In the name of Allah

Pre-feasibility studies

Project Name:

Production of Fire Extinguishers (Gas, Powder, Gas and Powder Capsules)

> Project Owner: Mr. Hossein Rajabi

Advisor of the project: Zahra Badoei

Project address: Khuzestan, Dezful Industrial Estate No.1

Date of P.F.S: March , 2021

Summary of pre-feasibility plan

General Specification	
Name of The Project	Production of fire extinguishers (powder, gas, powder and gas capsules)
Project Capacity	12500 unit
Personnel Number	16 persons
Working Days	250 days
Product Usage	Increased safety of living, working, public buildings, automobiles and widespread use in extinguishing small fires
Marketing	
Product Global Price	10 to 50 EUR /unit
Domestic Demand	1,237,809 unit
Domestic Production	1,207,360 unit
Import	30,449 unit
Export	18,070 unit
Technical Study	
Land Area	1500 m ²
Building Area	500 m ²
Main Raw Materials	Sheet steel, paint and extinguishing agent
Supplying Place of Raw Materials	Domestic
Power Requirement	80 KW/hr
Water Requirement	600 m ³
Fuel Requirement	30000 m ³
Economical & Financial Study	
Fixed Investment Cost	47,820.0 million Rails $\cong 0.175$ million Euro
Working Capital	8,446.00 million Rails \approx 0.030 million Euro
Total Investment Cost	56,266.00 million Rails \cong 0.205 million Euro
Annual Sale (in 100% capacity)	66,250.00 million Rails≅ 0.24 million Euro
Net Present Value(NPV)	27,054.42 million Rails ≈ 0.099 million Euro
Break Even Point(BEP)	49.83%
Internal Rate of Return(IRR)	30.94%
Investment Return Period	4.20 years
Investment Sources Ratio:	
Equity:51%	28,456.00 million Rails \cong 0.104 million Euro
Finance: 49%	27,810.0 million Rails \cong 0.101 million Euro

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Introduction:

Development and Prosperity of Civilizations such as Egypt, China, Greece, Iran, Rome, and India in ancient times and before the Renaissance and Anglo-Saxon and Western Civilizations are illusions to support such claims; Modern Civilization, conceivably "Industry," is convincing and reflective of this Development and cannot be linked to Modern Civilization. It is as if the Civilization resulting from Manchester's Industrial wastewater has now been able to withstand the whole world with its products. An overview can easily conclude that countries such as the United States, Canada, Western Europe, Japan, and in recent years South Korea and China have been able to rely on the same "Industry" and pursue an Industrialization strategy, detaching its approach from the rest of the states and providing their nation with increased prosperity and comfort.

Although "Industry and Industrialization" is a phenomenon that has not lasted more than three centuries, it has been had a profound impact on man and his environment. Alvin Toffler believes that industry has begun a new wave in human social life, a wave that has brought new experiences for human life. Meanwhile, after World War II, Political, Social and Economic Developments have doubled the need for sustained growth through investment in Industry for Third World countries. This was clearly due to the experience of advanced Western Societies in the direct link between their welfare and improved living standards with expansion of Industries in the Societies. Another remarkable issue was the countries' tendency to industrialize, reducing the competitive advantage of raw materials and its acute price fluctuations, and relatively steady and sometimes declining trend compared to higher value-added industrial products. This has been a reason for the dominance of Industrial development in developing countries. In addition, Industrial Development was also a driving force for the development and growth of all Economic sectors and social contexts.

Characteristically, countries with an oil Economy such as Iran have begun an inadequate attempt to join the Industrialization process since the 1960s which has so far resulted in most of the assembly Industries and largely rent-seeking monopolies. There are also promising successes in industries such as the food and basic Metal Industries which are attempting to extend to other sectors of the Industry.

Accomplishing that Khuzestan province is one of the leading provinces in the production of basic Metals such as Steel, and there is no factory or workshop in the field of production of "Fire Extinguisher", so Mr. Rajabi aims to establish this field in the region. The plan is a probative in terms of access to raw materials, communication infrastructure and access to markets inside and outside the country. It should be noted that Mr. Rajabi is currently involved in the production and repair of signs, safety and traffic signs.

It should be noted that investor willing to import and supply up-date Machinery are appreciated and honored.



1.Product introduction:

The purpose of the current project is to produce 12,500 fire extinguishers. Fire extinguisher is a type of fire extinguishing device. This machine is part of the handheld portable fire extinguisher and, depending on the type of fire, it combines various combinations such as water, powder and gas, carbon dioxide and bioversale with pressure on the fire. Fireproof capsules are solid metal cylinders filled with water or a type of carbon dioxide, in which they attach a tube, a pressure vessel to the top of the capsule, and a spring valve to block the connection between the pipe and the outlet. At the top of the cylinder, there is another small cylinder filled with compressed gas such as Carbon Dioxide and a valve to prevent CO_2 emissions.

Weight of Powder and Gas Fire Extinguishers Iranian standard

- 1- Powder and Gas Capsules in 1kg
- 2- Powder and Gas Capsules in 2kg
- 3- Powder and Gas Capsules 3kg
- 4-Powder and Gas Capsules 4kg
- 5- Powder and Gas Capsule in 6kg
- 6- Powder and Gas Capsules 12kg
- 7- Powder and Gas Capsules 25kg
- 8-Powder and Gas Capsules in 50kg

The volume of the cylinder is powder, other dry air or Nitrogen and is 10 bar (10 PSI) at the time of charging. Because the powder inside the extinguisher is constantly under pressure, it is very likely to be stuck. Generally needs to turn the power off and put it back in place. Often there is a pressure gauge on this silencer that shows the pressure inside the cylinder. This extinguisher is of a controllable type and is available in weights ranging from 0.5 to 14 kg (1 to 30 Pounds). The discharge time depends on the weight of the material; from 8 -14 seconds, and the discharge time is at least 85%. The power of this extinguisher is 6 meters and is used for fires of different classes. Once a month, a face-to-face visit of the extinguisher is performed, and in this visit, the pressure inside the cylinder is monitored by the pressure gauge and then the body and the seal are inspected. Use extinguishers once a year if feasible.



1.1. Product name and ISIC code

ISIC is the most common classification and categorization of economic activities. ISIC classification is defined as: classification and categorization of the international standard industrial classification of all economic activities. This classification is allocated to one of the 2, 4, and 10 digit codes based on the type of industry and product. ISIC code for metal fire extinguishers capsules are given in the table below.

Product name	ISIC Code	Unit
Fire capsule	2919412363	Unit
Powder fire capsule	2919512364	Unit
Gas fire capsule	2919512365	Unit
Gas and water fire capsule	2919512366	Unit
Powder and gas fire capsule	2919512367	Unit

Source: organization of Industry, mine and trade

1.2. Customs tariff code

Based on the export and import regulation of Islamic republic of Iran the custom tariff for fire extinguishers capsules are as follows:

Heading subheading No.	Description
8424	Mechanical appliances (whether or not hand-operated) for projecting, dispersing or spraying liquids or powders; fire extinguishers, whether or not charged; spray guns and similar appliances; steam or sand blasting machines and similar jet projecting machines.
84241000	Fire extinguishers, whether or not charged

Source : export-import regulations (2020)

1.3. Import and export products conditions

Given the conditions for product import and export in Islamic republic of Iran, conditions and tariffs for import and export of fire extinguishers capsules are as follows:

Heading Subheading No.	Description	SUQ	Import duty
8424	Mechanical appliances (whether or not hand-operated) for projecting, dispersing or spraying liquids or powders: fire extinguishers, whether or not charged:		
0121	spray guns and similar appliances; steam or sand blasting machines and similar jet projecting machines.		
84241000	Fire extinguishers, whether or not charged	U	10

Source : export-import regulations (2020)

1.4. Review and presentation of standard (national or international)

- national Standard

Number	Title			
869	Powder and manual extinguishers	Iran		
13300	Fire fighting - Portable fire devices extinguishers - Performance and construction	Iran		

Source: Institute of Standards and Industrial Research of Iran

International Standard

No.	Topic of standardOrganization that assigned the abbreviation		Number of standard
1	Firefighting - Portable fire extinguishers -Performance and construction	ISO	7165:2017
2	Standard for Dry Chemical and Dry Powder Hand and Wheeled Fire Extinguishers	CAN/ULC	S504-M86
3	Portable fire extinguishers - Powder type	AS	1846-1985
4	Standard for Portable Fire Extinguishers	NFPA	NFPA 10
5	Specification for portable fire extinguishers	BS	5423:1987

1.5. Review and provide information about domestic production prices and global price of the product

Considering big range of extinguisher variation, it is difficult to determine a price for it. However average cost is between €10-50 for fire extinguishers . The wholesale price of fire extinguishers inquiry is listed below:

D	Eine Entin quicken Ten e	Local Currency	Foreign Currency
KOW	Fire Extinguisher Type	Tomans	Euro
1	CO ₂ Capsule (3kg Capsule)	690,000	25.18
2	CO ₂ Capsules (4kg Capsules)	800,000	29.20
3	CO ₂ Capsules (5kg Capsule)	860,000	31.39
4	CO ₂ Capsules (6kg Capsule)	910,000	33.21
5	CO ₂ Capsules (12kg Capsule)	1,200,000	43.79
6	CO ₂ Capsules (25 kg Capsules)	1,500,000	54.74
7	Powder Capsules (1kg Capsule)	98,000	3.58
8	Powder Capsules (2kg Capsule)	140,000	5.11
9	Powder Capsules (3kg Capsules)	156,000	5.96
10	Powder Capsules (4kg Capsules)	168,000	6.13
11	Powder Capsules (5kg Capsules)	200,000	7.30
12	Powder Capsules (6kg Capsule)	205,000	7.48
13	Powder Capsules (12Kg Capsules)	304,000	11.09
14	Powder Capsules (25kg Capsules)	750,000	27.37
15	Powder Capsules (50kg Capsules)	1,199,000	43.76
16	Powder gas Capsules (2kg Capsules)	104,000	3.8
17	Powder gas Capsules (3kg Capsules)	353,000	12.88
18	Powdered Gas Capsules (4kg Capsule)	385,000	14.05
19	Powdered Gas Capsules (12kg Capsule)	745,000	27.19
20	powdered gas Capsules (25 kg capsule)	1,200,000	43.80
21	powdered gas Capsules (50 kg capsule)	1,400,000	51.09

1.6. Explaining the usage and application of the product in the domestic and foreign markets

A fire extinguisher is a tool used to control small fires in an emergency. Specifically, each fire extinguisher capsule contains a cylindrical, portable, high-pressure portable tank that can be used to extinguish or contain fire. In the United States, it is imperative that at least annually all fire extinguisher capsules be serviced and repaired in all offices, industrial and commercial areas, except homes. There are generally two types of fire extinguisher capsules that are pressurized tank capsules and cartridge based capsules. In capsules with pressure vessels, the chemical remains in the chamber until recall and is activated and activated after being recalled by the user. Depending on the type of chemical used in the tank, different driving forces are also used.

Nitrogen is mainly used in fire extinguishers that use dry ingredients. Air and foam capsules also use air.

Pressure fire extinguishers are the most common type of capsule today. In general, each type of fire extinguisher is designed for a specific type of fire. There are six classes or classes of fire that are tailored to each of the different types of fire extinguishers. Types of fire extinguishers and their use are as follows:

 Water fire extinguishers :These capsules are one of the most cost-effective methods of combating Class A fires that occur in certain solids such as paper, wood and textiles. There are four different types of fire extinguishers, such as jet, water spray, water with additives, and steam or fog. All of these extinguishers have a red label.



• Foam extinguishers can be used in Class A and Class B fires. They are best suited to extinguish fires caused by liquids such as gasoline or diesel fuel, and are much more versatile than blue jet sprays, with foam extinguishers being worm-colored.



 Powder extinguishers are suitable and versatile extinguishers because they can be used in all Class A, B and C fires. They can also be used in fires caused by electrical equipment and installations. However, powder extinguishers are more commonly used for Class D fires or combustible metal fires; powder extinguishers have a blue label.



CO₂ extinguishers are ideal for places with electrical equipment such as offices and computer room servers because they can be used in fires caused by electrical appliances. Carbon dioxide extinguishers extinguish the fire by removing the oxygen element from the fire triangle and also eliminate the heat and heat caused by the fire through their very cold evacuation operations. These types of extinguishers have a black label.



• Chemical extinguishers are suitable for use in Class F fires, including fires caused by cooking oils and fats such as soybean oil, olive oil, sunflower oil, corn oil, butter, and more. Chemical extinguishers have a yellow label.



1.7. Evaluation of alternative products, competitors and analysis and its effects on consumption of the product

Cartridge-operated capsules are a substitute for fire extinguishers, although they are of much lesser use. These capsules, which contain gases excreted through the cartridge, are cartridges before being discharged and in effect provide the driving force for the fire extinguisher to release. These types of fire extinguishers are not common and are mainly used in industrial installations.

1.8. The strategic importance of the product in Iran and foreign markets

Fire extinguishers are important in preventing fires and damages to buildings and industries because the use of fire extinguishing equipment requires the safety plan of buildings and industrial centers, especially warehouses. Such centers have become fully regulated. However, according to the researches regarding the strategic importance of the product, the design product in Iran is not of strategic importance because the technical knowledge and skills required to produce it are quite simple and the technology related to it. It is native to the country. This product can be manufactured in most countries and at the same time it does not have any political, social or other barriers to market entry.

1.9. The major producing countries and product consumer

The United States, Japan, Germany, India and Australia are the major countries producing this product.

No.	Major producing countries	Manufacturer company
1	United States	United Technologies Corp
2	United States	Johnson Controls
3	Japan	Morita Group
4	Japan	Hochiki
5	Germany	Minimax
6	India	Ceasefire Industries
7	United Kingdom	Britannia Fire Ltd.
8	Australia	Flamestop Australia
9	India	Kanex Fire

2. Situation of supply and demand in Iran and foreign markets

2.1. Study of utilization capacity and production process since the beginning of the Sixth Five Year Economic Development Plan of the Islamic Republic of Iran, unit location, the number and level of technology of available units, nominal capacity, practical capacity, lack of full capacity utilization reasons, the name of country and manufacturer of machinery used in production

According to the statistics of the units with active exploitation licenses presented by the Organization of Mines, Trade and Commerce, there are currently four industrial units with a nominal capacity of 1,741,500 units in the field of production of fire extinguishers throughout the country. The major producers of this product are located in Tehran and Gilan provinces. The status and amount of production of these units are presented in the following table:

- Tabriz Machine Making
- Salian Machine Tabarestan Industrial Group (Metal Cutting)
- Ghaem Machine Company
- Ajmy tool machine

		Number of	Canacity	investment	
No	Province	units	(set)	Million Rials	Million Euros
1	Isfahan	1	10,000	193	0
2	Alborz	1	30,000	9,490	0
3	Azerbaijan, East	1	20,000	5,200	0
4	Azerbaijan, West	1	12,500	526,978	0
5	Tehran	3	468,000	457,229	0.294
6	Khorasan, Razavi	1	15,000	15,856	0
7	Semnan	1	24,000	3,681	0
8	Qazvin	2	50,000	8,084	0
9	Qom	1	3,000	700	0
10	Kermanshah	1	50,000	8,045	0
11	Gilan	4	549,000	15,105	0
12	Mazandaran	2	510,000	26,724	0
Total nominal capacity		19	1,741,500		
Practical capacity (80%)		15	1,393,200	1,077,285	0.294

Of licensed operation unit in the field of metal fire extinguishers

Source: Organization of Industry, Mine and Trade

2.2. Study of the status of new projects and under construction development projects (In terms of number, capacity, operation place, the physical progress rate and the level of their technology and investments by both foreign exchange and other required) and semi-finished projects

Based on data obtained from the Organization of Industry, Mine and Trade, the units under construction of metal fire extinguishers and their volume of production are presented in the following table.

Under Construction Units of metal fire extinguishers with 20-99% of physical progress

No	Province	Number	Capacity	investment			
110		of units	(set)	million Rials	million Euros		
Un	Units under construction of Portable fire extinguishers with physical development 60%-99%						
1	Gilan	1	1,000	29,000	0		
2	Mazandaran	1	20,000	13,498	0		
Sum Total		2	21,000	42,498	0		
Units under construction of Portable fire extinguishers with physical development 20%-59%							
1	Ilam	1	8,000	8,135	0		
2	Qazvin	2	90,000	134,800	0		
Sum Total		3	98,000	142,935	0		

Source: Organization of Industry, Mine and Trade

2.3. The trend of imports of the product in the last five years

According to customs statistics, the import of firefighting capsules has been downward for five years and has fallen by almost half from 2014 to 2019. However, most of the imports have imported from Spain.

year	unit`	Rails value	Dollar value	Description
2018-19	30,449	101,866,263,232	2,448,286	Spain:27%_Germany:25%
2017-18	80,636	195,423,277,548	5,733,057	Spain:27%_ UAE:25%
2016-17	83,262	87,930,874,272	2,839,011	
2015-16	57,975	58,210,083,570	1,965,735	
2014-15	68,196	118,346,740,189	4,558,891	

Imports of fire extinguishers capsules in the last 5 years

Source : The Islamic Republic of Iran Customs Administration (2020)

¹ In order to calculate the amount of consumption and future need for the commodity in question the export and import unit has been converted from "Ton" to "Machine".



The amount and value of fire extinguishers imports in the last 5 years

Imports of fire extinguishers divided by country in 2018-2019

NO	Country	Weight (kg)	Value (Rials)	Value (Dollar)	Weight percent%
1	Spain	99,359	27,543,584,243	656,723	27.19
2	Germany	90,987	20,933,673,707	496,887	24.90
3	UAE	54,052	6,716,581,982	158,122	14.79
4	Czech Republic	37,957	4,714,985,155	112,261	10.39
5	China	30,780	9,597,644,631	227,151	8.42
6	Italy	29,625	6,128,573,401	149,939	8.11
7	Turkey	6,386	1,636,055,375	38,954	1.75
8	Malaysia	5,700	1,446,128,000	34,432	1.56
9	Republic of Korea	4,290	7,361,203,091	198,015	1.17
10	France	2,189	1,482,920,802	35,241	0.60
11	Other countries	4,065	14,304,912,845	340,561	1.11
	Sum	365,390	101,866,263,232	2,448,286	100

Source : The Islamic Republic of Iran Customs Administration (2020)

NO	Country	Weight (kg)	Value (Rials)	Value (Dollar)	Weight percent%
1	Spain	271,186	58,412,331,175	1,666,849	28.03
2	UAE	187,106	29,350,064,571	862,783	19.34
3	Italy	182,873	40,243,603,681	1,187,264	18.90
4	China	146,270	8,504,972,534	252,100	15.12
5	Germany	68,668	9,186,162,150	271,610	7.10
6	Turkey	28,223	20,784,447,970	635,525	2.92
7	Czech Republic	24,673	1,622,127,520	49,699	2.55
8	Cyprus	15,400	6,584,916,800	199,301	1.59
9	Republic of Korea	15,243	11,597,730,111	343,918	1.58
10	France	10,712	4,882,650,910	138,781	1.11
11	Other countries	17,278	4,254,270,126	125,227	1.79
	Sum	967,632	195,423,277,548	5,733,057	100

Imports of fire extinguishers divided by country in 2017-2018

Source : The Islamic Republic of Iran Customs Administration (2020)

2.4. The trend of consumption in the last five years

One of the common methods of calculating the amount of internal consumption is to estimate the amount of apparent consumption, which is calculated in the following table.

As can be seen from the following tables, the apparent consumption rate of fire extinguishers in 2019 was estimated at 1,219 thousand units.

Estimating apparent consumption of fire extinguishers in the country over the past 5 years (2014-2019)

	2014-2015	2015-2016	2016-2017	2014-2015	2015-2016	2019-2020
Domestic production (unit)	201,600	258,400	378,840	734,960	847,400	1,207,360
Imports (unit)	68,196	57,975	83,262	80,636	30,449	30,449
Export (unit)	11,090	6,171	3,108	4,391	18,070	18,070
The apparent consumption (unit)	258,705	310,204	458,994	811,205	859,779	1,219,739

2.5. The trend of export product in the last five years and the possibility of its development

Due to categories such as technology and finished product prices, manufacturers have so far failed to export a significant share of production to the target countries, with exports accounting for only 1% of the total production of fire extinguishers. The promising issue is the average annual growth of 10 percent of exports from 2014 to 2019, which has led to an increase in exports from 11,000 units in 2014 to 18,000 units in 2019. The table below shows the export of fire extinguishers over the last 5 years.

year	Unit	Rails value	Dollar value	Description
2018-19	18,070	29,250,164,423	402,879	Azerbaijan:60% - Iraq: 19%
2017-18	4,391	3,462,472,359	101,619	Afghanistan:10% - Iraq: 83%
2016-17	3,108	1,926,173,884	61,068	
2015-16	6,171	4,333,480,876	145,818	
2014-15	11,090	6,914,393,149	263,410	

Exports of fire extinguishers in the last 5 years

Source : The Islamic Republic of Iran Customs Administration (2020)



The amount and value of fire extinguishers exports in the last 5 years

NO	Country	Weight (kg)	Value (Rials)	Value (Dollar)	Weight percent%
1	Azerbaijan	129,401	8,904,333,100	132,522	59.68
2	Iraq	41,480	4,520,211,320	87,990	19.13
3	Turkey	33,455	9,494,367,229	108,444	15.43
4	Armenia	11,651	6,005,726,194	67,408	5.37
5	Afghanistan	604	158,102,830	2,718	0.28
6	Sweden	250	167,423,750	3,797	0.12
	Sum	216,841	29,250,164,423	402,879	100

Exports of fire extinguishers divided by country in 2018-2019

Exports of fire extinguishers divided by country in 2017-2018

NO	Country	Weight (kg) Value (Rials)		Value (Dollar)	Weight percent%
1	Iraq	43,946	3,100,285,484	90,697	83.40
2	Afghanistan	5,173	277,270,515	8,310	9.82
3	Azerbaijan	2,000	48,666,000	1,500	3.80
4	Turkmenistan	1,300	18,197,200	560	2.47
5	Armenia	276	18,053,160	552	0.52
	Sum	52,695	3,462,472,359	101,619	100

1.6. Reviewing of products needs based on export priority

Given the growth trend of firefighter capsules consumption over the past five years, averaging 36 percent annually, it is about half as high (17 percent) as the most cautious. It considers consumption growth for the year 2020 to 2025 and also considers export growth with a 5-year average of about 5% in view of the resistance economy, oil sanctions and the need to focus on exporting non-oil products. Based on this, the deficiency or surplus of the fire extinguisher is calculated for the next 5 years.

As can be seen from the table below, by 2025 countries will face a production shortfall of 1,417,000 in terms of firefighting capsules. Constructed or imported the product.

Production	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
The domestic consumption (unit)	997,975	1,127,711	1,274,314	1,439,975	1,627,172
Export (unit)	114,783	126,261	138,887	152,776	168,053
Total demand (unit)	1,112,758	1,253,973	1,413,201	1,592,751	1,795,225
Output of current units (unit)	987,512	987,512	987,512	987,512	987,512
Production of new operational units (unit)	73,058	218,734	286,972	322,226	347,043
Total supply (unit)	1,060,569	1,206,246	1,274,483	1,309,737	1,334,554
(Shortage) / surplus	(52,188)	(47,727)	(138,718)	(283,014)	(460,671)

Estimating the required amount of fire extinguishers over the next 5 years

3- Overview of technology and production methods and product supply in the country and compare it with other countries

To make a fire-extinguishing capsule that works with powder and gas and used to extinguish the fire different sheets of different lengths and thicknesses enter the factory and perform the following operations on them. To be assembled and packaged and shipped outside the factory. Manufacturing of different capsule components involves the following steps:

-Sheets of 2 * 1 m size are cut by guillotine in different dimensions of 24 * 24, 22 * 22 and 30 * 50 cm for different purposes in different parts of the capsule.

-Some parts, such as the capsule lens head, are molded and stretched by hydraulic press after cutting.

-The parts are carried out by teleportation and drilling impact presses and then bent inward by the edging machine.

-For the capsule body, the sheets are either sent by rolling machine or bent by hand press.

-At this point, all parts that are made or purchased by the weld or CO₂ are welded together.

-The set is cleaned and degreased after cleaning with a sandblasting machine.

-Painting: The pieces are then introduced into the dyeing chamber and painted red.

- Color Baking Oven: The color used is of the type of furnace, so it is baking in the furnace and is controlled after baking so that it does not rust and is uniformly colored.

-After the parts have been made and after complete inspection and filling, the powder is assembled from dry powder and then charged with nitrogen gas and then final inspection again.

-The fire extinguisher capsule conforms to the standard of information by labeling or printing and it should be noted that the label or printing is not to be erased after a while.

- Packaging: After thorough inspection of all parts of the capsule, it is packaged in plastic and stored in a war



4. Determine the strengths and weaknesses of known technologies (in outline) in the production process

Nonstandard charge of extinguishing agent is the weakness of process. High quality of products is the significant point of the process in domestic manufactures.

5. Determine the minimum economic capacity includes the estimated volume of fixed investment estimated volume with the separation of Rials and foreign exchange (Using information of available and under construction units, UNIDO, internet, the global data banks, technology selling companies and equipment, etc.)

Considering the market need especially Khuzestan province and neighboring provinces as well as the export goals of the project, and considering the economic capacity, the annual project capacity of the project is estimated at 12,500 capsules. This will be achieved in 250 working days and one shift per day if you provide the cash needed to purchase the machinery.

Construction period is 6 months and effective life time for the project execution is 12 years.

Years	s of operation	1'th Year 6 months	2'th Year	3'th Year	4'th Year	5'th Year
Percent	tage of capacity	70%	80%	90%	100%	100%
CO ₂ Fire E (25% produc	xtinguisher Capsules	1,094	2,500.00	2,813.00	3,125.00	3,125.00
Powder Capsules (30	Fire Extinguisher	1,313.00	3,000.00	3,375.00	3,750.00	3,750.00
Powder and Gas Fire Extinguisher Capsules (45% production)		1,969	4,500.00	5,062.00	5,625.00	5,625.00
Tota	l production	4,376.00	10,000.00	11,250.00	12,500.00	12,500.00
The out	tcome of selling					
CO ₂ Fire Exti	nguisher Capsules	8,752.00	20,000.00	22,504.40	25,000.00	25,000.00
Powder Fire E	Extinguisher Capsules	4,201.60	9,600.00	10,800.00	12,000.00	12,000.00
Powder and Gas Fire Extinguisher Capsules		10,238.80	23,400.00	26,322.40	29,250.00	29,250.00
Total	million Rails	23,192.40	53,000.00	59,626.40	66,250.00	66,250.00
sales	Million Euro	0.08	0.19	0.22	0.24	0.24

Plan production and sales over the next 5 years

Average price of CO₂ Fire Extinguisher Capsules:8,000,000 Rial ≅29.2 Euro

Average price of Powder Fire Extinguisher Capsules :3,200,000 Rial ≅11.68 Euro

Average price of Powder and Gas Fire Extinguisher Capsules:5,200,000 Rial ≅18.98 Euro

Table of Project Investment

			require	ed Costs		Total		
Description	incurred Costs	The Fo	reign currency	Local Currency	Total		Equivalent	
Description	(million Rails)	Million Equivale Euro Rails		Million Rails	(Million Rails)	Million Rails	in Million Euro	
land	6,000	0.0	0.0	0	0	6,000	0.022	
landscaping	3,045	0.0	0.0	0	0	3,045	0.011	
Construction	12,200	0.0	0.0	0	0	12,200	0.045	
utilities	2,150	0.0	0.0	0	0	2,150	0.008	
Equipment& Machinery	0	0.0	0.0	19,000	19,000	19,000	0.069	
laboratory equipment	0	0.0	0.0	1,000	1,000	1,000	0.004	
transportation	0	0.0	0.0	600	600	600	0.002	
Office Equipment & Supplies	215	0.0	0.0	410	410	625	0.002	
Other and unpredicted	0	0.0	0.0	1,800	1,800	1,800	0.007	
total	23,613.00	0.0	0.0	22,810.00	22,810.00	46,420.00	0.169	
Pre- Production expenditures	400.00	0.0	0.0	1,000.00	1,000.00	1,400.00	0.005	
Total of fixed Capital	24,010.00	0.0	0.0	23,810.00	23,810.00	47,820.00	0.175	
Working capital	0.00	0.0	0.0	8,446.00	8,446.00	8,446.00	0.030	
Total Investment	24,010.00	0.0	0.0	32,256.00	32,256.00	56,266.00	0.205	

Exchange rate:

1 Euro \approx 274,000 Rails 1 US\$ \approx 228,000 Rails

land specification of project as follows as:

	Area(m ²)		Cos	ost (million Rails)		Equivalent in
Description	done	required	done	required	Total	Euro
land	1500	0.0	6,000	0.0	6,000.0	21,897.81

landscaping price as follows as:

	Area(m ²)		Cos	t (million l	Equivalent in	
Description	done	required	done	required	Total	Euro
Excavation and leveling	1500 m ³	0.0	375	0	375	1,368.61
Wall (2.5 meters high)	160 m	0.0	1,920	0	1,920	7,007.30
Landscaping with sand and sidewalk	750 m ²	0.0	600	0	600	2,189.78
Green space and lighting	100 m ²	0.0	150	0	150	547.45
total			3,045	0	3,045.0	11,113.14

Construction items Information:

Description	Building Type	Square	e meters rea	Total c	Equivalent in		
	Duning Type	Done	Required	Done	Required	Total	Euro
Production and storage salon	Industrial shed – production area 300 m ² -storage area: 100 m ²	400	0	10,000.0	0	10,000.0	36,496.0
Administrative buildings		70	0	1,750.0	0	1,750.0	6,387.0
Gate guard	Made of bricks,	30	0	450.0	0	450	1,642.0
Total infrastructure and costs		500	0	12,200.0	0	12,200.0	44,526.0

Utilities:

Description	Technical		Required co (million Rai	Equivalent in		
Description	Specifications	Done	Required	Total	Euro	
Flectrification	Three Phase Power	1 350	0.0	1 350	4 927	
Liccumention	and Electric supply	Electric supply		1,550	1,727	
Water	Split 1 "and water	500	0.0	500	1,825	
Heating & Cooling	Air condition	300	0.0	300	1.095	
Total		2,150	0.0	2,150.0	7,847.0	
				-		

Equipment& Machinery product line:

Description		Qty	The cu (I	foreign rrency EUR)	Equivalent Rails (million	Local Currency (million Rails)		Total costs (million	Equivalent in Euro
	Done	Required	Done	Required	Rails)	Done	Required	Rails)	
Press: 63 ton Hydraulic	0	1							
press brake: 63 ton	0	1							
Drill: M-20A/1.1KW	0	1							
Rolling Sheets: 2050 Newton	0	1							
Scissor: manual	0	1							
Guillotine: 2m Dim	0	1							
Sandblast	0	1							
Saw Machine: 0.736 KW	0	1							
Stone Machine	0	1							
Press:1ton -HS	0	1	0	0	0	0	19,000.0	19,000	69,343.0
Edge device	0	1							
Compressor: 475-500 Lit/min	0	1							
Color Baking Oven: 50 PCS per day	0	1							
Gas Injection machine: 50 PCS per day	0	1							
Compressor: 7.5 KW	0	1							
Capsule: 50 Lit Nitrogen Gas	0	1							
Press: 63 ton Hydraulic	0	1							
Total			0	0	0	0	19,000.0	19,000.0	69,343.0

Supplier and Manufacture of Machine Tools: Salian Machine Tabarestan Industrial Group (Metal Cutting)

Execution Period: 5 month

- Services:
- - Basic and detailed design
- - Manufacture and supply of equipment and installations (inside and outside the country)
- - Control system and instrumentation
- -Equipment installation
- - Personnel training, startup, commissioning and capacity testing

Transportation

Description		Qty	The cui (I	foreign rrency EUR)	oreign ency JR) (million		Local Currency (million Rails)		Equivalent in
	Dono Poquiro		Dono	Required	(Infinition Rails)			Rails)	Euro
	Dom	Requireu	Done	Requireu	ituns)	Done	Required	ituiis)	
Crane 2 ton	0	1	0	0	0	0.0	600	600	2,190.00
Total	0	1	0	0	0	0.0	600	600	2,190.00

Office Equipment & Supplies and Services:

Description	Qty		The foreign currency (EUR)		Equivalent Rails (million	Local Currency (million Rails)		Total costs (million	Equivalent in
	Done	Required	Done	Required	Rails)	Done Required		Rails)	Euro
Office furniture	1	0	0	0	0	50	0	50	182.48
Tables and chairs	4	0	0	0	0	60	0	60	218.698
Dining table and chair	0	14	0	0	0	0	70	70	255.47
Fax	1	0	0	0	0	50	0	50	182.48
Phone / Modem	1	0	0	0	0	5	0	5	18.25
Computers and Laptops	1	1	0	0	0	50	140	190	693.43
Printer	0	1	0	0	0	0	50	50	182.48
Refrigerator	0	1	0	0	0	0	150	150	547.45
Total			0	0	0	215	410	625.0	2,281.01

Working capital:

D : //	duration	The fo	reign currency	Local Currency	Total	Equivalent in
Description		Million Euro	Equivalent Rails (Million Rails)	Million Rails	(Million Rails)	Million Euro
Supplementary Raw Material and	1 Month	0	0	2 382 13	2 382 13	0.009
Packaging		0	0	2,302.43	2,302.43	0.009
Semi-produced products	10 days	0	0	1,129.45	1,129.45	0.004
Cash in hand	1 Month	0	0	1,238.61	1,238.61	0.0045
Account receivable	1 Month	0	0	3,695.92	3,695.92	0.013
total		0	0	8,446.40	8,446.40	0.03

Production costs:

Description	Amount	Equivalent in		
2 0001-p1011	(Million Rials)	(Million Euro)		
Costs of materials	28,589.15	0.104		
Cost of production personnel salary	8,364.20	0.031		
Cost of utilities (fuel and	236.00	0.001		
electricity, water)				
Cost of repair and maintenance	1,534.90	0.006		
cost of unforeseen production(5%)	1,936.00	0.007		
Depreciation expense	3,090.60	0.011		
Administrative personnel salary	2,935.60	0.011		
Costs of administrative and sales	662.50	0.002		
Financial costs	2,502.90	0.009		
Factory insurance	92.84	0.0003		
Total sum	49,944.49	0.182		

6- The annual major required raw materials and annual and to supply outside or inside the country, domestic and foreign exchange and checking the major developments in the supply of essential required items in the past and future

Steel sheets as the main raw material of the process are all available from Khuzestan province. But other items must be supplied from outside the province.

Ċ		tion per t unit	it 1ption	The amount	Price of unit	Curren	cy prices	Cost	ying ce	Total cost	ent in o Euro)
NC	Description	Consump	Un Consun	required for all capacity	million) (Rails	The currency (million dollar)	Equivalent Rails million) (Rails	(million Rails)	Suppl	(million Rail's)	Equival Eur (million
1	Steel sheet 13 * 3 st- 2 mm thicknes	0.0024	ton	30	207	0	0	6,210.0	Domestic	6,210.0	0.0227
2	Steel sheet 13 * 3 st- 1.5 mm thicknes	0.00128	ton	16	200	0	0	3,200.0	Domestic	3,200.0	0.0117
3	Aluminum wire 4 mm	0.00504	Kg	63	0.55	0	0	34.65	Domestic	34.65	0.0001
4	Steel Pipes 6m -2cm diameter	0.112	Kg	1,400	0.21	0	0	294.0	Domestic	294.0	0.0011
5	Capsule head valve (3 hole brass with minimum diameter of 1.5 mm)	1	pcs	12,500	0.015	0	0	187.5	Domestic	187.5	0.0007
6	manometer up to 26 kg / cm	1	pcs	12,500	0.2	0	0	2,500.0	Domestic	2,500.0	0.0091
7	Oaring Rings of brass valve (2cm Rubber)	1	pcs	12,500	0.07	0	0	875.0	Domestic	750	0.0032
8	Inner brass washers 2 cm in diameter	1	pcs	12,500	0.01	0	0	125	Domestic	125	0.0005
9	Brass Valve Needles	1	pcs	12,500	0.01	0	0	125	Domestic	125	0.0005
10	Brass Valve Springs	1	pcs	12,500	0.012	0	0	150	Domestic	150	0.0005
11	Hoses (0.5 inch diameter) - 40 cm long	1	pcs	12,500	0.12	0	0	1,500.0	Domestic	1,500.0	0.0055
12	Brass beads 13 mm - 30 mm long threaded	2	pcs	25,000	0.01	0	0	250.0	Domestic	250.0	0.0009
13	Furnace colors - red	0.24	Kg	3,000	1.4	0	0	4,200.0	Domestic	4,200.0	0.0153
14	Bicarbonate Dry Powder	0.006	ton	23	150	0	0	3,375.0	Domestic	3,375.0	0.0123
15	Gas CO ₂ Beget (10 x			10 500	0.007			5,250.0	D .	5,250.0	0.0192
16	25 cm)	1		12,500	0.008	0	0	100	Domestic	100	0.0004
17	for packaging	0.0152	Kg	190	0.4	0	0	76.0	Domestic	76.0	0.0003
18	degreaser (95% NaOH and Other Additives)	0.024	Kg	300	0.04	0	0	12	Domestic	12	0.000
19	Clamps (0.5 x 1 inch Aluminum)	2	pcs	25,000	0.005	0	0	125	Domestic	125	0.0005
	sum					0	0	28,589.15		28,589.15	0.1043
						27					

7. The risk analysis of the project

Strengths:

- Access to internal Raw Materials
- Possibility of Mass Production
- High Internal rate of return
- Production method is the same in Iran and other countries of the world
- Communication infrastructure such as transit roads, railways and waterways to access the domestic and foreign markets, especially Iraq and the Gulf States.
- Access to important commercial ports such as Imam Khomeini Port and Khorramshahr for export

Weakness:

- Lack of liquidity to Supply Machinery
- Full Competition Market
- Need of High Production Capacity

Opportunities:

- Support Domestic Production
- Support Attracting Foreign Investors
- Existence of a very large Consumer Market within the scope of the plan (Khuzestan is the country's industrial hub and has a large number of factories, offices and organizations that are required to use fire extinguishing equipment).
- Access to key axes and infrastructure such as freeway, south-north rail, access to open water for export

Threats:

- US Sanctions
- Variable inflation rates and rising production prices

Threats:

- US sanctions
- Political instability in the Middle East
- variable inflation rates and rising production prices

Sensitivity analysis of IRR based on the changes in sale revenue, fixed assets and operational cost



8. Human resources and employment status

The employment rate of the project is 16 people who are active 12 in production and 4 official sections. Considering prestigious universities in the province and technical and engineering graduates, access to specialist human resources is provided.

	S	ex]	Required		Monthly salaries	Salaries	Annual	Equivalent
Job Title	F	М	Qty	Shift	Sum	per person (million Rails)	(million Rails)	(million Rails)	in Euro
CEO		~	1	1	1	50	50	820	3,319.8
Finance director, sales, administrative	~	~	1	1	1	45	45	738	2,693.4
Process engineer	~	~	1	1	1	45	45	738	2,693.4
Skilled worker		~	3	1	3	43	129	2,115.6	20,110.9
Worker		~	8	1	8	42	336	5,510.4	5,027.7
Guard		~	2	1	2	42	84	1,377.6	2,042.9
Total			16	6	16		689	11,299.6	41,566.6

9. Determine the amount of water, electricity, gas, telecommunications and communication facilities (road - rail - Airport - Port ...) and how to provide them in the appropriate area to implementation

Dezful Industrial estate has basic infrastructure and water, electricity, gas and telecommunication facilities available on site. The distance between Dezful to Ahvaz (capital of the province) is 150 km and to the port of Imam Khomeini 250 km, which facilitates trade commerce. The distance to airport and railway station is about 10 and 15 km respectively.

Description	unit	Annual consumption	Price per unit (Rails)	Total price (million Rails)	Equivalent in Euro
Electricity	KW	140,000	1,300	182	664.23
water	m ³	600	20,000	12	43.80
Gas	m ³	30,000	1,400	42	153.28
		total		236.0	861.31

10. Economic and trade support for plan

To stimulate the industrial section and related to the resistance to economy, several projects are implemented and the following are mentioned

In order to study, exchange of views and coordination to resolve the problems and obstacles faced by manufacturing units, "the Working Group of facilitate and remove of production obstacles " is formed in all provinces and with membership of the governor (chairman), head of the provincial Ministry of Industry, Mine and Trade (Secretary), management and planning organization chairman, President of the Chamber of commerce, Industries, mines and Agriculture of province and chairman of the house of industry, mine and trade. The main tasks of this working group can be mentioned as follows:

- Helping to expedite the completion and commissioning of the production of semifinished projects and develop

- Support and contribute to the export development of provincial products.

- Investigating slowdown causes or production units suspension and problem solving coordination.

- Working Group on Economy of Resistance (boom): Regarding to the economy resistive of Ministry of Industries and Business in Act 12868 dated 2016.21.4, the funding are considered in order to completing industrial plans with a physical progress more than 60% and also improving the competitiveness of small and medium production units to increase exports.
- **Investment Guarantee Fund of Small Industries**: The credit guarantees issuance is guaranteed to facilitate financing was through small business facilities and securitized principal and interest and credit facilities granted by banks and financial institutions to small firms. This credit guaranties have been issued for applicants after expert review and validation, obtaining fees with the required securities and warranty credit.

10.1. Supporting of Customs tariff (products and machines) with global tariff

In order to support domestic production and ease of technology supply, the machines' input duty to the project are relatively low at around 10%. In order to support domestic production, the input rights of the products are very high and about 32 to 55%. This prevents the import of similar products to the country.

10.2. financial support (existing units and projects) banks - investment firms

The most important sources of financial credit from banks, can be cited as follows.

1. Foreign exchange reserves: The surplus proceeds from the sale of crude oil facility will be provided support and finance of part of the foreign exchange needs of producers and exporters of private and cooperative sectors. In the framework of contracts and Islamic banking laws and regulations enacted by the opening credits are awarded based on the provisions of the import and export of goods and services.

2. Economy of Resistance Committee (boom): Now, funding is considered for the completion of a physical progress with 60% and industrial production units as well as enhance the competitiveness of small and medium enterprises to increase exports.

3. Foreign Investment Promotion and support Act:

Since 1955, the legal framework for foreign investment in Iran has been the Attraction and support of Foreign Investments law. In line with reforms in the economic structure of the country, the Iranian parliament has offered the foreign investment plan as a Foreign Investment Promotion and Support Act which legislated finally in 1381. This will lead to the development of the legal framework and operational environment for foreign investors in Iran. Some of the new developments in the field of foreign investments include:

• Islamic Republic of Iran is welcome of foreign investments by foreign persons, whether natural or legal persons in all areas of economic activity.

- Recognition of new investment methods in addition to foreign direct investment
- Short and quick process and approval application and foreign investment approval.

• Creating an unique organization called the Center for Foreign Investment Service Organization for Investment, Economic and Technical Assistance of Iran in order to focused and effective support of the activities of foreign investors in Iran

• Further liberalization of foreign exchange mechanisms for more use by foreign investors

In case of absorbing foreign investor, the government considers some bonus, such as:

- 1. Tax exemption for the products of foreign investing companies
- 2. Presenting insurance coverage for the investors
- 3. Presenting customs exemptions for importing equipment required by foreign investing companies
- 4. Granting subside for training local manpower
- 5. Preparing free zones for investment
- 6. Granting infrastructure facilities and less expensive public services such as water and power
- 7. Guaranteeing return on profit and the main capital and prevention from their confiscation and nationalization

11.Analyzes And providing summary and final offer

Given the growth trend of fire extinguisher capsule consumption over the past 5 years, it represents an average of 36% annual growth, in the most cautious case it accounts for about half of the above growth (17%) as consumption growth Considering the years 2020-2025, and also considering the economy of resistance, oil sanctions and the need to focus on the development of non-oil currency exports, export growth is also projected at around 5% over the past five-year average. Based on this, the amount or deficiency of the fire extinguisher capsule is calculated for the next 5 years.

Therefore, given the aforementioned, the firefighting capsule product faces a shortage of production and supply by 1403 (2025AD), which is due to general system policies and reduction in the damaging effects of foreign sanctions. It definitely has to be addressed through domestic production. In order to meet the domestic demand, using the opportunity created in the Iraqi

export market and in the near future in Syria, as well as reducing dependence on single-product oil exports, it is necessary to create new units such as Mr. Rajabi's factory.

	CO_2 Capsules : 6.77 million Rails \cong 24.7 Euro			
Cost of Fire Extinguisher (unit)	Powder Capsules: 2.7 million Rails≅ 9.85 Euro			
	Powder and Gas Capsules: 4.40 million Rails≅ 16 Euro			
	CO_2 Capsules : 8 million Rails \cong 29.2 Euro			
Sale price of Fire Extinguisher	Powder Capsules: 3.2 million Rails≅ 11.68 Euro			
(unit)	Powder and Gas Capsules: 5.2 million Rails≅ 18.98 Euro			
total Sales (in 100% capacity)	62,250.00 million Rails≅ 0.24 million Euro			
Present sales in break-even point	49.83%			
Profit (in 100% capacity)	22,229.13 million Rails≅ 0.081 million Euro			
Gross value added (million Rail's)	35,890.0 million Rails≅ 0.13 million Euro			
Net value added (million Rail's)	32,799.4 million Rails≅ 0.12 million Euro			
The Gross value added to total Sales	54%			
The Net value added to total Sales	50%			
The Gross value added to Investment	64%			
Investment Return Period	4.2 years			

Exchange rate:

1 Euro \approx 274,000 Rails 1 US\$ \approx 228,000 Rails

12- Summary of pre-feasibility plan

General Specification					
Name of The Project	Production of fire extinguishers (powder, gas, powder and gas capsules)				
Project Capacity	12500 unit				
Personnel Number	16 persons				
Working Days	250 days				
Product Usage	Increased safety of living, working, public buildings, automobiles and widespread use in extinguishing small fires				
Marketing					
Product Global Price	10 to 50 EUR/unit				
Domestic Demand	1,237,809 unit				
Domestic Production	1,207,360 unit				
Import	30,449 unit				
Export	18,070 unit				
Technical Study					
Land Area	1500 m ²				
Building Area	500 m ²				
Main Raw Materials	Sheet steel, paint and extinguishing agent				
Supplying Place of Raw Materials	Domestic				
Power Requirement	80 KW/hr				
Water Requirement	600 m ³				
Fuel Requirement	30000 m ³				
Economical & Financial Study					
Fixed Investment Cost	47,820.0 million Rails $\cong 0.175$ million Euro				
Working Capital	8,446.00 million Rails ≈ 0.03 million Euro				
Total Investment Cost	56,266.00 million Rails \cong 0.205 million Euro				
Annual Sale (in 100% capacity)	66,250.00 million Rails≅ 0.24 million Euro				
Net Present Value(NPV)	27,054.42 million Rails ≈ 0.099 million Euro				
Break Even Point(BEP)	49.83%				
Internal Rate of Return(IRR)	30.94%				
Investment Return Period	4.2 years				
Investment Sources Ratio:					
Equity:51%	28,456.00 million Rails \cong 0.104 million Euro				
Finance: 49%	27,810.0 million Rails \cong 0.101 million Euro				