In the name of God

Pre-feasibility study form

Plan Name: Heat Setting of Yarn Types

Project Owner: Pooshak 202

Consulting Company: Kavosh Consultants Co.

Project address: Shahrekord Industrial Estate

Initial date: 2019

Update 2 (2020)

SUMMARY OF THE FEASIBILITY STUDY

General Specification
Name of The Project: Feasibility studies for Heat setting of yarn types
Project Capacity: 4200 ton per year
Personnel Number: 25 people
Working Days: 288 Days
Product Usage: Carpet production
Marketing
Product Global Price: 1.7 $
Domestic Demand: 60929 ton
Domestic Production: 16578 ton
Import: 44,350,406 Kg
Export: 13,341,373 Kg
Technical Study
Land Area: 6100
Building Area: 1470
Main Raw Materials: Types of filament yarn
Supplying Place of Raw Materials: Local
Power Requirement: 580,000 (kwh)
Water Requirement: 90000(m3)
Fuel Requirement200,000 (m3)
Economical & Financial Study
Fixed Investment Cost: 139543 Million Rials- 589339 Euro
Working Capital: 65645 Million Rials-277241 Euro
Total Investment Cost: 205188 Million Rials- 866580 Euro
Annual Sale: 714000 Million Rials- 3015467 Euro
Net Present Value(NPV): 170990 Million Rials- 722149 Euro
Break Even Point(BEP): 10413 Million Rials- 43978 Euro
Internal Rate of Return(IRR): 38%
Investment Return Period: 3 Years

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Introduction

Feasibility studies are expert studies that are carried out prior to the implementation of economic investment plans. In these studies, from the market, technical, financial and economic point of view, the plan is analyzed and its results used as a basis for investor decision making.

The present report is a feasibility study of heat setting of yarn types. These studies have been prepared in the framework of feasibility studies methodology and according to the above methodology, the economic capacities and volume of investments required to execute the project will be estimated and presented so that investors and interested stakeholders can obtain all the information needed. Earn money and start investing in open-ended, open-minded economic investment. It is hoped that these auxiliary studies, however small, will contribute to the development of our country.

1 -Product Introduction

Heat stabilization operations are one of the most important and effective heat treatment operations in the carpet industry. In fact, during this operation, the yarn structure is irreversibly stabilized by heating. Heat-stabilized yarn should be cooled immediately. In other words, heat stabilization operations include both heating and cooling.

The thermal stabilization of the yarn not only affects the physical-mechanical properties of the yarn and the woven rug, but also changes the visual appearance of the rug. As the temperature of the fibers increases and reaches above a certain temperature (glass transition temperature), the microstructure of the fiber forming polymer changes. On the one hand, at the irregularities of the internal structure of the fiber, the molecules move and on the other hand, the crystallization of the polymer chains occurs and new crystals are created. So it can be said that the fiber has a new structure in which the polymer chains and crystallization rates have changed.

However, if the fiber is immediately cooled, the fiber will not be able to return to its previous structure, and the new polymer order and consequently the new internal structure of the fiber will remain permanently unchanged. Since the changes in the fiber structure due to process heat are time-consuming, it can be said that the length of time in which the fibers are kept under heat stabilization is a very important factor in the structure of the yarn.

In general, the physical-mechanical properties of thermally stabilized yarns depend on important factors such as temperature, elongation of the yarn, the length of the yarn heating, the length of the yarn cooling, the vapor pressure, as well as the chemical structure of the yarn. The most important and effective of these is perhaps the temperature and duration of heating the yarn.

The most important reasons for performing heat stabilization operations may include:

- Thread fixation to prevent twisting
- Prevents the reduction of the curve and the yarn wave and maintain the bulk and fluffiness of the yarn
- Dimensional stability of yarn
- Resistance to corrosion of raw yarn when using carpet

•Improved carpet repellent properties during loading
•Grain pomegranate grained surface of carpet resulting in greater clarity of carpet map when viewed
•Reduce the carpeting rate of woven rugs

Dry heating or steam heating are used to heat the yarn in heat stabilization operations. Heat stabilization by hot air or dry heat is used for filament yarns made of synthetic fibers such as polypropylene, nylon and polyester. Of course, in some cases water vapor is also used to heat the synthetic filament yarn (especially nylon bridge) at a lower temperature. Hot starch is generally used for thermal stabilization of spun yarns, especially woolen yarns.

Features of Heat Setting of yarn types:
-Curling and flattening the yarn and reducing the amount of yarn consumed and the carpet covering better than its density (yarn bulking)
-Stronger thread and less tearing time
-Reduce lint
-More soft carpet
-Thermal stabilization
-Twist fixation (spinning yarn around you)
-Pin point effect of carpet; Detection of thread head in woven carpet
-Higher knitting efficiency
-Better coloring
-Increased erosion resistance
-Absorb less pollution and dust

1-1-Product Name and Code (ISIC 3)

According to information obtained from the Ministry of Industry, Mining and Commerce, the ISIC code is 1711512371.

1-2-Customs Tariff Number

According to the Book of Export and Import Regulations of 2018 and the Chamber of Commerce, Industries, Mines and Agriculture website, heat setting of yarn types is not directly mentioned but is a reference to the Customs Tariff Code 5501.

1-3- IMPORT AND EXPORT CONDITIONS

Basic salaries include customs duties, taxes, patents, types of duties and other remuneration received from imported goods and are equivalent to 4% of the customs value of the goods. In sum, this is the income received from the business determined by the Board of Ministers in accordance with the relevant rules. The entry fee for this project is 5%.

1-4- REVIEW AND PRESENTATION OF STANDARDS (NATIONAL OR INTERNATIONAL)

The national standards associated with the title of this plan are as follows:

Standard Name	Standard Number	Description
National standard	927	Textile - Polyester yarn threaded by virtual twisting method Properties and test methods
National standard	63900	Ropes-3,4,8,12-strand polypropylene fibers as strip, single filament and multi filament (pp2) and high strength polypropylene filament (pp3) -Features
National standard	4819	Characteristics of cotton-polyester blend used in machine rugs
National standard	4820	Properties of Cotton-Polyester Blend Fabric
National standard	925	Properties of stretched polyester thread
National standard	2739	Characteristics of polyester fibers used in the cotton spinning system

International standards related to the title of this project are as follows:

Standard Name	Standard Number	Description
IEC	61067-1	Properties standard for polyester fibers

1-5- REVIEWING AND PROVIDING NECESSARY INFORMATION ON DOMESTIC AND GLOBAL PRODUCTION PRICES AS WELL AS GLOBAL PRODUCT PRICES

The average price of the types of yarn used in this project is around 150,000 Rial/kg and the international price of this product is around $ 2 / kg.

1-6- EXPLAIN THE USES OF THE PRODUCT

- carpet industry.

-Different types of textiles

-Types of clothing

-Industrial applications

1-7-EXAMINE ALTERNATIVE PRODUCTS AND ANALYZE THEIR EFFECTS ON PRODUCT CONSUMPTION

Considering that the material used in this design is filament yarn, we compare it with its alternative, acrylic yarn:

Acrylic yarn and polyester filament yarn comparison table

Property	Acrylic yarn	Polyester filament yarn
Bullying	With lint	Absolutely no lint
Impact on consumer health	Has an allergic problem due to thinning. In the EU, the use of acrylic in clothing, blankets and .wool is banned	No allergic problems due to lack of lint. It is common in the EU
Moisture absorption percentage	1-3 %	0,5 %
Density	1.16	1.38
Indirect heating effect	It begins to soften at temperatures of 150 ° C and breaks down at temperatures .above 200 ° C	It cools to 240 ° C and melts at .260 ° C
Resistance to alkalis	Resistant to 35% solution (less sensitive to chlorinated detergents)	Resistant to 10% solution (sensitive to chlorinated detergents)
Acid resistance	Resistant to hydrochloric acid 35%	Resistant to hydrochloric acid 35%
Yarn wash stability	Scale 6	Scale 6
environmental issues	It emits toxic cyanide as it burns and ignites	Burns and ignites like carbon dioxide burns water and carbon dioxide gas
Pressure reversibility	standard range and slightly higher than polyester	standard range
World production rate	From 1990 to 2003, upward trend with variable rates between 3 and 3.5 million tonnes per year, from 2003 to 2009 decline in production to 2.6 million tonnes per year	From 1990 to 2009 with a steadily increasing trend to 19 million tonnes per year

1-8-STRATEGIC IMPORTANCE OF GOODS IN IRAN AND COUNTRIES OF THE REGION

1-Profitability and return on investment

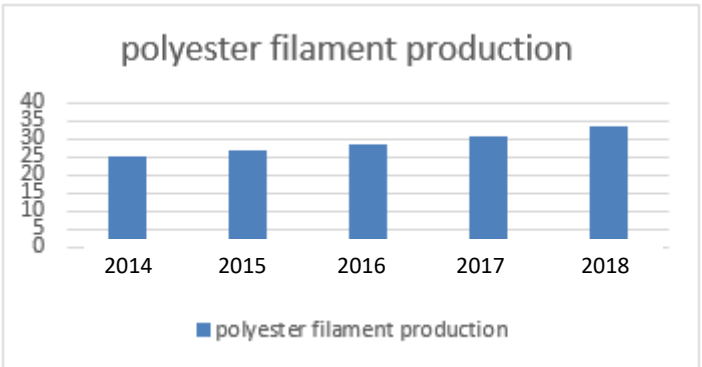
2- Potentially growing domestic consumer market and creating favorable conditions for export

3- The high import of this product in recent years has led to a large amount of currency withdrawal from the country, which is prevented if the domestic demand for foreign currency is produced and fulfilled.

Due to the relatively long history (about 5 years) of production of this product in Iran and the presence of skilled technicians and skilled workers, as well as the existence of various textile colleges with the fields of polymerization and synthetic fibers and the training of excellent experts and engineers in this field. The field does not need to buy production technology from abroad. In addition, the vendor of the machinery will provide the buyer with all the scientific and technical information specifically required by the machinery.

1-9-MAJOR MANUFACTURING AND CONSUMER COUNTRIES

According to statistics provided by Year Fiber in 2019, synthetic fiber production rose 7.4 percent to 61.8 million tonnes in 2018. According to the statistics presented, the production of staple fibers and filaments has grown by 7.4% and 9.3% year-on-year, respectively. Polyester (staple-filament) fibers account for the largest share in the production of synthetic fibers with a share of 52 million tons and nylon and propylene fibers are next. According to statistics presented, polyester filament production increased to 33.7 million tonnes in 2018, indicating a steady average growth in the last seven years. China is the largest producer of polyester filament in the world. Among the major uses of polyester filament are the carpet and textile industries. The chart below shows the continuous growth of polyester filament production in the world from 2014 to 2018.

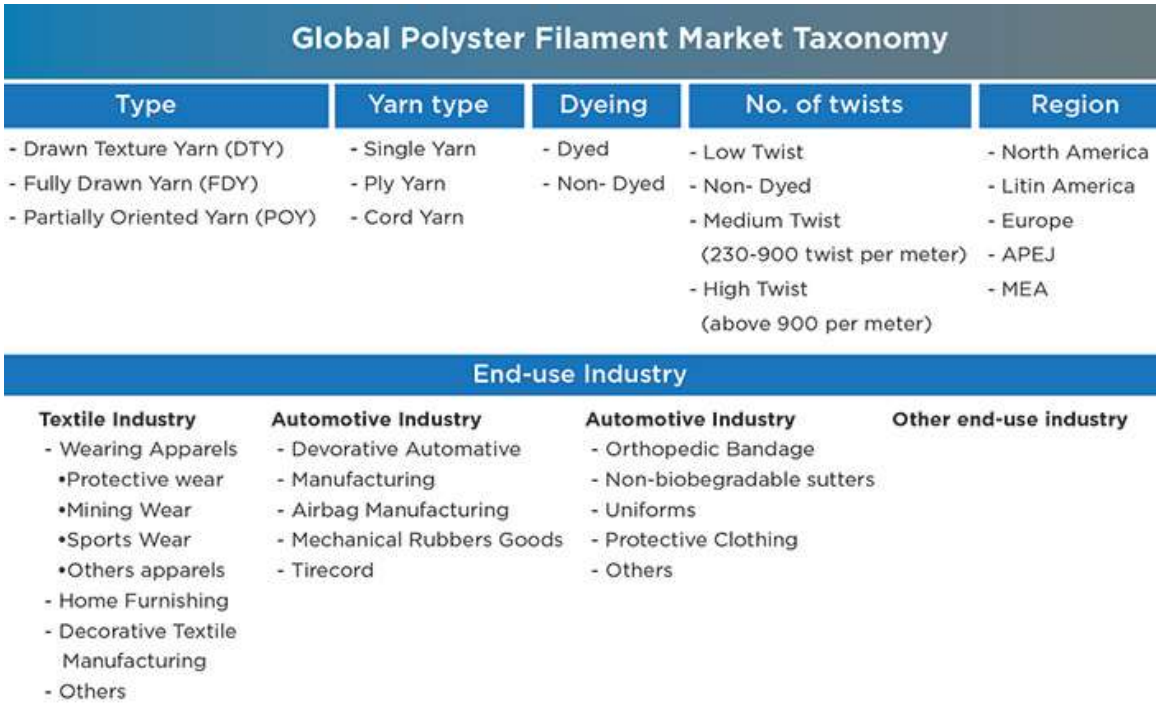


Given the high volume of polyester filament production and its increasing trend, it is important to realize its importance in the world and its widespread use in textile industries such as carpet, garment and textile industries. Due to the increasing trend of polyester filament production in the world, in recent years we have also witnessed an improvement in the production of this type of fiber in Iran, which has been accompanied by increased employment in this field. One of the important advantages of polyester filament can be the internalization of the raw materials used for the production of polyester and the need to import raw materials in this field.

2- SUPPLY AND DEMAND SITUATION IN IRAN AND COUNTRIES IN THE REGION

The polyester fiber market is expected to generate more than $ 87,000 million by the end of 2018. Significant growth in the use of polyester in the textile industry, including apparel and home furnishings, and increased demand for polyester fiber in automotive textiles are some of the prominent contributors to the polyester fiber market revenue. The textile industry accounts for more than 60% of the polyester fiber market. Demand for polyester in the textile industry is expected to see healthy growth. The textile industry is in high demand for polyester filaments, which have the ability to replace cotton yarn to some extent. Despite the relatively high yarn prices, demand and sales of polyester filament yarn are steadily increasing.





Source: textiletoday

The following are some of the leading global manufacturing companies operating in the industry:

HYOSUNG CORPORATION

ZHEJIANG CO

SAINT-GOBAIN AMERICA SA DE CV

RELIANCE INDUSTRIES LIMITED

ORIENTAL INDUSTRIES (SUZHOU) LTD

LEALEA ENTERPRISE CO., LTD

GOLDEN LADY COMPANY SPA

The names of the domestic companies active in this industry are given in the next section.

2-1-AN EXAMINATION OF EXPLOITATION CAPACITY AND PRODUCTION PROCESS FROM THE BEGINNING OF THE THIRD DEVELPOMENT PLAN TO NOW

Row	Name	City	Capacity
1	Rang Asil Mahout Kashan	Aran and Bidgol	2000
2	Shirin Baft	Qom	377
3	Nakh Peivasteh Zagros	Esfahan	3000

4	Seyed Jamal Hosseini Darbazi	Yazd	110
5	Polyester Pars yarn production	Esfahan	2200
6	Niavaran carpet	Aran and Bidgol	2800
7	Seyed Saeed Mirbod and Zahra Zamani	Shahreza	1000
8	Spadana Polymer Race	Shahreza	1500
9	Taft Baft Borujen	Borujen	10000
10	Ilya Nesaj Mahtab Iranian	Borujen	1500
11	Setareh Talaei Mallat	Esfahan	2000
12	Mosharaketi Elegant Semnan	Semnan	1010
13	Asayesh Kashan	Aran and Bidgol	1800
14	Rasool Asadi Eskandani	Tabriz	95
15	Qaitaran Talaei Kashan	Aran and Bidgol	2800
16	Khatam Aran	Aran and Bidgol	3300
17	Dibarisan Aran	Aran and Bidgol	7000
18	Sanei Avar Shimi	Qom	4000
19	Sima Farshineh	Mobarake	2000
20	Atrin Nakh Qom	Qom	8100
21	Shafagh Kashan	Kashan	3000
22	Nafis Nakh	Qazvin	990
23	Negin Carpet Mashhad	Mashhad	3500
24	Qiam Nakh	Yazd	8200
25	Shahab Farsh Bidgol	Aran and Bidgol	1800
26	Sabaris Kashan	Kashan	5000
27	Farrokh Sepehr Kashan	Kashan	2100
TOTAL			**81182**

Source: Ministry of Industry, Mining and Commerce - Statistics and Information Center

2-2-CHECK THE STATUS OF NEW PROJECTS AND ONGOING DEVELOPMENT PLANS

Row	Name	City	Capacity
1	Koosha Rangdaneh Qom	Qom	8000
2	Risandegi Negin Mashhad	Mashhad	3500
3	Rang Asil Mahout Kashan	Aran and Bidgol	1000
4	Shirin Baft	Qom	500
5	Yas Baft Pouya	Qom	500
6	Nakh Kowsar Fard	Qom	500
7	Nakh Aban Tehran	Qom	500
8	Nakh Taban Shokoohieh	Qom	500
9	Nakh Bahar Shokouhieh	Qom	500
10	Kashbaf Mehr Tehran	Qom	500
11	Al-Ghadir Tehran	Qom	500
12	Nakh Kowsar Alborz	Qom	500
13	Nakh Rose Tehran	Qom	500
14	Farsh Kimia Kashan	Kashan	6000
15	Kashfar Bahar Tehran	Qom	500
16	Kashabf Azar Tehran	Qom	500
17	Polyester Pars	Esfahan	2600
18	Nahid Nakhsh Shokoohieh	Qom	500
19	Nakh Sobhan Shokoohieh	Qom	500
20	Nakh Shokouhieh Asia	Qom	500
21	Nakh Gol Shar Shokouhieh	Qom	500
22	Nakh Erfan Shokouhieh	Qom	500
23	Nakh Golestan Shokouhieh	Qom	500
24	Nakh Tandis Shokouhieh	Qom	500
25	Risandegi Khosh Nakh Yazd	Yazd	2000
26	Risandegi Kashan Ziba	Kashan	2000
27	Alvan Ris Kavar Kashan	Kashan	15000
28	Abrisham Baft Zagros	Borujen	700
29	Armaghan Parsian Kashan	Kashan	4500
30	Nasim Ris Kavir	Yazd	150
31	Hasht Behesht Kish	Borujen	5000
32	Mahdis Qadir Kashan	Kashan	5000
33	Nesaji Saba Tab Isatis	Yazd	700

34	Nassaji Mandegar	Shahin Shahr and Maymeh	4000
35	Akbar Moshiri Sadr	Karaj	60
36	Fardin Mohammad Goharvi	Kiaar	1000
37	Delnavaz Kashan	Kashan	14000
38	Miras Fakhr Sina	Kashan	5000
39	Nafis Nakh	Alborz	600
40	Ziba Ris Alborz	Kashan	1500
41	Mahout Company	Esfahan	7000
42	Bahar Natanz	Natanz	2000
43	Negin Kashan	Kashan	1500
44	Negin Alborz Aran	Aran and Bidgol	7000
45	Khatam Aran	Aran and Bidgol	4000
46	Hasht Behesht Kish	Borujen	
47	Seyed Saeed Mirbod and Zahra Zamani	Shahreza	1500
48	Panjah Rang Abrisham	Aran and Bidgol	3000
49	Sima Farshineh	Mobarake	2000
50	Paya Polyester Yazd	Yazd	1000
51	Arad Kavir Kashan	Aran and Bidgol	4500
52	Almas Ris Aria	Esfahan	3000
53	Zomorrod Azin Mehregan	Aran and Bidgol	1000
54	Nassaji Mandegar	Shahin Shahr and Maymeh	4000
55	Khatereh Kashan	Kashan	5000
56	Nesaji Zartaban Kashan	Aran and Bidgol	3000
57	Diba Nakh	Yazd	600
58	Iran Tak Nakh	Nowshahr	1500
59	Talaaris Kashan	Kashan	9000
60	Farrokh Sepehr Kashan	Kashan	8000
61	Zartab Zayandehrood	Esfahan	1500

Source: Ministry of Industry, Mining and Commerce - Statistics and Information Center

2-3-REVIEWING THE PROCESS OF PRODUCT IMPORTATION

According to the information in the book "Export and Import Regulations of the Islamic Republic of Iran in 2018, the title of this scheme is the Customs Tariff Schedule 5501. The amount of imports in the last 5 years, along with the value of the rial and dollar, according to the announcement of the Chamber of Commerce, Industry, Mines and Agriculture is as follows:

Year	2015	2016	2017	2018	2019
Weight (kg)	22,614,380	30,827,365	33,950,604	44,350,406	2,898,027
Rial value	1,364,258,502,964	1,703,054,521,665	2,490,577,353,044	4,509,644,028,953	273,095,477,355
Euro value	39,236,940	45,967,051	61,599,069	90,561,229	5,510,402

2-4-MONTORING CONSUMPTION TRENDS

The best way to determine the amount of yarn consumed by the heat setting process is to use supply and demand balances. So that the amount of domestic consumption is estimated to be the result of the difference in supply (total domestic production and imports) and exports. According to the latest statistics in the year 2019, we have imported about 2,000 tons and produced about 81,000 tons. Consumption of this product has been increasing in recent years due to the industrial development of the country and it is expected to reach 100,000 tons in the near future.

2-5-INVESTIGATE THE EXPORT PROCESS OF THE PRODUCT AND THE POSSIBILITY OF ITS DEVELOPMENT

The amount of exports in the last 5 years, along with the value of the rial and the dollar, are as follows:

Year	2015	2016	2017	2018	2019
Weight (kg)	6,989,386	11,871,124	12,996,966	13,341,373	449,860
Rial value	304,864,462,102	539,817,906,766	706,023,073,714	1,027,654,066,495	69,451,208,610
Euro value	8,829,874	14,528,910	17,573,614	16,412,342	610,718

2-6- PRODUCT REQUIREMENT CHECK WITH EXPORT PRIORITY

Basically, the process of heating and steaming is to improve the quality of the yarn and ultimately the carpet. Experience has shown that the use of heatsink yarn in a single carpet weaving unit has increased productivity by seven to ten percent. That would be a very high figure in a company's financial period. As mentioned, this increase in efficiency is due to the removal of many defects in the heatsink stage, and this is one of the reasons that carpet manufacturers have welcomed the heatsink. The Heat Set is almost a must today for high tech carpet weaving machines. Today, the speed of tissue is increasing. And especially at high densities of yarn carpets, they must withstand a great deal of tear.

In the Heat Set machine, an average of twenty-four to forty-eight threads are fed to the machine on the shelf. Basically, the process of steam flamming yarn is an essential process for high quality machine rugs. Steam gives rise to high tear resistance, high dimensional strength, reduced surface roughness,

resulting in thinning of the yarn, high color absorption, bulking of the yarn and the creation of a perfectly smooth surface with a soft undercoat. There is also a reservation. That the production process does not stop when the first reel is completed.

3-OVERVIEW OF TECHNOLOGY AND METHODS OF PRODUCTION AND SUPPLY IN THE COUNTRY AND COMPARISON WITH OTHER COUNTRIES

Operationally there are two general methods for fixing the yarn:

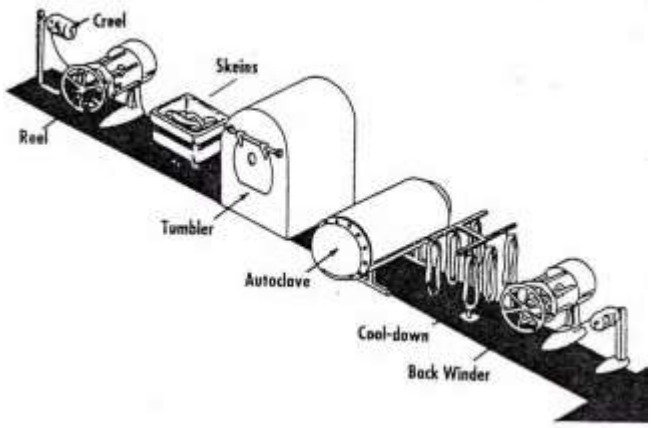
- autoclave method
- Continuous method

Autoclave method

In the autoclave method, which is a non-continuous method, a cargo of yarn is transported into the autoclave in the form of coils or loose coils. Due to the thickness of the raw carpet yarns, they are first coiled by a screw coil and then the coils are shipped into the autoclave.

The autoclave machine resembles a large horizontal cylinder or capsule (and in newer models resembles a cubic chamber with its end closed and a large door at the beginning) which is closed after carrying the yarn. The saturated water vapor is then injected into the autoclave for one hundred and forty minutes. After the operation is completed, the yarn is moved out of the machine to cool completely. Due to the saturation vapor, the temperature inside the autoclave is adjusted by the pressure inside the machine.

The fiber stabilized by autoclave twisting or thermal fixation is usually bulkier and lighter than the thread-stabilized twist. The autoclave method is also the most common method of removing any defects or twisting of the spun yarn.



Continuous method

In the continuous process where companies such as Sussen, Superba and Power Heat Set are the most important machine makers of this type, the thermal stabilization process is a continuous process. In other words, the yarns are fed from one side of the machine by going through the steps inside the machine, from the other side as the yarn is thermally stabilized. These machines can usually heat up to 5 tons of yarn per day. In these machines, the yarns are first loosened from the feed rack coils (with the capacity of twenty-four to seventy-two coils) open and in the form of small rings on the grid steel conveyor.

As the grid conveyor moves, the yarn first passes through a small steam chamber. In this chamber, which is fitted to prepare the thread for thermal stabilization and known as the "pre-steam" section, the steam is threaded at 100 ° C under atmospheric pressure. Then, as the conveyor moves forward, the yarn enters a tunnel called the "thermal stabilization tunnel" or "stabilization channel" about nine meters in length. In this tunnel, depending on the type of thread, pure saturated steam is threaded at temperatures of about 120 to 150 ° C under high atmospheric pressure. The length of time the yarn passes from the beginning to the end of the tunnel depends on the speed of conveyor movement and the length of time required for each type of yarn to steam. This time for polypropylene BCF yarns is about one minute.

After the yarns leave the tunnel and cool, the yarns separate. Each thread is wrapped in a separate direction to the twisting section, wrapped in a separate bobbin.

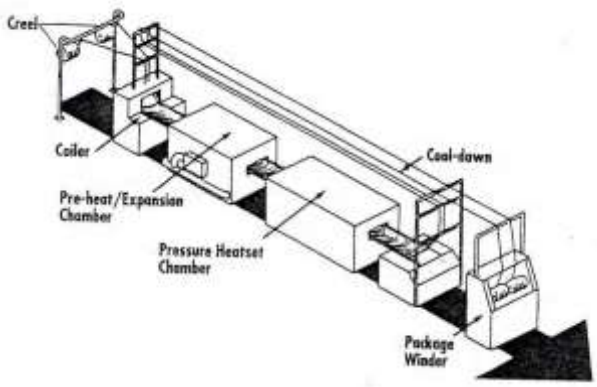
In some models of heat stabilization machines, instead of being threaded onto the conveyor, the threads are coiled on two parallel ropes, after opening from the feed coils. Moving toward the fixation channel, the two ropes carry the yarn placed inside the canal. The stabilization channel, unlike the thermal stabilization tunnel, has a shorter length (about two meters). At the beginning of the thread entry into the channel, a low-temperature preheating is applied to the thread and then in the middle of the channel, the thread is saturated with steam to be thermally stabilized. Each strand wraps on a separate bobbin after leaving the channel. The length of the heat-stabilized thread in continuous methods is about a few minutes (fifty seconds to two minutes), which is much shorter than the length of time the thread is placed in the autoclave, which sometimes reaches thirty minutes. This is due to the rotation and movement of the water vapor on the one hand and the non-compressed yarn on the other hand, which causes the water vapor to penetrate the yarn more rapidly and to achieve faster thermal stabilization.

In general, thermal stabilization machines are long machines. The length of these machines varies from twenty to fifty meters and their width is about five meters, depending on the type of shelf and the length

of the shelf and the coil winding section. Due to the need for saturated water vapor, thermal stabilization machines require ancillary equipment such as boilers and steam pipes.

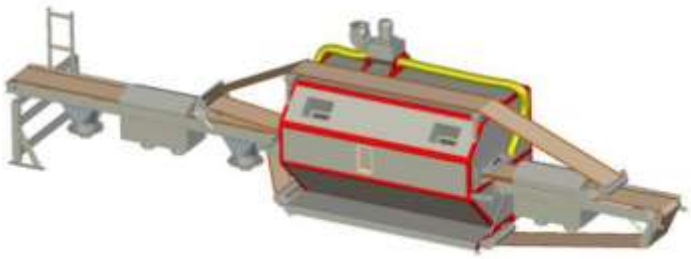
It is important to note here that although the general method of thermal stabilization of yarn has been described in the continuous method, there are also differences between the stages and conditions of thermal stabilization of yarn in different machine manufacturing companies. In the Iranian machine-made carpet industry, there are generally two types of BCF polypropylene filament yarns and thermally stabilized acrylic spun filaments. The reason for the thermal stabilization of each strand is different.

Woven rugs from polypropylene yarns have poor reversible properties. In other words, these types of machine-made carpets become rigid after baking, and their raw yarns do not return to their original state after being squeezed (tearing or placing heavy objects on the carpet). Hence, the polypropylene BCF yarn is subjected to heat stabilization. This will improve the reversible properties of the woven carpet, and make the carpet slip off later. In contrast, the most important causes of thermal stabilization of spun acrylic yarns can be attributed to the stabilization of twist yarn, reduced carpet yield, and pomegranate grain carpeting. Pomegranate grains make the carpet look clearer and more beautiful. As a result, the carpet's visual appearance is improved and the carpet is more customer-friendly, as exemplified in Iranian quality carpets, including Mashhad Ardahl carpet and ... can be seen.

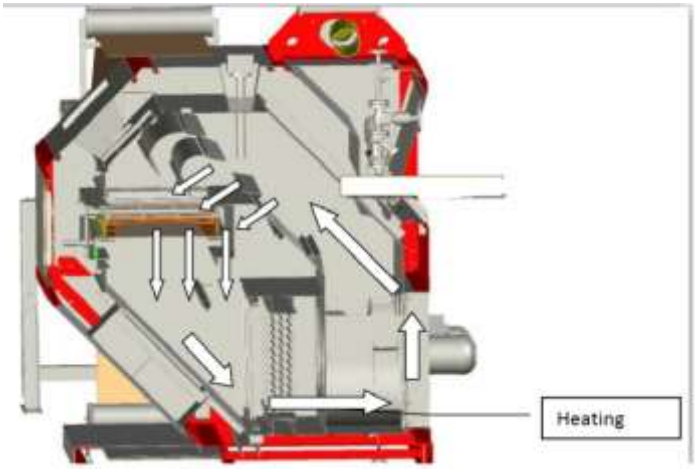


4-DETERMINING THE STRENGTHS AND WEAKNESSES OF CONVENTIONAL TECHNOLOGIES IN THE PRODUCT MANUFACTURING PROCESS

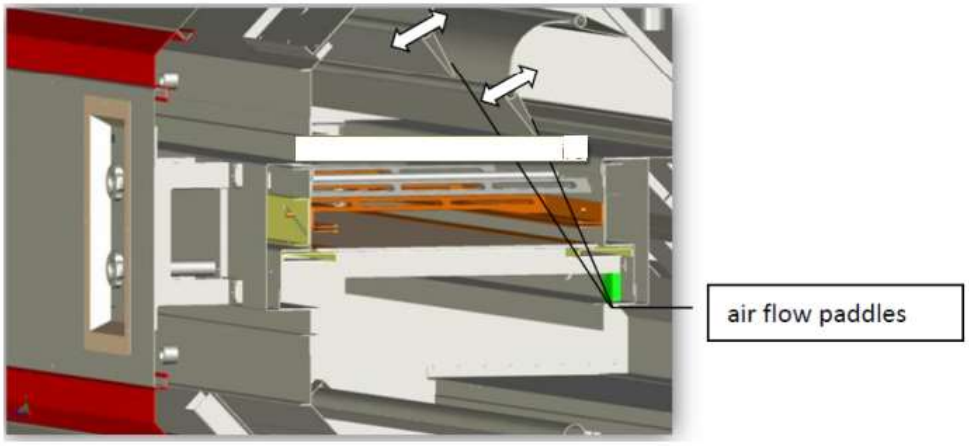
The technology uses a unique conveyor belt to transfer the yarn to heat and steam environments, which improves the quality of the yarn set.



The use of this type of conveyor belt and the greater control over heat stabilization operations have ensured that the quality of the yarn set is constant even among several machines and that there is no difference in carpet and rug texture when used and blended. In this technology, four symmetrical balanced pressure fans are designed as well as a special air passage system, which makes the thermal environment, throughout the yarn stabilization process, very stable and uniform. By converting air blockage into airflow, high volumes of heat wind combined with steam by relatively high compression make it possible for the thread to heat up quickly and reach its true thermal stabilization point. Thus, reaching the dew point in the Heat Set process occurs in a shorter time, which reduces the density of the yarn and improves the working process when passing through the thermal tunnel.



The coating system, which is adjustable outside the heat chamber, can adjust the value of the width of the hot current passage to the amount of fiber moving on the strip.


air flow paddles

5- INVESTIGATE AND DETERMINE THE MINIMUM ECONOMIC CAPACITY, INCLUDING ESTIMATING THE VOLUME OF FIXED INVESTMENT IN RIAL AND FOREIGN CURRENCY

EXPLANATION: EXCHANGE RATE BASED ON NIMA SYSTEM - DATED 22/8/2020 - AMOUNT: 236784 RIALS

Project Investment Schedule:

Description	Cost (Million Rials)	Cost (Euro)
Land	6100	25763
Landscaping	1633	6897
Construction	10575	44662
laboratory equipment	2400	10136
Utilities	2420	10220
transportation	3840	16218
equipment and machinery	105074	443763
Office equipment	856	3616
Miscellaneous and unforeseen	6645	28064
Total	139543	589339

The ground specification of the project implementation is as follows:

Description	Area (m 2)	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Land	6100	1/000/000	6100	25763

The cost of landscaping is as follows:

Description	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Digging and leveling	6100	150/000	915	3865
Fencing	322	1/500/000	483	2040
Asphalt and pavement paving	400	450/000	180	761
Green space and lighting	550	100/000	55	233
Total			1633	6897

Building Information:

Description	Building type	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Production	Niches	700	5/700/000	3990	16851
Raw materials and supplies	Niches	550	5/700/000	3135	13240
Office building and services	Official	120	20/000/000	2400	10136
Utilities	Niches	50	6/000/000	300	1267
Guard		50	15/000/000	750	3168
Total		1470		10575	44662

Utilities:

Description	Cost (Million Rials)	Cost (Euro)
Power Supply	850	3590
Fuel	100	422
Heating and cooling equipment	650	2745
Protective equipment and security system	320	1351
Compressed air supply	500	2112
Total	2420	10220

Transportation:

Description	Technical Specifications	Cost (Million Rials)	Cost (Euro)
Forklifts	3 ton	2400	10136
Pickup	Nissan	790	3337
Riding	Samand	650	2745
Total		3840	16218

Equipment and Machinery:

Manufacturing machinery is the most important part of industrial investment. The machinery of each manufacturing complex determines the quality and variety of products, production technology, raw materials, and many of the methods, costs of production, and even the finished product price. Machinery selection is a critical and influential factor in the macroeconomic indicators of the plan. The cost of producing the machinery and equipment of the production line is estimated on the basis of inquiries from major manufacturing companies or reputable agencies. It also calculates the cost of procuring machinery, including shipping, installation, customs duties, and so on. Power Heat Company's leading manufacturers of Heat Set process equipment including steam chamber, cooling systems, thread passage and thread separation, etc. can be mentioned. It is one of the largest Heat Set process machine manufacturers in the world. Other manufacturers include the Meera Industrial Group (MEERA) and Superba. The price range for all of these companies is about 10 percent. The price of machines for this process is given in the table below.

Number	Name	Required amount	Currency (Euro)	cost (million rials)	Rial sum (million rials)
1	Steam compartment	2	27029	6400	12800
2	cooling systems	2	32308	7650	15300
3	Strip system	2	4646	1100	2200
4	Feeding the yarn	2	15416	3650	7300
5	TRB	1	35898	8500	8500
6	Cooling section	1	31675	7500	7500
7	Sealing system	2	8025	1900	3800
8	Sensors	3	5913	1400	4200
9	Fiber Brush	1	22806	5400	5400
10	Exhaust system	1	14148	3350	3350
11	Path of the yarn	1	36743	8700	8700
12	Harvest unit	1	29563	7000	7000
13	Yarn separation unit	1	34099	8074	8074
14	Yarn Stretch Compensation Unit	1	19638	4650	4650
15	Yarn Pack Control Unit (BCU)	3	8869	2100	6300
Total(million rials)					105074
Total (Euro)					443763

laboratory equipment:

Number	Name	Currency (Euro)	Rial Cost (Million Rials)	Rial sum million) (rials
1	laboratory equipment	59625	2400	2400
2				
3				
Total		2400		

Office equipment:

Number	Name	The required amount	Currency (Euro)	Rial cost per unit	Rial Cost (Million Rials
1	Management table with chair	1	63	15/000/000	15
2	Conference table and conference chair	1	190	45/000/000	45
3	Computer desk and chair	3	37	9/000/000	27
4	Office desk and chair	3	34	8/000/000	24
5	Secretary's desk and chair	1	30	7/000/000	7
6	Showcase	1	34	8/000/000	8
7	Library	1	34	8/000/000	8
8	Quad slider file	2	17	8/000/000	8
9	Waiting chair comfort	6	12	18/000/000	18
10	Dining table and chair	1 Series	37	9/000/000	9
11	Computer	6	190	270/000/000	270
12	Printer and Scanner	4	63	60/000/000	60
13	Fax	3	25	18/000/000	18
14	Telephone	8	8	16/000/000	16
15	kitchen appliances	1 Series	634	150/000/000	150
16	Fingerprint Attendance Device	1	36	85/000/000	85
17	Wireless and Internet equipment	1	25	6/000/000	6
18	Office stationery	4 Series	13	12/000/000	12
19	Central central system	1	296	70/000/000	70
Total (Million Rials)		856			
Total (Euro)		3616			

Working Capital Costs:

Name	Description	Cost (Million Rials)	Cost (Euro)
Raw materials and packaging	60 Days	64666	273106
salary	30 Days	828	3496
Energy costs	30 Days	63	266
revolving fund	15 Days	88	371
Total		65645	277241

Production costs:

Description	Cost (Million Rials)	Cost (Euro)
Cost of raw materials and packaging	388000	1638657
Salary Cost	9939	41975
Energy costs	754	3185
Cost of maintenance	1369	5782
Unforeseen cost of production	11948	50461
Administrative and sales costs	4120	17400
Costs of financial facilities	5745	24263
Insurance costs	450	1900
Depreciation cost	11948	50461
Depreciation expense before operation	45	190
Total	434318	1834275

6-THE AMOUNT OF RAW MATERIAL NEEDED ANNUALLY AND WHERE IT IS SUPPLIED

Number	Description	Consumption per unit product	Unit of consumption	Amount of Consumption Required for Total Capacity	Rial equivalent (per unit)	Place of supply	Cost (Million Rials)
1	Filament yarn	1	Ton	4200	92/000/000	Internal	386400
2	Packaging materials and...	1	Ton	800	2/000/000		1600
3							
Total (Million Rials)							388000
Total (Euro)							1638657

7-RISK ANALYSIS OF PROJECT IMPLEMENTATION

Studies show that in the next year the market will be in short supply and there will be a greater need for imports. So it can be said that the implementation of new projects in this field is not very risky because in addition to the domestic market there is easily good potential to export this product to neighboring countries and if for any reason the applicant intends to undertake this plan, it is necessary to act with caution and superiority over other industrial units and by examining further the weaknesses and strengths as internal factors as well as opportunities and opportunities. Threats as external factors minimize project risk.

8- HUMAN RESOURCES AND NUMBER OF JOBS

One important aspect of any industrial unit is its job creation, which is thoroughly examined in the market segment. Due to the nature of the industry and the need for 3 shifts to work, it has been attempted to select the number of personnel in a manner that addresses the production needs of the two shifts. It has also been tried to use related specialties in different parts of production.

To calculate the amount of annual salaries and benefits, three shifts and other benefits have been added to the annual salary. For this purpose, the annual salary is set at 16.4 months per year.

Description	Gender	Number	Monthly salary per person (Million Rials)	Monthly salary (Million Rials)	Annual salaries (Million rials)	Annual salaries (Euro)
Managing Director	Man	1	41	41	672	2838
financial manager	Man	1	34	34	558	2357
Marketing Manager	Man	1	34	34	558	2357
Financial, sales and administrative personnel	Female	2	29	58	951	4017
warehouse keeper	Man	2	24	48	787	3323
Line Administrator	Man	1	24	24	394	1664
skilled worker	Man	3	23	69	1132	4781
Semi-skilled worker	Man	4	22	88	1443	6095
worker	Man	4	21	84	1378	5820
Service	Female	2	21	42	689	2910
Guard	Man	2	21	42	689	2910
Driver	Man	1	21	21	344	1453
Secretary	Female	1	21	21	344	1453
Total		25			9939	41975

9- CHECK AND DETERMINE THE AMOUNT OF WATER, ELECTRICITY, FUEL AND ...

Description	Unit	annual consumption	Cost per unit in Rials	Total Cost (Million Rials)	Total (Euro)
Power Consumption	KWh	580000	648	376	1588
Water Consumption	Cubic meters	90000	1973	178	752
Gas	Cubic meters	200000	1000	200	844
Total				754	3185

10- CONDITIONS OF ECONOMIC AND COMMERCIAL SUPPORT

10-1- CUSTOMS TARIFF SUPPORT (PRODUCTS AND MACHINES) WITH GLOBAL TARIFFS

Customs tariff support consists of two parts: tariff import of machinery and materials required by the export tariff plan of exported products, which must be selected and applied for the growth of the industry. As with most industrial machinery, the input rights of foreign machinery required by the plan are about 10%, which is a reasonable tariff and does not impose a high cost on investors. On the other hand, in recent years, the government has provided incentives for products that can compete in international markets and can be exported overseas and give export bonuses to these units, which has led to the volume of non-oil exports. In recent years, the country has enjoyed good growth despite difficulties and obstacles. Therefore, government incentives can be used to produce products made of light and heat-resistant types of yarn at a reasonable price.

10-2- FINANCIAL SUPPORT (EXISTING UNITS AND PLANS) OF BANKS - INVESTOR COMPANIES

Financial support for production units including bank facilities and how to repay them, as well as tax breaks that facilitate the implementation of the plan if appropriate. And provide the conditions for entrepreneurs to invest. Some of these situations are discussed below.

-One of the important banking facilities for manufacturing units is the payment of bank loans up to 70% of fixed investment by state-owned banks. This value can also be increased for deprived areas.

-The interest rate on the Riyal facility in the industrial sector is 12%, which is subsidized by banks as subsidies to some of the cooperatives and establishments in areas deprived of part of the facility's profits.

-The repayment period of long-term banking facilities is up to 8 years depending on the nature of the production plan, the type of technology and the possibility of exporting the product. It is also possible to use a one to two year installment repayment period.

-Another important banking facility is short-term bank loans (6 to 12 months) for use as working capital needed to carry out production processes, which provide up to 70% of the bank network. Obtaining short-term facilities to this extent is subject to the confidence of operating banks and a good track record in repaying previous facilities.

-In addition to the banking facilities available for the construction of new production units, tax exemptions are provided to encourage investors and guide them to the establishment of factories:

- Tax exemption for up to 10 years to implement the project in deprived areas
- Tax breaks of up to 4 years for implementation of projects in industrial estates
- Tax for ordinary areas, 25% of gross profit is defined.

11-ANALYZING AND PRESENTING FINAL CONCLUSIONS AND PROPOSALS FOR THE CONSTRUCTION OF NEW UNITS

- As mentioned, the characteristics of yarns with the process of heat setting in general include: curling and flattening of yarn and reducing the amount of yarn consumed and carpet coating better than its compaction (yarn bulking), greater yarn strength and less tearing time. Texture, yarn shrinkage, greater carpet softness, thermal stabilization, twist fixation (pin point effect); pin point effect; detection of yarn head in woven carpet, higher knitting efficiency, better staining, Increased erosion resistance results in less absorption of dust and dust.
- According to the aforementioned and the technical and economic studies carried out in the preceding sections, the investment for the construction of a unit for Heat Setting of various types of yarn is economically justified for the following reasons:
- The product market of this unit is very desirable. carpet production units are in dire need of the unit's products and will face shortages in the coming years. This product has great export potential as well.
- The return period is desirable.
- Based on economic calculations in the previous sections, with the investment of 205188 million Rials, this unit will be directly employed for 25 people.
- The plan is to start operating at 60 percent capacity in the first year and increase below capacity in the following years, respectively.

-

Year	First Year	Second Year	third year	forth year	Fifth year
Capacity(%)	60 %	75 %	90 %	100 %	100 %
Production capacity (ton)	2520	3150	3780	4200	4200

prime cost	103 Million Rials- 434 Euro
Selling prices of products	150 Million Rials- 634 Euro
Total Sales (Million Rials)	630000 Million Rials – 2660707 Euro
Percentage of sales at the point head to head	25
Profit	197400 Million Rials-833688 Euro
Gross Value Added	239877 Million Rials- 1013083 Euro
Net Value Added	120348 Million Rials- 508271 Euro
Ratio of gross value added to total sales	0,38
Ratio of net added value to total sales	0,19
Ratio of gross value added to investment	1.2
Net Present Value(NPV)	170990 Million Rials- 722149 Euro
Return of capital	3