteste Viskosefabrik heisst Slovenský hodváb, National-Unternehmen Senica. Die hier hergestellte Faser tritt ins Gewissen unserer Öffentlichkeit unter der Benennung SLOVISA.

More than 300 years have passed since the idea was born by the Englishman Hoock about the possibility to produce man made fibre to the rayon making reality of today. The oldest producer of viscose rayon in Czechoslovakia is the National Enterprise SLOVENSKÝ HODVÁB in Senica.
This rayon enters the consciousness of our public under the name SLOVISA.



Viskózový hodváb SLOVISA vďaka svojim fyziologickým vlastnostiam podobným prírodným vláknam, ako je nasiaklivosť, príjemný omak, antistatické vlastnosti ale i dobrá a trvale sa obnovujúca surovinová základňa, je a ešte dlho zostane nepostrádateľnou surovinou textilného priemyslu.

Najrozšírenejšie použitie nachádza SLOVISA pre výrobu dámskej bielizne, kde je vysoko hodnotená pre dobré hygienické vlastnosti. Okrem toho sa používa pri výrobe hodvábnych brokátov, polohodvábnych pánskych košiel, blúz, podšívkovín, dekoračných látok, stúh, šatoviek ľahkého typu, k výrobe zmesových priadzí a pod.

Viskózový hodváb SLOVISA – matný

Вискозный шелк СЛОВИСА – матовый

SLOVISA – matte Viskose Rayon

Matt Rayon SLOVISA

Vyrábaný sortiment
dtex 67 f 15
110 f 20
133 f 25
167 f 30

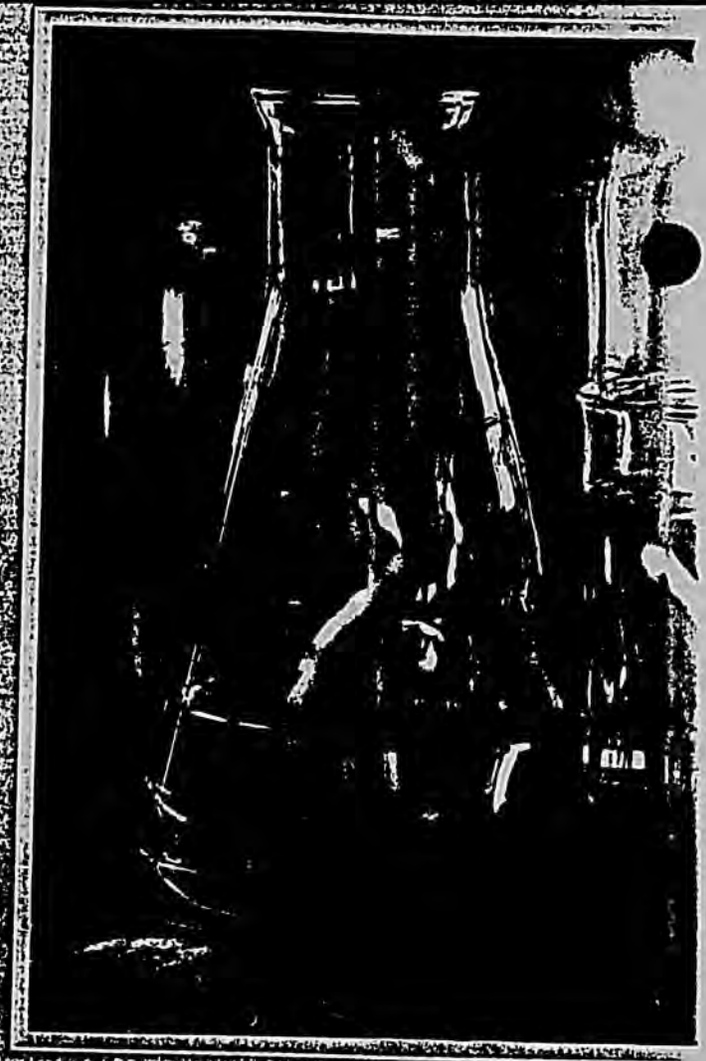
Hodváb je dodávaný na kónických krížom súkaných cievkach so zákrutom 130/m. U dtex 67f15 je možnosť snovania na 30" cievkach pri počte nití max. 800.
Dodáva sa v troch akostných triedach a triedi sa podľa fyzikálno-mechanických vlastností a povrchových znakov.

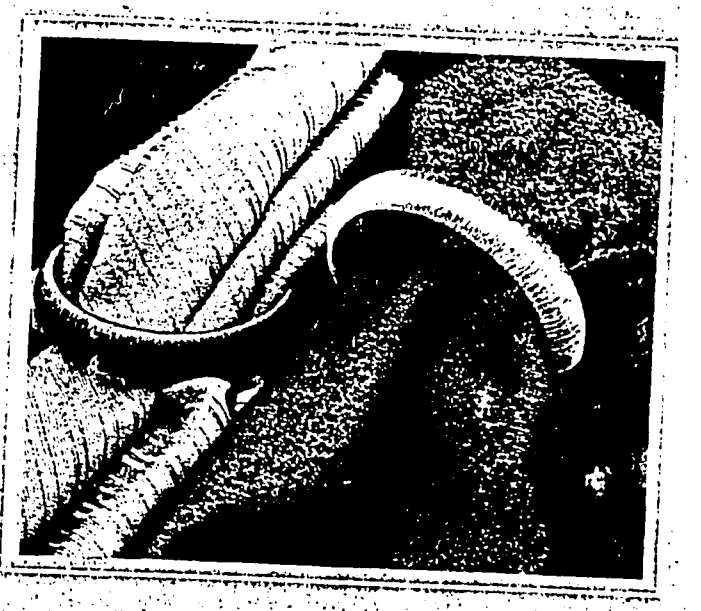
Merná vlhkosť v %	11,0
Obsah preparácie v %	2±0,5
Obsah mat. prostriedku v %	0,8–1,4
Obsah popola na sušinu v % max.	1,55
Odchýl. od vysled. jemnosti v % max.	±5,0
Ø pevnosť v klim. stave	1,3
v cN/dtex nad dtex 110	1,4
Ø ťažnosť v klim. stave	20±2
v % nad dtex 110	23±2
Odchýlka od men. zákrutu v %	±6
Predloha: kónická cievka	Ø 50 mm
	dĺžka 172 mm
Hmotnosť návinu	1500 g

Распоряжаем следующим ассортиментом:
дтекс 67 ф 15
110 ф 20
133 ф 25
167 ф 30

Поставляем его на конических бобинах крестовой намотки с 130 закрутками на текущий метр.
Линеарная плотность на основе дтекс 67 ф 15 дает возможность снования на 30'' бобины с максимальным количеством нитей 800.
Поставляем его в 3 качественных классах. Классификация происходит свойств и поверхностных знаков.

Изм. влажность в %	11
Содержание препарации в %	2±0,5
Содержание средства матирования в %	0,8–1,4
Содержание золы из сушенного субстрата – макс. %	1,55
Уклонение от финальной линеарной плотности – макс. %	±5,0
Ø прочность в конд. сост. сН/дтекс	1,3
более чем 110 дтекс	1,4
Ø растяжимость в конд. сост. %	20±2
более чем 110 дтекс	23±2
Отклонение от номинальной закр. в %	±6
Питание на: конической гильзе Ø	50 мм
длина	172 мм
Масса бобины	1500 г





Verfügbares Sortiment

dtex 67 f 15
110 f 20
133 f 25
167 f 30

Das Garn wird an konischen Kreuzspulen mit einem Drall von 130 D/m geliefert. Beim dtex 67f15 besteht die Möglichkeit zu schären auf 30'' Trommeln mit einer Fadenzahl max. von 800. Sie wird in drei Qualitäts-Klassen nach physiko-mechanischen Eigenschaften sowie auch nach Oberflächenmerkmalen klassifiziert und geliefert.

Feuchtigkeit in %	11,0
Präparationsgehalt in %	2±0,5
Mattierungsmittelgehalt in %	0,8–1,4
Aschengehalt im Trockenen in % max.	1,55
Abweichung vom Nenntiter in % max.	±5,0
Ø Festigkeit in konditioniertem Zustand cN/dtex	
mehr als 110 dtex	1,3
Ø Dehnung in kond. Zustand in %	1,4
mehr als 110 dtex	20±2
Abweichung vom Nenndrall in %	23±2
Vorlage: auf konischer Hülse	±6
	Ø 50 mm
Wickelmasse	Länge 172 mm
	1500 gr

The Filament Yarn is available in folloving assortment:

dtex 67 f 15
110 f 20
133 f 25
167 f 30

The rayon is supplied on conic cross wound bobbins with a twist rate of 130 T/m.

With the dtex 67f15 there is a possibility of warping max. 800 threads on 30'' drums. It is supplied in 3 quality classes and classified according to physico-mechanical properties as well as surface appearance.

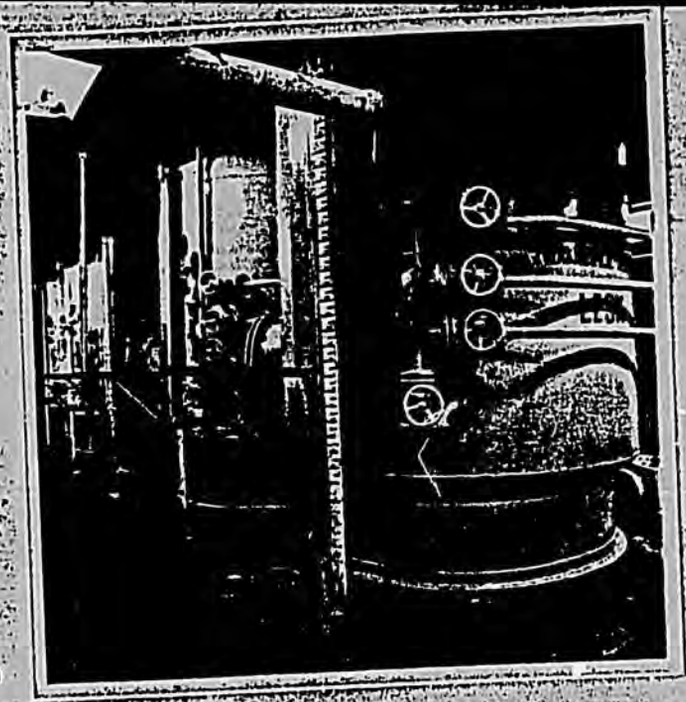
Rated moisture content	%	11,0
Finish content	%	2±0,5
Matting means content	%	0,8–1,4
Dry substrate ash content	max. %	1,55
Deviation from the final titre	max. %	±5,0
Tenacity in conditioned state in cN/dtex		1,3
more than 110 dtex		1,4
Elongation in conditioned state in %		20±2
more than 110 dtex		23±2
Deviation from the nominal twist	%	±6
Supply: crosswound bobbin on tube	D =	50 mm
	length	172 mm
Bobbin weight:	in grammes	1500

Viskózový hodvab SLOVSA – lesklý

Вискозный шелк СЛОВИСА – блестящий

SLOVSA = glänzendes Viskose Rayon

SLOVSA = Bright Viscose Rayon



Vyrábaný sortiment
dtex 84 f 18
110 f 25
133 f 25
167 f 30

Hodváb je dodávaný na kónických krížom súkaných cievkach so zákrutom 130/m. U dtex 133f25 i so zákrutom 310/m. Dodáva sa v troch akostných triedach a triedi sa podľa fyzikálno-mechanických vlastností a povrchových znakov.

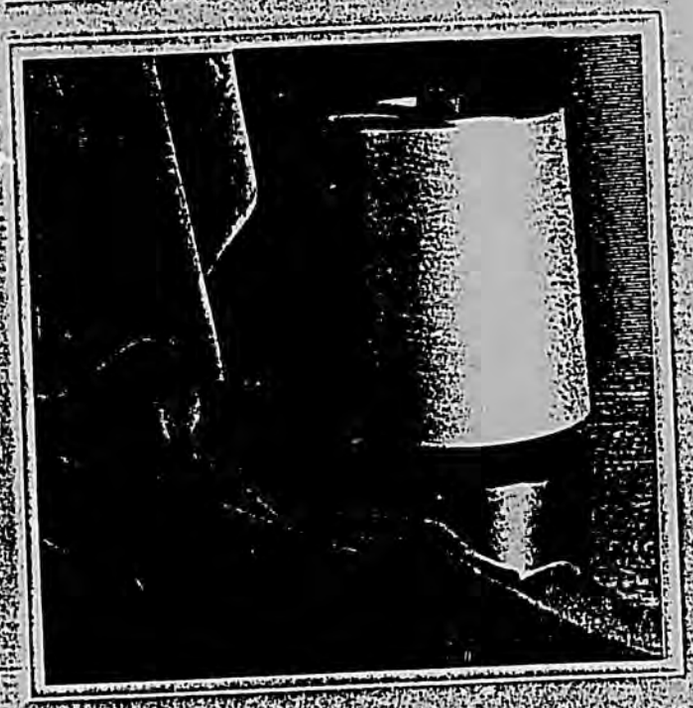
Merná vlhkosť v %	11,0
Obsah preparácie v %	2±0,5
Obsah popola na sušinu v % max.	0,15
Odchýl. od výsled. jemnosti v % max.	±5,0
Ø pevnosť v klim. stave v cN/dtex	1,3
nad dtex 110	1,4
Ø ťažnosť v klim. stave v %	22±2
nad dtex 110	25±2
Odchýlka od men. zákrutu v %	±6
Predloha: kónická cievka	Ø 50 mm
	dĺžka 172 mm
Hmotnosť návinu	1500 g

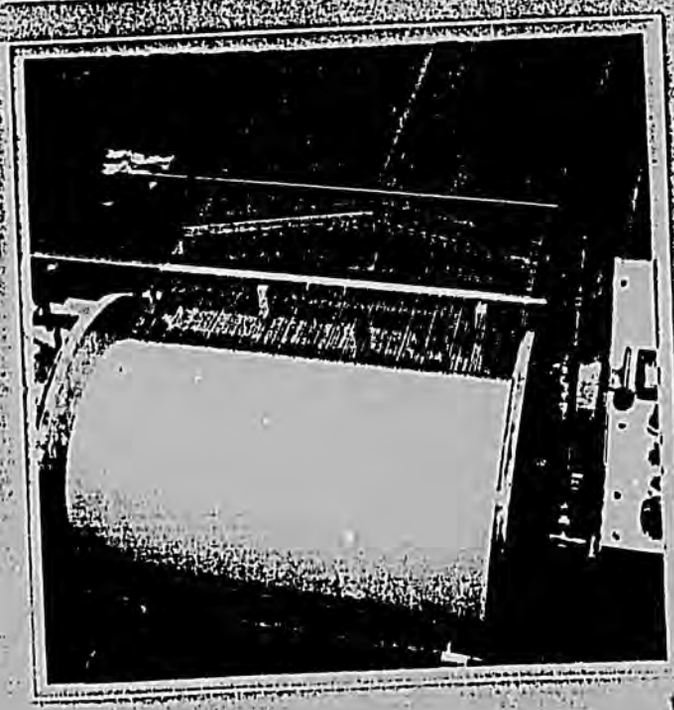
получается в следующем ассортименте:
дтекс 84 ф 18
110 ф 25
133 ф 25
167 ф 30

Поставки осуществляются на конических бобинах крестовой намотки с закруткой з=130 на текущий метр. Для линеарной плотности дтекс 133 ф 25 предлагается тоже с закруткой з=310/м.

При поставках распоряжают 3-ми качественными классами. Классификация происходит на основе физико-механических свойств и поверхностных знаков.

Измерительная влажность в %	11,0
Содержание препарации в %	2±0,5
Содержание золы на высушенный субстрат – макс. %	0,15
Отклонение от финальной линеарной плотности – макс. %	±5,0
Ø прочность в конд. состоянии сН/дтекс	1,3
более чем 110 дтекс	1,4
Ø растяжимость в конд. сост. %	22±2
более чем 110 дтекс	25±2
Отклонение от номинальной закр. в %	±6
Питание на: конической гильзе Ø	50 мм
длина	172 мм
Масса бобины	1500 г





Verfügbares Sortiment

dtex 84 f 18
110 f 25
133 f 25
167 f 30

Viskose Rayon wird an konischen Kreuzspulen mit einem Drall von 130 D/m geliefert. Beim Titer dtex 133f25 auch der Drall von 310 D/m ist zur Verfügung. Die Lieferungen in drei Qualitäts-Klassen. Die Sortierung wird nach den Fysiko-mechanischen Eigenschaften sowie auch nach den Oberflächenmerkmalen durchgeführt.

Feuchtigkeit in %	11,0
Präparationsinhalt in %	2±0,5
Aschengehalt im Trockenen max. %	0,15
Abweichung vom Endtiter max. %	±5,0
Ø Festigkeit in konditioniertem Zustand	
cN/dtex	1,3
mehr als 110 dtex cN	1,4
Ø Dehnung in kond. Zustand in %	22±2
mehr als 110 dtex %	25±2
Abweichung vom Nenndrall in %	±6
Vorlage: konische Spule	Ø 50 mm
	Länge 172 mm
Masse des Wickels	1500 gr.

Bright rayon SLOVISA is made in following titre assortment:

dtex 84 f 18
110 f 20
133 f 25
167 f 30

The rayon is taken up on conic cross wound bobbins with 130 T/m. With the dtex 133 f 25 the twist rate 310 T/m is possibble too. It is available to physico-mechanical properties and surface appearance.

Rated moisture content	in %	11,0
Finish content	in %	2±0,5
Dry substrate ash content	max. %	0,15
Deviation from the final titre	max. %	±5,0
Tenacity in conditioned state in cN/dtex		1,3
	more than 110 dtex	1,4
Elongation in conditioned state in %		22±2
	more than 110 dtex	25±2
Deviation from the rated twist	in %	±6
Supplied on: conic bobbin	D =	50 mm
	length	172 mm
Bobbin weight:	in grammes	1500

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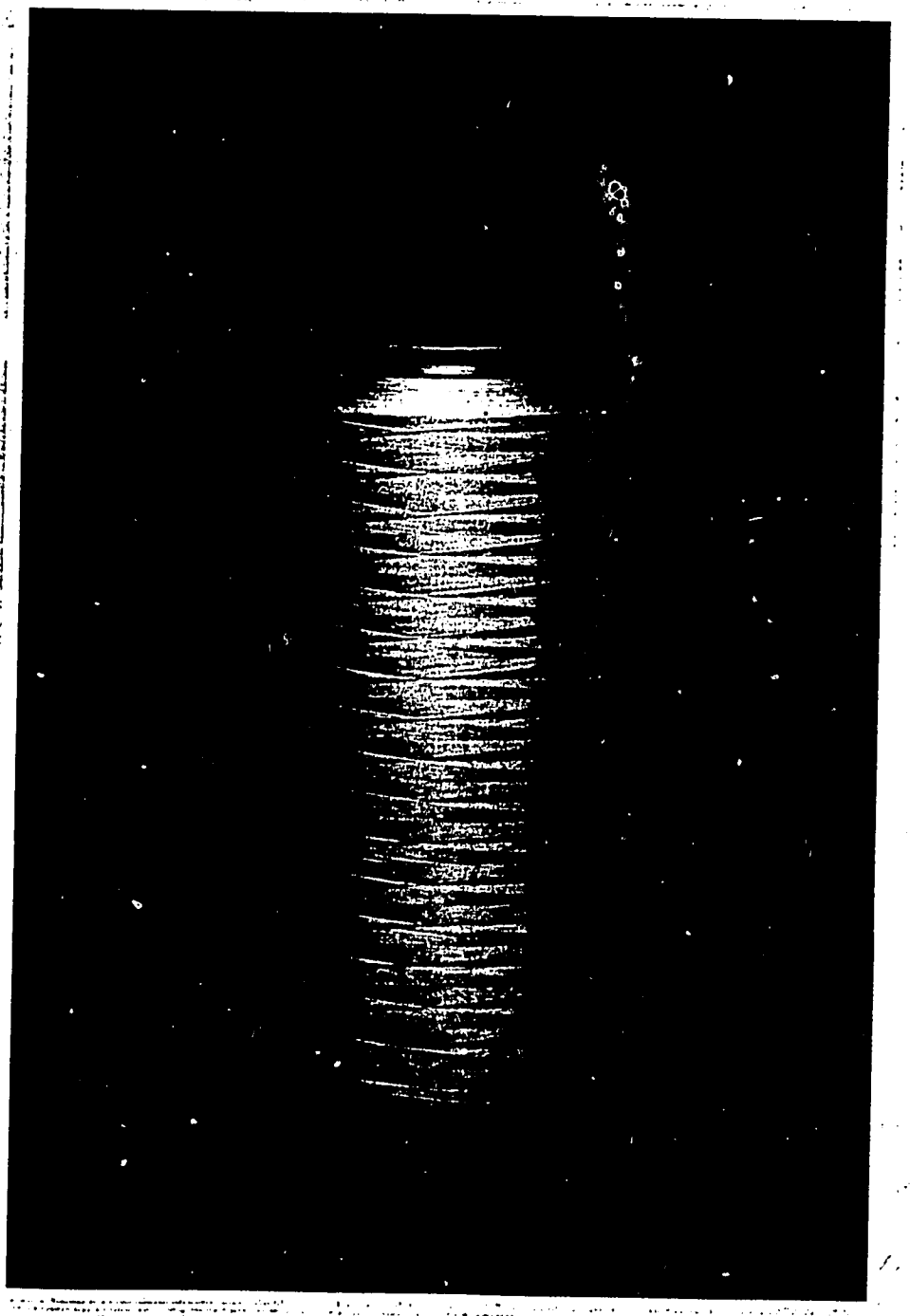
Zostavil: Jozef Spačil
Grafická úprava: Ivan Karasek
Foto: Peter Karasek a Milan Brtva
Vydal: Slovenský hodváb Senica n. p. v Nakladateľstve Pravda
Vytlačila: Pravda, TK KSS, tlačiarenské závody Pravda, závod 01

Telegramy: Slovenský hodváb Senica
Telefóny: 2751–7
Ďalekopis: 09123 SLhd c
PSČ. 905 35
SBČS pobočka – Senica

Slovisa Slovisa Slovisa Slovisa Slovisa Slovisa

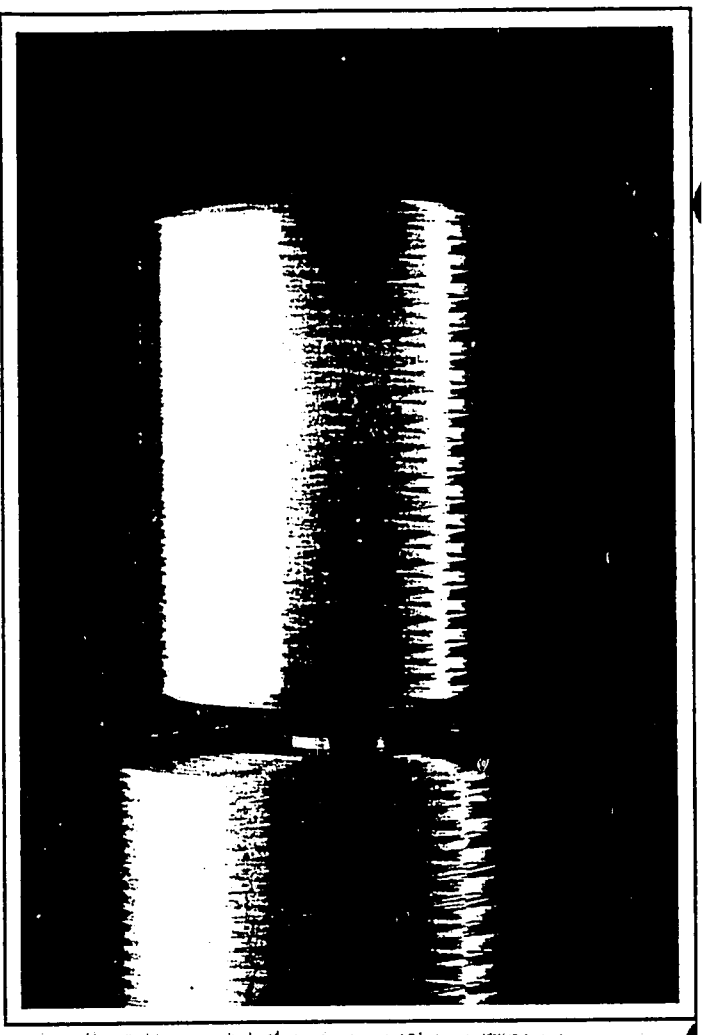


STATNY PODNIK
SENICA NAD MYJAVOU

Polyesterové technické vlákno SLOTERA® TV

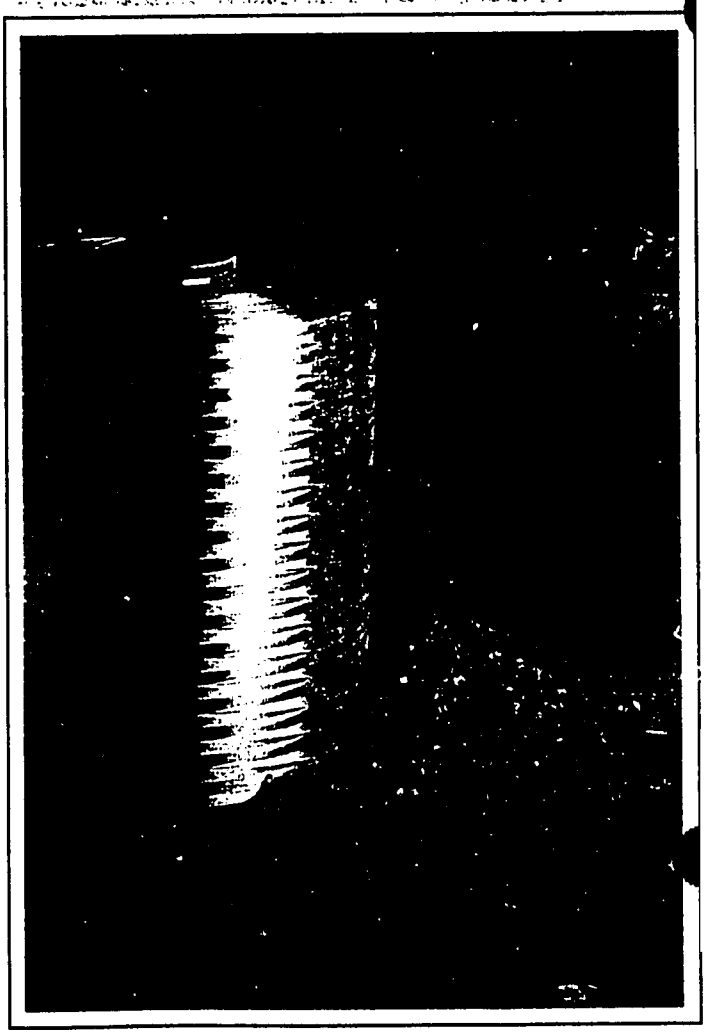
V súčasnosti už nie je úlohou chemických vlákien nahrádzať vlákna prírodné, pretože svojimi vlastnosťami predovšetkým pre oblasť technických textílií ich ďaleko predstihujú. Najväčší rast spotreby sa predpokladá práve u polyesterových technických vláken. Vyznačujú sa vysokou pevnosťou, nízkou rozťažnosťou, nízkym zmrštením, vysokou elasticitou, odolnosťou voči svetelnej a tepelnej degradácii a zvýšenou stálosťou v kyslom a alkalickom prostredí pri nižších teplotách.

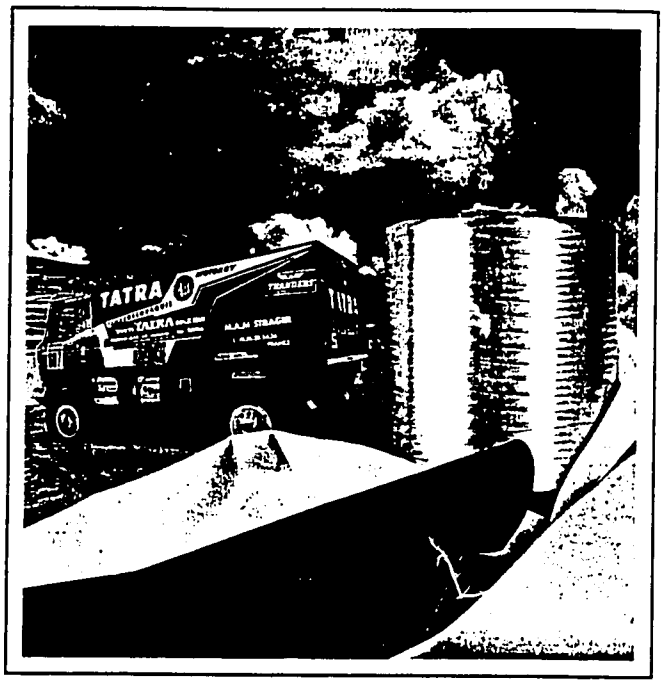
Jedným z producentov polyesterových technických vláken pod označením SLOTERA® TV je Slovenský hodváb Senica.
Vlákna vyrába extrúderovým zvlákňovaním lesklého dopolykondenzovaného PET polyméru s následným viacstupňovým dĺžením.

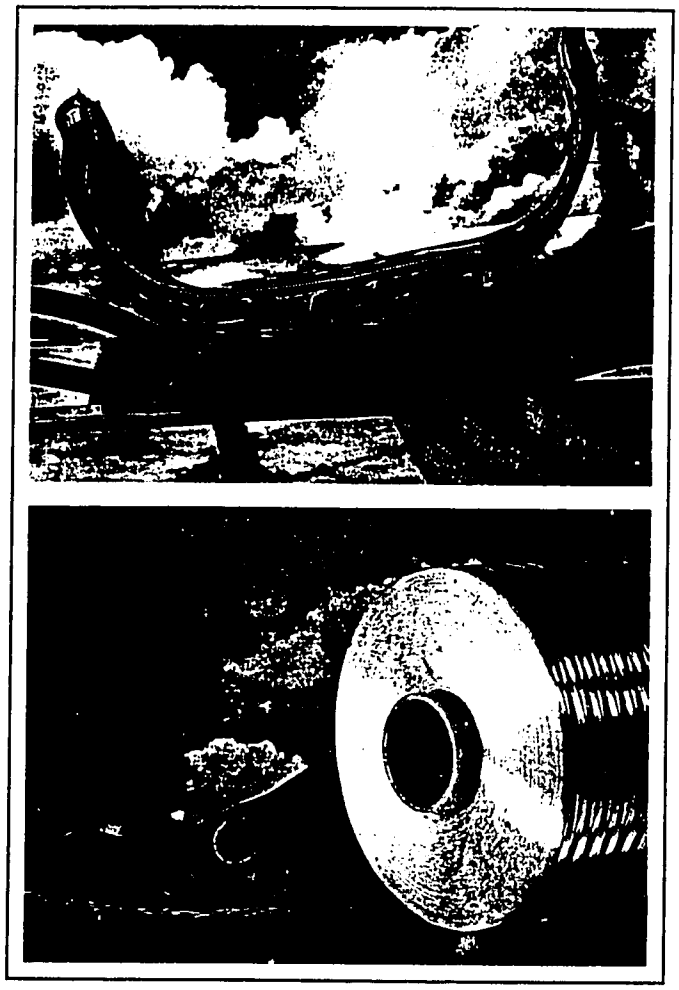


Industrial polyester yarn SLOTERA® TV.

On applicating the advatages of the polyester industrial yarn in many industrial branches above all in technical industrial textiles. Properrties of industrial polyester fibres are more high as properties of natural fibres.
Properties of polyester fibres:
high breaking force
high tenacity
high elasticity
high thermostability
high photostability
more high stability in acid and lye medium (at low temperature) low shrinkage.
The consumption of man-made fibres for industrial pursposes is incessantly growing all over the world. Due to its excelent properties the polyester industrial yarns are to be mentioned before other ones.
One of the significant producers in Czecho-Slovakia is Slovenský hodváb Senica offering its industrial polyester yarn SLOTERA® TV.
SH produces industrial polyester fibres with extrusion spining of bright polycondensate polyester polymer and multistage drawing.







Vo svojom výrobnom programe sa zameriava na výrobu PES technických vláken pre tieto hlavné oblasti ich aplikovania:

- PES vlákna pre textilné spracovanie pre výrobu nánosovaných textílií, autoplachiet, autopásov, lán, sietí a pod.
- PES vlákna adhezívne aktivované pre použitie v gumárenskom priemysle pri výrobe dopravníkových pásov, klinových remeňov, gumových hadíc a pod.
- PES vlákna vysokomodulové a nízkozrážavé adhezívne aktivované pre použitie v gumárenskom priemysle na výrobu automobilových pneumatík.

The application range of the SLOTERA® TV as well as of the fabrics made from it:

- polyester fibres for production backing wovens and unwovens for impregnation or coating them with reinforsing layers of varions materials for a wide range of applications (belts, staps, ropes, tielts, impregnated webs)
- polyester tibres adhesion activated for making connveyer – belts, V – belts, pressure – hoses.
- polyester fibres high modulus low shinkage adhesive activated using in rubber industry for producing car tires.

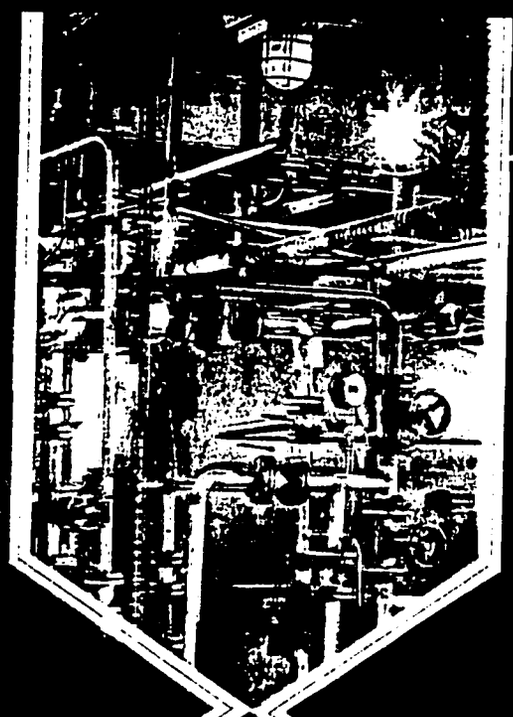
STATNY PODNIK
SENICA NAD MYJAVOU

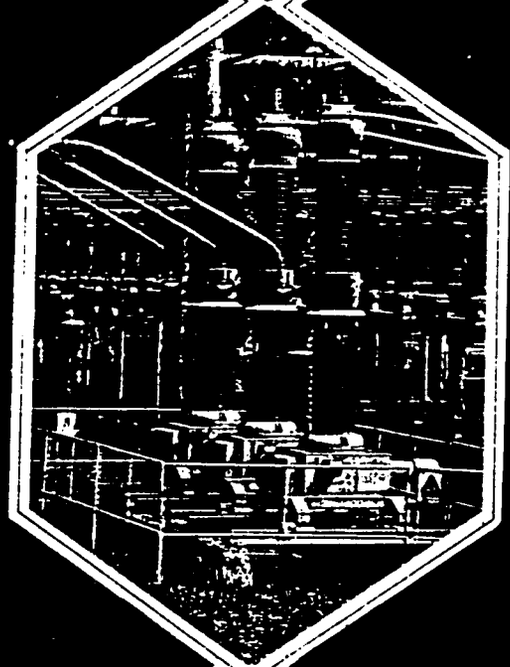
Zostavil: Jozef Spáčil
Grafická úprava: Ivan Karásek
Foto: Peter Karásek, Milan Brtva, Peter Šimončik
Vydal: Slovenský hodváb Senica

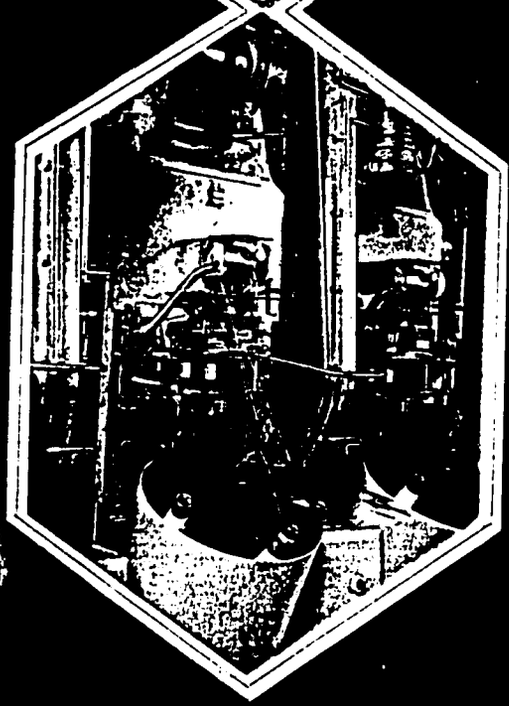
Adresa: Slovenský hodváb, Senica
PSČ: 905 35
Telefón: (0802) 2751-5
Telex: 936 11
Fax: 5150
Všeobecná úverová banka Senica

Slotera®

ATTACHMENT C





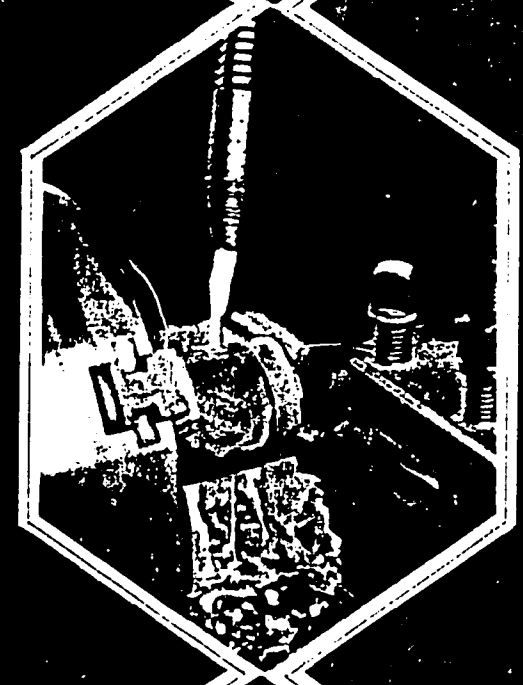


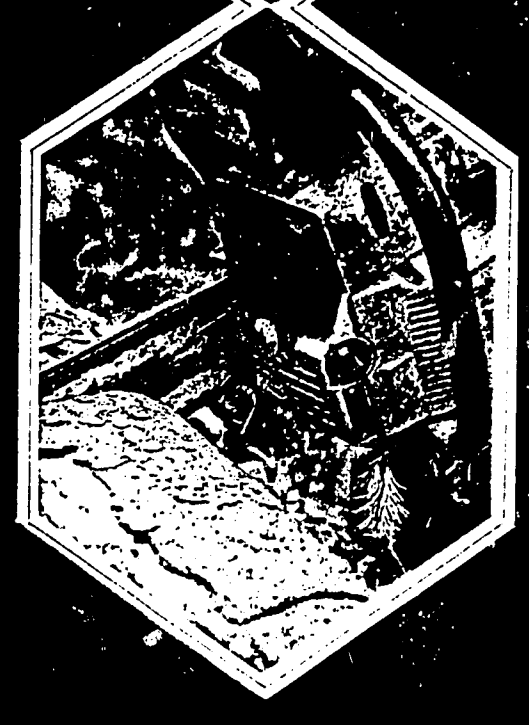
STRUČNÝ PREHĽAD VÝROBKOV

- **Pohonné látky** - nafty so zníženým obsahom síry a zníženým bodom tuhnutia.
- **Vykurovacie oleje** - sú určené k výrobe tepla v špeciálnych spaľovacích zariadeniach, vyznačujú sa nízkym obsahom síry.
- **Tmavé oleje** - sa používajú na mazanie kĺzných ložísk, kľukových mechanizmov a prevodov zaťažených veľkým tlakom, nárazom a pracujúcich v prašnom prostredí.
- **Transformátorové a kondenzátorové oleje** - používajú sa ako náplň transformátorov, kondenzátorov, vypínačov a iných elektrických zariadení, vyznačujú sa vysokou oxidačnou stálosťou a vynikajúcimi elektroizolačnými vlastnostami.
- **Konzervačné oleje** - slúžia pre medzioperačnú a krátkodobú ochranu drobných a členitých výrobkov zo železných kovov a konzervovanie oceľových dielcov a konštrukcií.
- **Formové oleje** - s výhodou sa používajú k vymazávaniu foriem pri výrobe prefabrikátov.
- **Oleje nízkotuhnúce** - sú určené na mazanie chladiacich kompresorov a hydraulických mechanizmov, ktoré pracujú nepretržite i za nízkych teplôt.
- **Prostriedky pre obrábanie kovov** - používajú sa pri obrábaní železných i neželezných kovov, pri valcovaní oceľových plechov a pásov a iných technologických operáciách v strojárenskom priemysle.
- **Medicinálne oleje** - sa používajú ako základové olejové zložky vo farmaceutickom priemysle, kozmetickom a potravinárskom priemysle.
- **Olej na prenos tepla** - slúži ako teplonosné médium pre nepriamy ohrev v uzatvorenom beztlakovom systéme pri teplote do 270 °C.
- **Petrosulfonáty** - používajú sa ako detergentná zložka komplexnej prísady k zušľachťovaniu mazacích olejov a ako emulgátory minerálnych olejov.
- **Suroviny pre detergenty** - slúžia ako vstupná surovina na výrobu alkylbenzénsulfonátov, ako základných tenzidov pre výrobu práškových, tekutých, čistiacich a pracích prostriedkov a prostriedkov bytovej chémie.
- **Textilné pomocné prostriedky** - používajú sa takmer vo všetkých technológiách spracovania vlákien a textilných materiálov. Poskytujeme odpeňovacie, farbiace, detašovacie, zmäkčovacie, pracie prípravky, mazacie oleje, zušľachťovacie, preparačné, emulgačné, mastiace, egalizovacie, zmáčacie, rezacie prípravky a valchovacie pasty. Vyznačujú sa dobrou biologickou odbúrateľnosťou, stálosťou pri rôznych pH, sú dobré voči tvrdej vode.
- **Ostatné výrobky** - používajú sa v rôznych oblastiach priemyslu, napríklad na kalenie oceľových súčiastok strojov, na mazanie reťazí a líst ručných motorových a elektrických píl v drevárskom priemysle; na čistenie (odmasťovanie) obrobkov, do náplní hydraulických tlmičov motorových vozidiel a hydraulických zdvihákov, na úpravu chladiacich kvapalín naftových motorov; pri výrobe papiera, na predčistenie odpadových vôd, na regeneráciu iontomeničov, alebo ako plastifikačná prísada pri výrobe pórovitého betónu.

THE BRIEF REVIEW OF PRODUCTS

- **Propellants** - gas and diesel oils with lowered contents of sulphur and lowered pour point
- **Fuel oils** - are used for production of the heat in special combustion equipments, there are with low contents of sulphur.
- **Dark oils** - are used for lubrication of plain, crankshaft bearings and transmissions loaded by high pressure, impact and working in dusty surroundings.
- **Transformer and condenser oils** - are used as a filling of transformers and condensers, switches and other electrical equipments, marked by high oxidation stability and excellent electro-insulating properties.
- **Corrosion inhibited oils** - serve for inner-operating and short-term protection of small and unequable products from ferrous metals and for conservation of steel parts and constructions.
- **Form oils** - are used for lining of forms in production of prefabricated elements
- **Refrigerator oils** - are specified for lubrication of refrigerating compressors and hydraulic gears working continuously at the low temperatures.
- **Agents for metal working and cutting** - are used for working and cutting of ferrous and non ferrous metals, for rolling of sheet steel and steel bands and for other technological operations in engineering.
- **White oils** - are used as a main oil components in pharmaceutical, cosmetic and food-stuff industry.
- **Oils for heat transmission** - are used as a heat carriers for indirect heating in closed systems at the temperature until 270 °C.
- **Petrosulphonates** - are used as a detergent components of the complex additive for fining of lubricating oils, and as an emulsifiers of mineral oils.
- **Raw materials for detergents** - are used as a main raw materials for production of LABS, as a main tensides for production of powdered, liquid cleaning and washing agents.
- **Textile auxiliary agents** - are used almost in all technologies of working of fibers and textile materials. We offer antifoaming, dying, softening, washing preparations, preparations for removal of stains, lubricating oils, fining, preparating, emulsing, lubricating, wetting, fulling, levelling agents. These preparation have a good biological degradability, stability in different pH values, resistance against hard water.
- **Other products** - are used in a different branches of industry, for example for hardening of steel parts of the machines, lubrication of chains and strips of hand motor and electric chain saws in wood-working industry, for cleaning (degreasing) of workpieces, for fillings of hydraulic shockabsorbers of cars and for hydraulic car lifts, for treatment of cooling liquids of diesel engines, for paper production, for pre-cleaning in sewage works, for regeneration of ion exchangers and as a plasticizing agents for production of porous concrete.





Servis:

- poskytujeme poradenské služby, týkajúce sa celého sortimentu našich výrobkov
- ponúkame spolupráci pri riešení ekologických otázok, vyplývajúcich z používania našich výrobkov

Service

We offer:

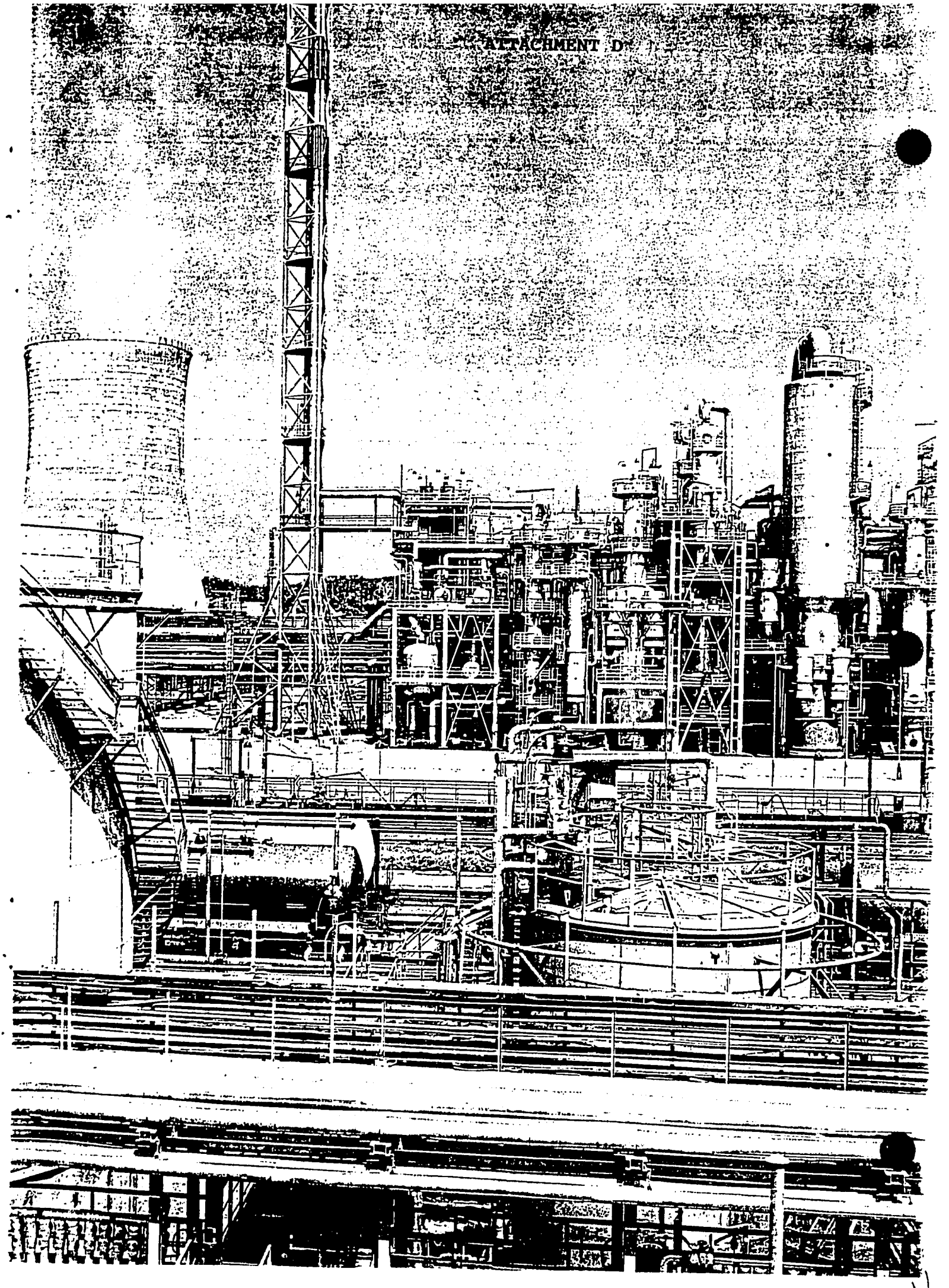
- consulting services regarding to all sortiment of our products
- cooperation in solving of ecological questions resulting from use of our products

PETROCHEMA DUBOVÁ CZECHO-SLOVAKIA

976 97 NEMECKÁ TEL: +867/92201-6 FAX: + 867/92286 TELEX: 070273

grafická úprava: Dušan Javorčík

ATTACHMENT D



1. BASIC DATA

1.1 Characteristics

CHEMKO Strazske is a chemical enterprise directed toward the production of basic products of organic and inorganic chemistry.

1.2 Legal Form and Property

As a state enterprise, the Czech and Slovak Federal Republic (CSFR) is the exclusive owner, and the Ministry of Industry of the Slovak Republic is the administrator.

1.3 Major Products

Cyclohexanone
Urea-formaldehyde Glues
Liquid Nitrogen Fertilizers

1.4 Location

The enterprise is located in the eastern part of the CSFR, between these three district towns, with populations and distances:

- Humenne	35,000 inhabitants	10 km
- Michalovce	40,000 inhabitants	15 km
- Vranov	25,000 inhabitants	15 km

Its location is very advantageous in relation to neighboring countries, with road distances to frontier crossings:

- USSR	35 km
- Hungary	45 km
- Poland	60 km

1.5 Transportation and Communication Connections

- Road: The plant has access to state primary road which runs within 300 meters.
- Train: The plant has access to an express railroad line which runs within 300 meters.
- Air: The nearest civil airport with permanent service is in Kosice at a distance of 60 kilometers.
- Telephone: 60 lines with worldwide service.
- Telex: 4 lines.
- Telefax: 9 lines.

1.6 Statistics

- Land Area	10,110,000 m^2
- Improved Area	3,762,000 m^2
- Employees	3,200
- Capital Stock	2,500,000,000 Kcs

1.7 Energy Supply

a. Electricity

- Capacity from external 110 kV network	2 x 60 MW
- Capacity from on-site power plant	40 MW

b. Steam

- Capacity from on-site steam plant	460 t/h

c. Water

- Maximum flow from Laborec River, 1 km	500 l/s
- Maximum flow from Ondava River, 5 km	500 l/s

2. EVOLUTION OF THE ENTERPRISE

2.1 Origins of the Enterprise

CHEMKO Strazske was established by the Czechoslovak State in 1952. The primary legal form was a "national enterprise." The first priority task of the enterprise was the production of explosives for the Army. A portion of semi-products (formalin and hexamethylentetramine) was allocated to the civil sector.

2.2 Enterprise Development

The additional development of the enterprise was carried out in three stages:

1. 1957-63. The formaldehyde chemistry complex was built in this stage. The facilities included: urea-formaldehyde glues, phenol-formaldehyde glues, and pentaerythritol.

2. 1964-69. The nitrogen chemistry complex was built in this stage. The facilities included: ammonia, nitric acid, NPK fertilizers, and carbon dioxide.

3. 1976-83. The following facilities were built in this stage: cyclohexane, cyclohexanone, and cyclohexanol.

Along with the stages of investment development mentioned above, the construction of auxiliary facilities was carried out (power supply, environmental protection, maintenance, etc.), as well as the construction of smaller facilities (diphenyl, polychlorinated biphenyls, rubber blowing agents, sulphuric acid, saltpeter, acetylene gas, liquid nitrogen fertilizer DAM-390).

On the other hand, some plants were gradually phased out (ammonia, NPK fertilizers, diphenyl, polychlorinated biphenyls, sulphuric acid, and saltpeter).

In recent years, development has been directed toward small volume chemistry. The following facilities have been constructed and put into operation: Light stabilizer of the Hals type -- Dastib 845, Antioxidant AO-49, lubricant Stepe 19, cleaning agents based on natural zeolites, etc.)

3. PRODUCTS

3.1 Chempors

3.1.1 Uses

For plasticized materials production such as rubber, PVC, and polyethylene. Several types of chempors are produced at CHEMKO (Chempor N 90, Chempor B 80, Chempor K, Chempor KD, Paste PC-55, Paste PC-65, and Adcafor).

3.1.2 Raw Materials

- DNPT
- Deodorant
- Kaolin

3.1.3 Quality Characteristics (Chempor K)

Appearance	light yellow powder
Rest after burning, mass %,max.	2.5
Water content, mass %, max	15.0
pH of water extract	7-9
Bulk density, kg/m^3	340
Start of decomposition, °C	120

Packing	PE bags á 40 kg, inserted into cardboars or metal drums
Transport	by trucks

3.2 Nitric Acid

3.2.1 Uses

A basic chemical raw material for many applications. As a semi-product, it is used for the production of DAM-390 fertilizer, Chemoform, DNPT for the production or Chempors and for concentrated products.

3.2.2 Raw Material

- Ammonia

3.2.3 Quality Characteristics

Appearance	yellow, liquid fuming on air
Nitric acid content, mass %, min.	55.0
Nitrous acid content, mass %, max.	0.15
Chloride, Cl^- content, mass %, max.(+)	0.01
Sulfuric acid, mass %, max.	0.08
Rest after burning, mass %, max.(+)	0.05

(+) The values are informative only and they are guaranteed in justified cases only, after previous agreement with customer.

Packing	stainless steel tanks
Transport	by railway

3.3 Formaldehyde

3.3.1 Uses

This organic raw material has many applications in the woodworking, chemical, leather, pharmaceutical, and plastics industries. Its primary use is in the chemical industry as the raw material for plastics and different resins, the production of pentaerythritol, hexamethylentetramine, aminoplasts, urea-formaldehyde and phenol-formaldehyde glues, in the paint and dye industry, and other uses. Several types of formaldehyde are produced at Chemko e.g. Formalin - technical grade, Formalin -technical grade stabilized with Melamine, Formalin -pure, Formalin -Medicine.

3.3.2 Raw Material

Methanol

3.3.3 Quality Characteristics
(Technical grade)

Appearance	colourless liquid
Formaldehyde content, mass %	36-38
Methanol content, mass %	4-11
Acids content like HCOOH, mass %	0.05
Ash content, mass %	0.008
Chloride content like Cl^-	0.0005

Packing	rail tanks
Transport	by railway

3.4 Hexamethylentetramine

3.4.1 Uses

Hexamethylentetramine (HMT) is used in the plastics industry, for producing moulding powder, in the explosives industry, in the pharmaceutical industry, and as a substitute for "solid alcohol." It is used as an accelerator in the rubber industry and as an additive to concrete for working at low temperatures. Several types of Hexamethylentetramine are produced at Chemko, e.g. Hexamethylentetramine, technical grade, crystalline, unstabilized; Hexamethylentertamine, technical grade, 1 % stabilized a.s.o.

3.4.2 Raw Materials

- Ammonia
- Formaldehyde

3.4.3 Quality Characteristics
(Technical grade, crystalline, unstabilized)

Appearance	white crystalline powder
Hexamethylentetramine content, mass %, min.	99.5
Ash content, mass %, max.	0.02
Water content, mass %, max.	0.05
Packing	four multiple paper bags á 25 kg with plastic insert
Transport	by railway, trucks

3.5 Urea-Formaldehyde Glue "Diakol 3T"

3.5.1 Uses

Diakol 3T is used for particle board and plywood production and for veneering at higher temperatures (140-180 degrees Celsius) and higher pressures. Use of this glue results in formaldehyde emissions lower than 10 mg/100 g DTD at the agglomerated materials production. This rate of emissions is rated at Class E-1.
(Besides the "Diakol 3T" many other types of Urea - Formaldehyde Glues are produced at Chemko. E.g.: Diakol M, Diakol DM, Diakol F, Lepidlo LP ..)

3.5.2 Raw Materials

- Urea
- Formaldehyde

3.5.3 Quality Characteristics

Appearance	milky liquid
Dry matter content, mass %, min	65.0
pH	7.4-8.4
The released formaldehyde, mg Fd/1g of bitumen, max.	0.2
Consistency (Ford 4/20)	
- by expedition, sec.	50-150
- by working, sec.	60-180
Time of condensation (100 ½C), sec.	60-100
Water miscibility, max.	1:1
Time of workability, weeks, min.(+)	6
The released formaldehyde - The Fesyp method (colorimetric), mg Fd/100g	5-7

(+) storage temperature max. 20 °C

Packing	insulated rail tanks, car tanks, galvanized 200 l drums
Transport	by railway, trucks

3.6 Phenol-Formaldehyde Glue "Fenokol 43"

3.6.1 Uses

Fenokol 43 is used for particle board and plywood production. Products glued with Fenokol 43 produce an emissions Class E-1 regarding the release of formaldehyde. It is suitable for industrial grade wooden construction and is suitable for production of waterproof plywood.

3.6.2 Raw Materials

- Phenol
- Formaldehyde

3.6.3 Quality Characteristics

Appearance	red brown liquid
Dry matter content, mass %	43-47
Dynamic viscosity, mPas	90-500
The released phenil, mass %, max.	0.05
The released formaldehyde, mass %, max.	0.05
Water solutibility	unlimited
Consistency (Ford 4/20)	20-80
Time of workability, days, min(+)	60

(+) storage temperature max. 20 °C

Packing	rail tanks, car tanks galvanized 200 l drums
Transport	by railway, trucks

3.7 Pentaerythritol

3.7.1 Uses

For paints, alkyd resins of different types, explosives, cosmetics, pharmaceuticals, and other uses.
Tree types of Pentaerythritol are produced at Chemko.
Product with 85 %, 96 % or 98 % monopentaerythritol.

3.7.2 Raw Materials

- Formaldehyde
- Acetaldehyde
- Calcium hydrate

3.7.3 Quality Characteristics (Technical grade 98 %)

Appearance	white crystalline matter
Melting point, ½C, min.	257.0
Hydroxylgroups content	49.1
Ash content, mass, max.	0.01
Water and volatile matters content, mass %, max.	0.3
Phalate test APHA, max.	200
Monopentaerythritol, mass %, max.	98.0
Packing	Paper bags á 25 kg, 30 kg with a PE or bitumen insert
Transport	by railway, trucks

3.8 Cyclohexanone

3.8.1 Uses

For caprolactum production, as a solvent for PVC, for nitrocellulose, and as a thinner for paints.

3.8.2 Raw Material

Benzene

3.8.3 Quality Characteristics

Appearance	oilyliquid
Cyclohexanone content, mass %, min	99.8
Moisture content, mass %	0.1
Organic additive content, mass %	0.1
- cyclohexanole content, ppm, max.	20.0
- n-hexanole content, ppm, max.	100.0
- 3-cyclohexanone content, ppm, max.	150.0
Packing	rail tanks, car trucks
Transport	by railway, trucks

3.9 DAM-390

3.9.1 Uses

DAM-390 is a nitrogen fertilizer which contains all three basic types of nitrogen in proper amounts and in liquid form, that is in the most proper one for growing vegetables. It is used for basic fertilizing before sowing and planting, or after sowing and planting in some cases.

3.9.2 Raw Material

- urea
- ammonia
- nitric acid

3.9.3 Quality Characretistics

Appearance	light yellow liquid
Amidic nitrogen content, mass %, min	14.5
Total nitrogen content, mass %, min	29.0
pH value of the origin sample	7.5-8.0
Packing	car tanks, rail tanks
Transport	by railway, trucks

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4. PERSONNEL
(Dec. 31, 1991)

4.1 Number of Employees

- Men Employees	2,551
- Women Employees	698
Total Employees	3,249

4.2 Age Distribution (in %)

Age group	Men	Women
Under 18	1	2
19 - 25	13	15
26 - 30	15	14
31 - 40	33	33
41 - 50	25	33
51 - 60	13	3
Over 60	0	0

4.3 Distribution by Education (in %)

Level of Education	Employees
Basic education not completed	1
Basic education	13
Journeyman's certificate	35
Secondary technical school (non-graduates)	1
Secondary technical school (graduates)	13
Grammar school	4
Total secondary technical education	23
University	10

Scientific education 11 persons

5. WORKERS' WELFARE

5.1 Operational Safety, Health Protection, and Work Environment

The operational safety and health protection of workers have always been stressed in the activities of the enterprise. Significant dangers exist there for the workers and for the property of the enterprise. Explosives are produced, and large quantities of combustible material (mainly liquids and gases) are processed. The enterprise processes raw materials and produces products, the larger part of which are classified as hazardous chemicals by the "Standards of the International Organization for Working with Chemicals." Technical facilities at the plant include considerable rotating machinery and other noisy equipment.

In spite of these dangers, unexpected events do not occur frequently causing crashes, explosions, or fires to property or harm to the health of workers from injuries or job-related illnesses. The ocurrence of such events has been below the statistical average in Slovakia for the past ten years. The same situation has been the case since the startup of the enterprise. Crashes of the technological machinery which threaten workers are very rare, with the exception of 1985.

Since its founding, the enterprise has experienced only two explosions resulting in large-scale damage and casualties. Fires are very infrequent and are usually extinguished quickly. During the last ten years, 23 fires have occurred which have caused property damage estimated at 600,000 Kcs, while human lives were not jeopardized. The rate of on-the-job injuries of 0.5 - 1.0 per 100 workers has been attained in recent years. Serious and fatal injuries have occurred rarely, except in 1985, when an injury occurred in connection with damage to the power plant boiler. Since 1980, 15 cases of job-related illnesses have been recorded, 10 cases of eczema caused by contact with chemicals and 5 cases of hearing difficulties. All cases were corrected by changing the workers' environment. No industrial poisons have been found.

The plant has 3 emergency vehicles to transport persons who become ill or who are injured, including outside persons who are legally on site. Such persons are transported to Strazske or Michalovce for medical attention.

The plant's toxicological laboratory, which has sufficient personnel and equipment, monitors the working environment (pollution, nuisance dust, and excessive noise and light). It cooperates with the Hygienic Station Laboratory in Michalovce in this regard. Because of the good situation in the work environment, the plant has not been required to pay any fines for pollution violations to the State Hygienic Supervisor.

The Safety and Fire Protection Department performs regular work safety and fire protection inspections in addition to the controls of the work environment discussed above. As experts in safety and fire protection, technicians are performing consulting and inspection activities at a level sufficient to maintain a high state of plant safety.

The plant provides sufficient protection against hazardous activities and materials. It provides protective clothing (including underwear), footwear, gloves, goggles, protective face shields, protective breathing apparatus (aspirators, breathing masks). Workers are given proper disaster clothing and insulated breathing apparatus for dealing with disaster relief.

The plant has installed fire alarms and stationary fire fighting apparatus and sprinkler systems at points where fire dangers exist to protect property against fires and gas explosions. Portable and mobile apparatus is also maintained at properly scattered locations and is monitored regularly for operational readiness.

The plant Fire Department, with its 17-man crew, assures constant readiness. It was established at the beginning of the plant and is equipped with the necessary mobile fire fighting technology and fire suppressants so that it can intervene effectively in cases of need. The Fire Department also ensures evacuation services in line with the emergency plan, inspection of breathing and revival equipment and first-line facilities, and the functional readiness of fire fighting apparatus and fire hydrants which are distributed all over the plant.

5.2 Social Care

CHEMKO has developed a social program in the following areas:

- Health preservation
- Factory board
- Housing
- Recreation for adults and children
- Pre-school facilities
- Sports and cultural activities

The plant has invested more than 300 million Kcs and spends more than 25 million Kcs annually to meet social needs.

The plant provides the following services to its workers:

- Factory Board: Nearly 60% of the employees utilize the possibilities of boarding at the factory on all three shifts.

- Housing: The enterprise has 1,694 flats (apartments) under a program which was organized when the enterprise was founded. Every year the enterprise grants loans to employees whom it wants to keep for single-family house construction. The enterprise also owns a hotel for single employees with 680 beds.

- Recreation: The enterprise owns three recreational facilities with 470 beds. Recreation is organized for employees and their families all year round. Recreation programs involve about 2500 adults and 700 children annually, and the enterprise spends about 4 million Kcs each year.

- Pre-School Facilities: Public nurseries and nursery schools have been built for 250 employee children. At present, these facilities are under the direction of the Ministry of Education. Starting September 1, 1991, the enterprise will operate the nursery schools with a capacity for 240 children.

- Sport and Cultural Facilities: A skating stadium, bowling alley, gymnasium, and a football stadium have been built and operated. The enterprise has a House of Culture for several purposes, a cinema, and spaces for different activities. The enterprise spends over 3 million Kcs annually for the operation of sport and cultural facilities.

The enterprise's social program is being re-evaluated now. Health care and factory board are receiving the most attention. The other activities should be gradually privatized because they are too much of a financial burden to the enterprise under conditions of a market economy.

The level and extent of health care is at the center of attention of the management as well as of the trade unions. The on-site health center is staffed by three health practitioners, two dentists, seventeen nurses and laboratory technicians. Besides these permanent workers, a gynecologist has office hours in the factory health center twice a week and a dermatologist has office hours once a week.

Health services include the following:

- Medical examinations at the start of employment, at the time of work changes, and at the end of employment and the evaluation of work environments as they might affect the health of workers.

- Care of sick workers by physicians of the factory health care center and specialists prescribing medicines. In cases when it is necessary to take a worker to a hospital or when special medical services are needed, the services are provided by district hospitals, clinics, health institutes, and others.

- Illness prevention is provided by the health care center which is equipped with necessary diagnostic and laboratory equipment such as an ultrasonograph, EKG, microspirometer, audio-chamber, memory-hemo-analyzer, and others. Because of job-related and other illnesses, regular examinations are conducted for workers who are exposed to risks such as unhealthy workplaces, and routine examinations are conducted for all workers. Special care is given to workers with cardiovascular illnesses, with immunity disorders, and other such conditions.

- Exercise rehabilitation is one of the health center programs together with massage for ill and convalescing workers, and for health preservation, as recommended by physicians. All of these services are free to workers.

- The night sanitorium has a special place in the health preservation program. Each year about 150 workers participate for three weeks at a time. The cure, which takes place after working hours, costs the worker 150 Kcs for a 15-day stay, the procedure, and transportation. For illness prevention, over 600 workers who work at unhealthy places are granted weeklong stays at the factory recreation facilities at no charge.

If necessary for their health, some workers are granted stays at State spas and at the spa in Sobrance.

The status of health protection is studied the management and by the trade unions. They observe the standards of health care and the incidence of job-related and other illnesses and make analyses. They make a complete analysis twice a year. Also, the trade unions and representatives of factory departments consult the health care services twice a year.

a/b

6. INTRA-ENTERPRISE SERVICES

6.1 Heat Supply

The basic heat source of the factory is from two boiler units situated in a power plant, each with a steam output of 160 tons/hour at a pressure of 13.6 MPa and a temperature of 540 degree C. The heat capacity of each boiler is 95 Gcal/h, and the boiler efficiency is between 83.5 - 85%.

The boilers are single-drum, bi-draught with natural circulation and with a slag-type furnace.

Each boiler is furnished with four grinding-ventilator mills for lignite, while the stabilization of the lignite powder burning is accomplished by means of casing-head gas. Besides these basic fuels, gaseous and liquid wastes from the cyclohexanone plant are burned in the boilers.

The power plant equipment includes facilities for unloading fuel, for storage of about 200,000 tons of lignite, and for fuel transport into the plant. The natural gas stepdown station, with a capacity of 5,000 m^3/h and reduction of 2.0/0.002 MPa, is built at the power plant site.

Demineralized water is used for steam generation. Thermic treatment of water is carried out in two stages (80/105 and 105/165 degree C).

Internal electric power is obtained from the switch control room at 6.3 kV which is connected through a transformer at 110/6.3 kV on the distribution system as well as from its own generator at 6.3 kV with an output of 40 MW.

The boilers generate steam at 13.6 MPa and 540 degree C, but the production plants use steam at the following parameters:

Indicated	Actual
0.5 MPa	0.42 - 0.45 MPa, 230 degree C
2.0 MPa	0.9 - 1.1 MPa, 230 degree C
2.0 MPa	1.6 - 1.7 MPa, 240 degree C
3.5 MPa	2.3 - 2.6 MPa, 340 degree C

Reduction to these parameters is performed either through a back-pressure turbine or by stepdown stations, with cooling.

Besides the main source of steam, the factory also has an auxiliary boiler house equipped with 5 compact boiler units:

25.0 tons/hour	-	installed in 1975
30.0 tons/hour	-	installed in 1984
30.0 tons/hour	-	installed in 1985
27.5 tons/hour	-	installed in 1986
27.5 tons/hour	-	installed in 1986

They are all flue, fire tube, medium pressure boilers which produce steam at 2.0 MPa and 245 degree C.

Treated water for the boilers is supplied from the water treatment plants:

- Demineralized water capacity 270 m^3/h
- Treated water 130 m^3/h

The steam is delivered to the production plants by a tube distribution system.

6.2 Electric Power Supply

The factory is connected to the VSE power distribution system by two 110 kV aerial supply lines of 60 MW power output each. The lines enter the factory in Pirelli underground oil cables to the Czechoslovak-made 110 kV switch control room. Two transformers, T 101 and T 102 (110/6.3 kV at 40 MVA) are connected to the switch control room using 110 kV dry cables from the firm SILEC. The third transformer, T 103, is also connected to the plant's own turbogenerator at 50 MVA (40 MW). The turbogenerator is driven by a back-pressure turbine.

Transformers T 101, T 102, and T 103 are connected to two block-switch control rooms. All electrical equipment is connected to the block-switch control rooms by 6.3 kV lines which are terminated in 23 distribution switch-control rooms for 6.3 kV. There are several hundred cable outlets from the main switch-control rooms to the secondary ones and to 6.3/0.4 kV transformers and to HV equipment.

The on-site distribution network consists of two parts, System A and System B, with all important facilities connected to both systems so that they can be supplied 100% by either system.

Low voltage distribution and one-way distribution at different voltage levels are carried out from separate control rooms.

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6.3 Water Supply

Water is supplied from two water supply complexes. One is on the Ondava River (with maximum diversion of 500 l/s) and the other is on the Laborec River (with maximum diversion of 500 l/s) which are used more according to actual need.

Water is pumped from the complexes into three water reservoirs with capacities of 1,000 m^3 each. Two reservoirs are used to supply technical water, fire water, and also water for the production of treated waters (lime-treated water, demineralized water, and water softened in the Na+ cycle).

The third reservoir is used for producing drinking water in the factory's water production facility.

Treated waters are produced in the central water treating plants:

- CHUV - 1: - Treated water capacity of 130 m^3/h (100 m^3/h + 30 m^3/h treatment of circulating condensate)

- CHUV - 2: - Demineralized water capacity of 270 m^3/h (110 m^3/h treatment of circulating condensate)
  - Lime-treated water in the B-L reactor (capacity of 1,000 m^3/h)

6.4 Waste Water Treatment

The waste water treatment plant contains:

- Collecting centres for partial homogenization of waste waters consisting of 16 surface metal tanks, with volumes of 80 to 140 m^3, into which waste waters are pumped from the various facilities and gradually discharged for biological cleaning. They were constructed in 1989 and are in good condition.

- Three 500 m^3 tanks as reactors for acid decomposition of biologically resistant formaldehyde precursors in waste waters. Built in 1989, they are already corroded and presently are being prepared for painting with an acid-proof coat by TERMOSTAV Bratislava.

- Three homogenization tanks with a useful volume of 3,500 m^3.

- The first biological stage, consisting of two 4,000 m^3 aeration tanks with aeration ejectors by KRUPP-KOPPERS (system Bayer). Final sedimentation tanks of the door type with volumes of about 400 m^3 each. Rebuilding of the aeration system in one of the tanks has been finished.

- The second biological stage, with two older aeration tanks of the carousel type operated in parallel (one-sludge system) with a possibility of connection in series (with the question of water quantity) in a two-sludge system. The first aeration tank was built in 1983 with a volume of 32,000 m^3, and the second one in 1989 with a volume of 16,000 m^3. The 6 aerators are from HUBERT ESMIL Netherlands (4 + 2) with turbine diameters of 365 cm (originally 375 cm). The direct supplier of the technology is DAVY BAMAG BmbH Butzbach.

- Sludge treatment, which consists three thickeners with volumes 2 x 600 m^3 and 1 x 450 m^3 and two chamber pressure filters from HOESCH (filtering surfaces of 250 m^2 and 120 m^2).

- Hydraulic load maximum: 400 m^3/h (actual about 300 m^3/h)

- Inlets: BOD5 about 5,000 mg 02/l
  CHOD Cr up to 10,000 mg 02/l
  Outlets: BOD5 up to 50 mg 02/l
  CHOD Cr about 700 mg 02/l
  Substantially lower CHOD Cr is expected (200 mg 02/l) after putting degradation reactors into permanent operation.

- Laboratory techniques are appropriate.

- A study of an Automatized System of Technological Process Control On Line has been prepared.

6.5 Transport

The Division of Transport was organized to perform transportation and handling operations at CHEMKO. In addition, the Division repairs and maintains all motor vehicles, superstructure, and locomotives, and maintains and cleans railway tankcars.

The Division of Transport also handles assignment of vehicles and repair of private cars. These services are performed by 207 employees, 30 technicians and 177 manual workers.

The Division's facilities are located in several places on site: the railway formation yard (which is outside the CHEMKO site), the new modern railway tank cleaning station, the railway engine shed for repair and maintenance, vehicle garages, the new waste water treatment facility, and the administration building.

7. QUALITY CONTROL

The enterprise adheres to common elements of international ISO quality standard 9000, with some products judged at ISO standard 9001. CHEMKO's management has adopted a quality strategy and directed all workers to carry it out. Training sessions are held for different levels of workers to adopt the quality policy and ISO standard 9000. Internal audits are scheduled and performed in line with ISO standard 9004. The enterprise is preparing for system certification with the aid of a foreign independent organization (TUV Germany) with the aim of approving its quality system and attaining and proving objectively its conformance with ISO standards 9001 and 9004.

Modification of the enterprise's charter will be implemented by December 31, 1991, and the certification process will be carried out from June 30 to December 31, 1992, so that the enterprise will be prepared for new conditions in the Euopean Common Market by January 1, 1993.

8. MAINTENANCE AND MECHANICAL MANUFACTURING

The entire maintenance function is handled by a separate branch with specialized departments for electrical equipment, measuring and control devices, special rotating machines, and for supplying machinery and construction activities. In addition, the maintenance branch offers services for outside customers such as assembly and installation, manufacture of machines, electrical work, repair of measuring and control devices, and crack detection. Finally, the branch offers residential services for space and water heating operation and distribution. The activity has 819 employees in 9 separately managed centres and one accounting center.

8.1 Mechanical Manufacturing Plant

The Mechanical Manufacturing Plant makes and renovates spare parts, equipment, and other machinery installations and carries out assembly and installation activities, repairs low and high pressure fittings, and repairs tanks for CHEMKO and outside customers. It trains plant and outside welders

and is authorized to manufacture high pressure steam and gas distribution equipment. Czechoslovak-made machine tools with an average life of 10 years predominate in the shops. These are general purpose machine tools, suitable for piece work. Semi-automatic welding machines are used to fabricate tanks. The investment is 21.4 million Kcs. There are 215 employees.

8.2 Electric Plant

The Electric Plant carries out all the maintenance of electrical equipment, electronics, and telecommunications, performing the daily and shift maintenance. It also does work for outside customers. The plant repairs elctromotors, including rewinding up to its authorized size of 100 KW. The plant is self-sufficient in this regard except for general repairs and rewinding of larger electromotors for which it contracts with outside suppliers. It balances the rotating parts of electromotors and other rotating machines and locates and repairs underground and surface electrical distribution cables. Projects are generally small in size. Electrical technicians perform their work with a high degree of precision. The plant's investment is 17.7 million Kcs, and there are 246 employees.

8.3 Measuring and Control Plant

The Measuring and Control Plant performs the complete maintenance on measuring and control equipment through daily and shift maintenance activities. The plant is self-sufficient except for typewriter repair. It designs and implements the process automation and control systems (TPACS) and maintains the equipment. It also repairs measuring and control instruments and offers metrological service for outside customers. The technicians are able to perform even the most complicated repairs on measuring and control devices such as analyzers and TPACS. The investment is 3.9 million Kcs, and the number of workers is 194.

8.4 Structural Maintenance Plant

The Structural Maintenance Plant maintains all kinds of structures to meet CHEMKO's needs, employing its own staff or outside contractors. Woodworking fittings are produced in a joinery shop, which includes a wood drier. It makes acid-proof pavings, boiler linings, as well as tinsmithing. Its concrete batch plant can supply a large volume of cement even for large structures. The total demand for pallets is provided by the joinery shop. Recently, the plant started wet cleaning tanks and then painting them. The investment is 4.2 million Kcs, and there are 80 workers.

8.5 Special Maintenance Shop

The Special Maintenance Shop performs the complete maintenance for lifting devices (lifts and cranes) and rotating machines (compressors, blowers, turbo-blowers, and turbines). These activities are performed for outside customers as well. The investment is 2.2 million Kcs, and the number of workers is 47.

8.6 Crack Detection Control

The Crack Detection Control unit looks for material defects, wearing, and quality of welds by using roentgen, ultrasonic, and magnetic methods and liquids. Mechanical properties of steel are tested. These authorized activities are both for CHEMKO and for outside customers. Investment is 1.2 million Kcs, and workers number 5.

8.7 Design Office

The Design Office prepares drawings of spare parts, steel structures, high and low pressure apparatuses, and other equipment. Drawings are prepared in the classical manner by 13 workers.

8.8 Reconstruction and Modernization Division

The Reconstruction and Modernization Division performs the main supplier function for structures paid mainly from investments or other means of development. The Maintenance and Mechanical Manufacture centers serve as sub-suppliers. There are 5 employees.

8.9 Advising, Information, and Implementation Centre for Saving Heat

As a newly established centre, it checks space heat and hot water consumption and advises ways to save on heat loss. It works in cooperation with MINOL Germany which will supply the instrumentation in accord with a 10-year contract. There are 8 employees.

9. MANAGEMENT INFORMATION SYSTEM

The Management Information System is based on two HEWLETT PACKARD HP 1000 computers, using an RTE VI operating system. There are 40 terminals and XT and AT PC's connected to both computers. Sub-systems for mechanical manufacturing and tracing supply movements are processed using a REDIFON system. The HP 1000 computers are used to elaborate the subsystems for worker hours and wages (PaM), financial information (EKI), sales, investments, production, and raw materials inventories. For the near future changes are being planned to network the existing system with greater reliance on PC's.

10. RESEARCH AND DEVELOPMENT

Research and Development capacities have been focused on technically and economically feasible innovations in chemical products and in protecting the environment and improving working conditions. Presently, attention is directed toward chemical speciality products. The work of research and development contributes significantly to the income of the enterprise.

Specialized departments comprise the Research and Development Division. It designs, tests, and verifies newly developed technologies and products.

Research and development focus is now on:

- Solving technological and innovation problems of present products.
- Developing and implementing new technologies and products, mainly in regard to admixtures to polymers and formaldehyde chemistry, and on products based on cyclohexanone and natural zeolites.
- Utilizing waste products from existing and new technologies.
- Solving environmental and working condition problems.

New directions of technology and product development are oriented, except for admixtures to polymers, to using natural raw materials which are located near the factory (salt, natural zeolites, and rape seeds), as well as to the applied research gained from the whole operation.

100 workers, including 30 researchers, work in CHEMKO's Research and Development Division which contributed 28% to profit in 1990.

11. INVESTMENT CONSTRUCTION DIVISION

Investment development is prepared and implemented in regard to production plans for the enterprise. This division organizes the investment development program, and the Technical Division completes the drawings and scheduling for plant modernization. The Investment Construction Division implements the actual construction.

A complete project for a structure and contracts for supplies are prepared during a pre-project activity period. In the construction period, activities of individual contractors are coordinated and completed segments are prepared for commissioning.

During recent years, investments in structures have been made in the amount of 250 million Kcs annually. Outside contractors worked to complete the structures. This year, the Maintenance Division is preparing plans for the "Diamin 6" facility and the "Dastib 1082" and "Adipic Acid" facilities for next year.

12. ANNUAL STATISTICS

Employees (Number)

1986	1987	1988	1989	1990	1991
3,928	4,224	4,242	4,224	3,755	3249

Total Sales (Millions of Kcs)

1986	1987	1988	1989	1990	1991
2,590.8	2,718.4	2,835.9	2,325.3	2,290.7	2,937.6

Profit (Thousands of Kcs)

1986	1987	1988	1989	1990	1991
186,481	333,524	486,339	201,726	147,314	31,657

Research Costs (Thousands of Kcs)

1986	1987	1988	1989	1990	1991
10,848	56,004	90,583	75,558	93,326	35,360

Investments (Thousands of Kcs)

1986	1987	1988	1989	1990	1991
214,847	318,302	444,115	426,033	391,842	284,832

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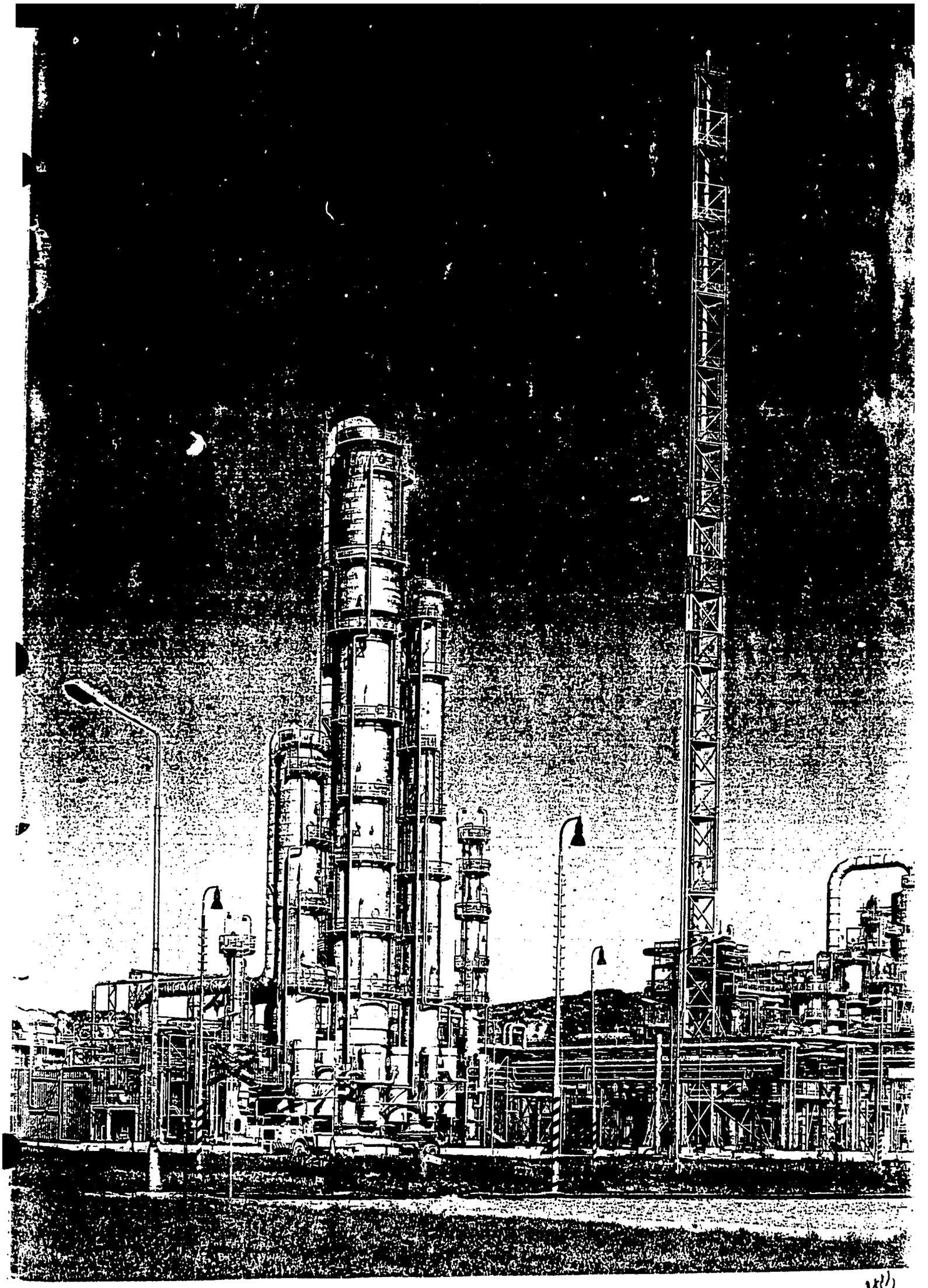

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KOŠICE
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