In the name of God

Pre-feasibility study form

Plan Name: Dolomite Bricks Production

Project Owner: Nasouz Mehrgodaz Co.

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 of Production of dolomitic bricks (refractory and non-refractory)
Project Capacity: 45000 ton per year
Personnel Number: 35 people
Working Days: 288 Days
Product Usage: Manure
Marketing
Product Global Price: 424 Euro per ton
Domestic Demand: 142000 ton
Domestic Production: 18000 ton
Import: 24,143,234 Kg
Export: 18,549,180 Kg
Technical Study
Land Area: 6000
Building Area: 3115
Main Raw Materials: Dolomite
Supplying Place of Raw Materials: Local
Power Requirement: 1,450,000 (kwh)
Water Requirement: 70000(m^3)
Fuel Requirement: 1,860,000 (m^3)
Economical & Financial Study
Fixed Investment Cost (Rail's& other Currencies): 131143 Million Rials- 553862 Euro
Working Capital: 156073 Million Rials- 659150 Euro
Total Investment Cost: 287216 Million Rials- 1213011 Euro
Annual Sale: 1305000 Million Rials- 5511464 Euro
Net Present Value(NPV): 239346 Million Rials- 1010840 Euro
Break Even Point(BEP): 7088.8 Million Rials- 29938 Euro
Internal Rate of Return(IRR): 29%
Investment Return Period: 4 Years
Investment Sources Ratio

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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 Dolomite bricks production. 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.

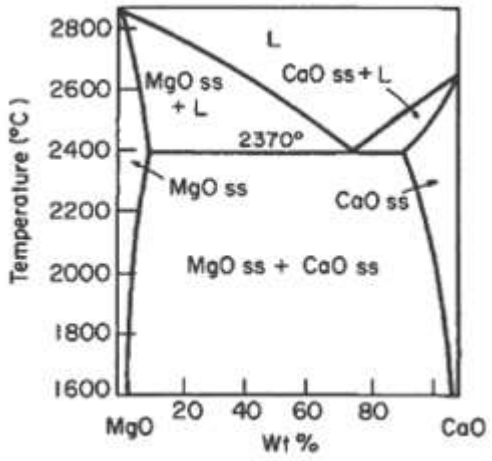
1 -Product Introduction

Brick is one of the oldest building materials dating back 10,000 years to some archaeologists. Remains of pottery and brick kilns in Susa and Silk Kashan in Iran date back to the fourth millennium BC. There are also signs of brick production and consumption in India, indicating a six-thousand-year history of brick in that country, including the Babylonian bricks and the names of the bricks on which the charters wrote the laws and the like. As the walls and floors of the stoves were cooked, the bricks were cooked. The basic brick kilns were undoubtedly composed of places where layers of firewood and clay were arranged alternately. The technique of using brick from West Asia to the west of Egypt and then to Rome and east to India and China In the fourth century the Europeans began to use bricks but after a while it was boomed and restored by the 12th century. It first started in Italy.

In ancient Iran, large and beautiful buildings were built, some of which are still standing, such as the Kausra Arch in western Iran, the tomb of Shah Ismail Samani in Kavus dome and the Isfahan mosque, which were also built with bricks and bridges. Old buildings such as the bridge of the daughter of Kabar Dam in Qom are among the old buildings. In Iran, where there was no stone, cooking and consuming bricks had become commonplace since ancient times. In the Sasanian era, consumption of bricks expanded. The floor of the corridor of Isfahan Jame mosque has been carpeted with Sassanid bricks by the Nasserian method. These bricks have remained here since the Sassanid era. The large brickworks of Neyshabur have remained in Sassanid times since the Azar-e-Berzine fire was sealed there.

The dolomite mineral, with its abundant deposits in Iran, is a combination of a solid solution of calcium and magnesium carbonate. Dolomite is a natural raw material for CaO-MgO refractories and found as fossils in the mountains, but limited deposits are suitable for refractory materials. Most compounds, such as clays, quartzite, calcite, iron and manganese, are dolomite impurities.

The dolomite is crushed after extraction and is baked in a rotary kiln at 1700-1800 ° C. Baking dolomite is a product of a mixture of lime or calcium oxide (CaO) and pericles or magnesium oxide (MgO) with the ratios of usually 2 and 1. Although temperatures of about 400-1000 ° C are sufficient for calcination, crude dolomite baking occurs above 1700 ° C for the growth of lime and periclase crystals and to provide dense raw material. To date, no compound is known in the CaO-MgO binary system. The system has a eutectic point at 2370 ° C, which occurs almost in the dolomite composition range. The ability to mix two oxides is only seen at high temperatures and in relatively narrow ranges (see figure below).



Dolomite bricks are alkaline products that are based on sintered dolomite or fused dolomite. The dolomitic refractories consist mainly of high-temperature refractory phases such as MgO and CaO. They contain approximately 60% calcium oxide (CaO) and 40% magnesium (MgO), and the lateral components include AL_2O_3, Fe_2O_3, SiO_2. The magnesia-dolomite bricks are products of a mixture of sintered dolomite (melting) and sintered magnesium (molten) in the proportions of 70/30, 50/50 and 30/70. As a result, MgO content is in the range of 50-80% by weight. Because of the alkali nature, these refractories have high resistance to corrosion of alkali slag at high temperatures.

Dolomite refractory bricks along with chamomile refractory bricks and other types of refractory bricks can also be used in the manufacture of refractory bricks (aluminum) for the manufacture of metal smelting furnaces and the processing of ceramic and metal materials and artifacts. The brick production process is the same and according to market demand and order, other types of raw materials can be produced by varying the percentage of raw materials.



Refractory bricks are made of refractory materials that have high heat resistance and maintain their physical and chemical properties at high temperatures. Bricks made of refractory materials, in addition to their high thermal resistance to damage such as chemical impacts, mechanical loads, blows and so on are also highly resistant. Refractory brick is a type of brick with fine, regular and dense molecular structure and this structure has the power required at high temperatures. Chinese soil is used in the manufacture of refractory bricks. It is composed of mineral refractory minerals that play an important role in increasing the strength of bricks. Chinese soil preserves the physical and chemical properties of the brick at high temperatures and gives it a stable state. This ideal heat resistance allows the use of bricks in furnaces and kettles.

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

According to information obtained from the Ministry of Industry, Mining and Commerce, the ISIC code is 2692412304.

1-2-Customs Tariff Number

According to the Export and Import Regulations Book of 2019 and the Chamber of Commerce, Industries, Mines and Agriculture website, this plan contains the Customs Tariff Code 6902.

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 15%.

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	1038	Refractory brick classification
National standard	1044	Dimensions of refractory bricks with rectangular surfaces
National standard	991	Dimensions of refractory bricks used in arched chambers

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

Standard Name	Standard Number	Description
ISO	R475	Dimensions of refractory bricks with rectangular surfaces
ISO	R1145	Dimensions of refractory bricks used in arched chambers

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

The global price of dolomitic bricks is $ 500 per ton on average. The price inside Iran is about half of its equivalent in rials.

1-6- EXPLAIN THE USES OF THE PRODUCT

The need to provide clean steel and better quality, along with environmental issues related to the use of bitumen and resin asphalt, has led to the attention of dolomitic refractories. Refractory steel inner wall refractories must resist corrosive slag and metallurgical reactive slag. Also, the refractory lining should be thermodynamically stable in contact with the steel to prevent re-oxidation of steel and problems with steel cleaning. Dolomite bricks typically meet these requirements. The first steel refining tank in the United Kingdom was primed with sintered dolomite in 1875 in England, providing conditions for the desulphurization and phosphorus decomposition of steel. Oxygen blower converters, Siemens-Martin furnaces, electric coupling furnaces, cement rotary furnaces, lime vertical furnaces, crude iron mixers and kettles were also used. The dolomitic bricks exhibit good resistance to slag, especially in steel cauldrons and rotary cement kilns. Magnesia-dolomitic refractories have relatively good resistance to slag penetration.

Therefore, they have found different uses in the steel industry. They are used as coatings and liners for pottery kilns and AOD chambers, as well as in arc furnaces in the form of non-ferrous materials. Lime, dolomite and cement rotary kilns are also used in the baking area.

In tanks used in the steel industry, dolomitic bricks are usually eroded by hot-slag CaO slag. This leads to the formation of calcium silicates, aluminates and ferrites. As a result, the brick microstructure weakens and the newly formed phases are co-localized with the residual periclase. In cement kilns, the penetration of CO, SO_3, Cl_2 and alkali oxides into the bricks together with the formation of bulky compounds such as $CaCO_3$, KCl, $CaSO_4$ and K_2SO_4 destroy the brick microstructure from its hot surface. Corrosion analysis of dolomitic refractories of the converter indicates that the reaction between slag iron oxide and CaO component of dolomite is the main cause of corrosion of these refractories. Corrosion of dolomite refractories by carbon bonding in steel potholes is simultaneously physical and chemical erosion and the predominant corrosion mechanism is physical and then the reaction between the slag and the refractory components becomes important.

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

Currently, dolomitic bricks can be used to make the furnace body, and a replacement or replacement product with a refractory brick capability has been defined. Since the selection of the respective bricks has to be done taking into account the required temperature range and the environmental conditions of the furnace, the different bricks (which generally have different

physical and chemical properties) cannot replace each other. In other words, it is not possible for dolomite bricks to replace the quality and properties required.

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

Due to their unique characteristics, these bricks have a wide variety of applications and their use of these products has taken on new dimensions and, with technological advances, new angles of consumption and application of dolomitic bricks have emerged.

Refractory production units were mainly established in Isfahan in the 1990s. Most of the technology of these units came from countries such as Russia and the US at the time of its establishment. Refractory products are called molded (brick) and amorphous (monolithic) products that have high temperature tolerance and durability and are mainly consumed by steel, cement, nonferrous metals, glass, ceramic and petrochemicals.

Given the following advantages of this product in Iran and the world is of strategic importance:

- Impressive and unique beauty
- High heat and heat resistance
- Light and light weight
- High strength and toughness
- Durable and durable
- Comfortable and convenient connection to structures
- Color variation
- Variation in size and size
- Insulation against cold and heat
- Resistant to wear and tear
- Highly versatile in application and layout pattern
- Eco-friendly

•Natural and consistent color

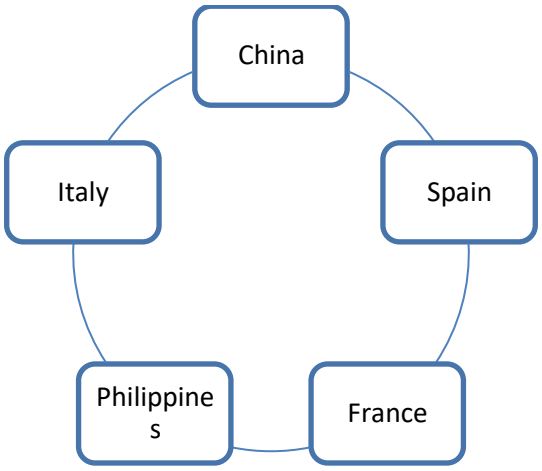
•Fire resistance

•Impact and scratch resistance

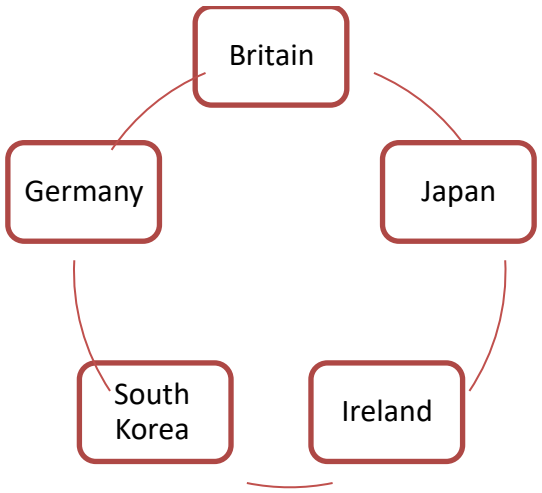
•Low water absorption

1-9-MAJOR MANUFACTURING AND CONSUMER COUNTRIES

According to the prestigious website www.factfish.com, the ten major product manufacturers listed in the plan for 2019 are as follows:



Main importing countries



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

ThermaGlo

Kilnlinings

Vitcas

Kelsen

Darley Firebrick

J. R. Refractory

Colonial Manufacturing

RHI

TRL Krosaki

ArcelorMittal Refractories

Qinghua Refractories

Rath

Magnesita

Melbourne Fire Brick Company

Refratechnik

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

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

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

With the establishment of dolomitic brick production units, in addition to breaking the dependency, by adding capacity and improving the quality of products, one can also hope to export it. At

present, the only dolomite products manufacturer in the country, including dolomitic bricks, is Nasooz Azar, which produced about 20,000 dolomitic bricks last year.

According to the latest statistics released by the Information and Services Portal of the Ministry of Industry, Mining and Trade, active units producing similar products (refractory bricks) in the country are as follows:

Note: Given that in the optimization system, the capacity of some units is stated in terms of tons and some units in terms of numbers, we refer to the same statistics here.

:

Row	Name	City	Capacity
1	Dirgodaz Arak	Arak	8400
2	Ceramic Tus	Saveh	300
3	Mohammad Sadegh Mohabbat Jahromi	Jahrom	30000
4	Azarakhsh Tosee Sanaye Nasouz	Qom	15000
5	Mehdi Mohammadian	Takestan	2700
6	Atlas Ceram Kavir Trading	Qom	100
7	Nasouz Azerbaijan	Shabestar	2000
8	Ebrahim Rostami	Qazvin	2080
9	Abolghasem Ahangar Moghaddam	Mashhad	2700
10	Tus Hirad Shargh	Mashhad	1200
11	Dirgodaz Iran	Gonabad	24000
12	Nasouz Khuzestan	Ahwaz	2000
13	Palaz Sanat	Shahreza	3000
14	Dirgodaz Jey	Esfahan	500
15	Azarakhsh Nasouz Qom	Qom	7500
16	Nasouz Azarakhsh Qom	Qom	1000

17	Faravardehaye Kani Ghere Felezi	Mashhad	3600
18	Faravardehaye Nasouz Azarakhsh	Mashhad	6400
19	Azarakhsh Ajor Nasouz Qom	Qom	6000
20	Esteghlal Abadeh	Abadeh	100
21	Dir Godaz Gostaran Pasargad	Behbahan	3150
22	Dirgodaz Amol	Amol	3500
23	Nasouz Arak	Shazand	1000
24	Ali Mohammad Pak Mehr	Urumia	2000
25	Ajor Sirang Maham	Qom	11200

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	Nasouz Mehrgodaz	Borujen	30000
2	Dirgodaz Iran	Gonabad	10000
3	Nasouz Tabriz	Azarshahr	4000
4	Raouf Fakhari Nia	Esfahan	120000
5	Mehr Arian Fars	Shiraz	17000
6	Hossein Haghighatzadeh	Meybod	9000
7	Aluminum ceram Negin	Meybod	400
8	Ali Reza Safdarizadeh Meybodi	Meybod	1000
9	Hamid Rostami	Avaj	12000
10	Gholamreza Hamdi	Neyshabur	1000
11	Caspian Iranian	Ashkzar	8500
12	Enix Soffal Bam	Namin	18000

13	Abadgaran Diar Samangan	Sirjan	11000
14	Seyed Mostafa Amini	Shahr e Kord	30000
15	Beton Azar Omran Gharb	Naqdeh	60000
16	Mohammad Hossein Ehsan Far	Qazvin	4000
17	Mohsen Naderi	Abadeh	1000
18	Hussein Nikoufar Balbal	Qom	5000
19	Sadat Taban Teb	Cheram	100000
20	Hossein Khairkhah Khairabadi	Mashhad	10000
21	Yekta Felez Iranian	Sarab	10000
22	Sarram Arai Fajr Zarrin	Torbat Heydariyeh	12000
23	Pishro Nasouz Tehran	Qom	2000
24	Setareh Badakhshan Iranian	Ashkzar	10000
25	Noyan Nasouz Shayan	Mashhad	1500
26	Parsian Pargas Ouher	Abhar	30000
27	Azadeh Islami Amirabadi	Ashkzar	30000
28	Mohammad Nazarian	Jiroft	10000
29	Davood Chaharmahal	Semnan	5000
30	Dirgodaz Tabriz	Varzaqan	3000
31	Maral Meybod	Meybod	3000
32	Navid Chizari	Shahroud	10000
33	Zahra Mohtasham Nia	Shahroud	10000
34	Mohammad Roustaei	Semnan	500
35	Ali Mousavi Nia	Semnan	500
36	Ajor Nasouz	Bam	32500
37	Davood Janshanzadeh	Boyer-Ahmad	250000
38	Mohammad Reza Shahsavari	Takestan	312
39	Armin Akhundi	Gonbad Kavous	5000
40	Nasouz Barez Tehran	Qom	1500
41	Abolfazl Hejbari	Shahroud	1300
42	Gholam Ali Meshkani	Larestan	7000

43	Mohammad Roustaei	Mashhad	3000
44	Majid Mohebbi	Meybod	1000
45	Saeed Khorramfar	Neyshabur	1000
46	Negarin Taher Yazd	Meybod	20000
47	Nasouz Apadana	Qazvin	8000
48	Atash Pouya Sepahan	Shahreza	8000
49	Khalil Asadi	Kalat	20000
50	Rudani Tabas	Birjand	3000
51	Bargol Soffalin Talaei	Mashhad	30000
52	Dirgadaz Mehr Arian Fars	Sarvestan	80000
53	Dirgadaz Mehr Arian Fars	Shiraz	10000
54	Dirgodaz Espadana	Esfahan	2000
55	Nader Zolfaghari	Boyer-Ahmad	250000
56	Caspian Iranians	Ashkzar	20000
57	Nasouz Khuzestan	Ahwaz	15000
58	Bojak Asad Ceramic	Esfahan	10000
59	Azarshid Pars	Mehriz	8000
60	Airiz Pisheh Alborz	Eshtehard	300
61	Mobin Sarm Artavil	Meshginshahr	10000
62	Namasazan Pahneh Kabir	Rafsanjan	22500
63	Hossein Rostami	Takestan	12000
64	Tosee Pardazan Komesh	Semnan	10000
65	Mavad Nasouz Keshvar	Sarbisheh	36000
66	Zobahan Alborz Gharb	Abhar	32000
67	Faravardehaye Nasouz Iranian	Dehaghan	15000

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, the title of this plan is Customs Tariff Schedule 6902". Is as follows:

Year	Euro value	Rial value	Weight (kg)
2015	34,691,693	1,199,641,201,736	28,850,342
2016	33,399,866	1,232,563,678,305	26,017,556
2017	23,733,851	971,567,564,274	18,015,001
2018	39,144,225	1,937,895,565,305	24,143,234
2019	931,492	46,164,737,523	317,606

2-4-MONTORING CONSUMPTION TRENDS

The best way to determine the consumption of the types of products mentioned in this plan is to use the balance of supply and demand. In such a way that the amount of domestic consumption is estimated to be equal to the difference between supply (total domestic production and imports) and exports. According to the latest statistics available in 2019, the total production and imports were about 140,000 tons. Consumption of this product has been on the rise in recent years due to the industrial development of the country and it is predicted that the consumption of this substance will reach 200,000 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 plus the value of the rial and the dollar according to the announcement of the Chamber of Commerce, Industries, Mines and Agriculture as follows:

Year	Euro value	Rial value	Weight (kg)
2015	1,662,911	57,408,357,410	11,019,707
2016	4,248,860	159,798,252,634	6,314,400
2017	1,751,212	68,047,719,932	6,013,760
2018	4,278,367	287,460,885,105	18,549,180
2019	219,143	25,198,790,803	1,846,710

2-6- PRODUCT REQUIREMENT CHECK WITH EXPORT PRIORITY

Dolomite is abundant and inexpensive in Iran, but due to its chemical reactivity with air, it has been less commonly used to make refractory bricks. But adding some materials and changing the

packaging can easily solve this problem, the new generation of dolomite bricks being fireproof bricks, with 5% of its material imported. These bricks are 5 percent less expensive than their previous counterparts, and 5 percent more heat-resistant. Dolomite refractories withstand 1700 ° C and high static pressure.

Dolomite was initially used as an alkali refractory layer in steel making equipment. But in the last century it has been used as a raw material for firing Siemens-Martin kilns, which consumes approximately 0.7 kg of dolomite to produce one ton of molten steel, and this amount is about 12 to 48 kg per liner. It's steel.

Dolomite and magnesium can be used in LD furnaces, but precise selection is difficult because magnesium is more efficient and dolomite is cheaper and affordable. The use of these two materials depends on the location of use in the furnace and it can be said that dolomitic and magnesium bricks can be used in different locations of a furnace.

Due to the widespread use of refractory products as well as dolomite, including dolomitic bricks, its dominance in world markets has become an important lever for power in developing countries, making it difficult to penetrate these markets and possess advanced technology of production, Other countries are trying to access these technologies and not reach their consumer markets.

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

Dolomite bricks are produced in two ways:

Cooked bricks (ceramic bonded)

The raw materials are pressed with standard aggregate and adhesive as bricks, and after drying, are baked in the furnace to form a ceramic bond. Although these types of bricks are better resistant to hydration, they are covered with materials such as tar pitch.

Raw bricks (with chemical bonding)

To the standard agglomeration of dolomite-based raw materials, the low-temperature diameter is added as a binder and pressed into bricks after mixing. These bricks are heated in a temp furnace in the range of 400 to 300 and shipped immediately to the place of use.

It is important to obtain dense clinker by thermal decomposition of dolomite and then high temperature sintering. There are two main ways to make dolomite clinker for ceramic bonded products:

One step procedure:

Sintering of crude dolomite in the form of coarse mass in a rotary kiln or shaft at high temperatures up to 2000 ° C

2-step method:

Mill and briquetting presses and their sintering Dolomite products are highly sensitive to water vapor due to free CaO and must be protected against hydration. Periclase and lime can both react with moist atmosphere and become hydrated, which results in increased volume, peeling and shedding. The reaction rate of lime and its destructive effect is much higher than that of periclase and is the main disadvantage of dolomitic bricks.

$$CaO + H_2O = Ca(OH)_2$$

$$MgO + H_2O = Mg(OH)_2$$

Generally, dolomitic bricks are produced during a four-step process:

1- Preparation of raw materials

2- Grading, weighing and mixing

3. Shaping

4- Baking control and packaging

Preparation and aggregation of raw materials are activities that occur after the raw materials enter the factory before their weighing and mixing. This step mainly involves calculating, crushing and grinding the raw materials. The importance of preparation as much as raw materials goes back to the creation of appropriate physical and chemical properties in the raw and cooked product, and the smaller size of the particles causes them to melt faster, in other words, to accelerate the formation of the liquid phase, and this in turn amounts to Thermal expansion of the body is very effective.

The material aggregation stage depends entirely on the type of product produced and each product needs a specific aggregation. Tips commonly used to determine material grading and how to weigh grains include: material fluidity, grain size, and initial grading of plasticity materials, adhesion properties, material properties and sensitivity to the drying process and material response to conditions. Cooking.

It is necessary to explain that there is no preparation and aggregation in the unit of production and the materials are procured and aggregated to save on investment. Raw materials are easily obtainable

from within the country. Raw materials are stored in the warehouse after entering the unit and then fed into the three-story vibration screen when feeding the production line and then stored in the feed line silo.

The weighing operation of the granulated material is carried out by the weighing machine in such a way that it is poured into the container at specified ratios. Of course, this container is movable on the rails and can be fixed on the scale. In each section the amount of material that enters the depot through the conduit is read by the weighing system and completes the container at the various mixing stations.

Following the brick manufacturing process, after mixing, molding is performed to form press molds and automatically feeds the blended material by moving the ram then tapping to achieve compression. The complete material is made by hydraulic press and for bricks that we are not economically capable of molding or molding, the mold is popped and the material is crushed by feeding with a hammer to form the brick come on.

After forming the bricks are sent to the oven for baking, first drying and then baking and cooling the product. Drying is done inside the baking oven. Depending on the type of brick, bricks are dried at temperatures above 1000 ° C during baking, the brick interior is formed and volatile substances such as water and CO_2 are removed from the bricks. As the volatiles evaporate and the crystalline brick forms, the dimensions of the bricks become small or large.

The cooking temperature inside the furnace for dolomitic bricks is about 1700 ° C and the cooking time varies for different types of furnaces and varies from 3 to 20 days.

Also, during the cooking process, the flame should be covered all around the brick so that all parts of the brick are cooked evenly. For high quality bricks they are placed in the furnace at temperatures up to 1800 ° C.

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

The behavior of dolomitic and dolomitic sintered bricks is determined by the amount of free CaO (which is sensitive to moisture). For this reason, the method of manufacturing, maintaining and installing these bricks is quite different from other refractory products. The dolomitic and magnesia-dolomitic bricks are packaged in vacuum-coated double-walled plastic sheets. This makes the brick's useful life of up to 6 months or more in humid weather. After the bricks are installed in the furnaces, the furnace temperature should rapidly rise above 600 degrees Celsius. For installation of these products, dry installation is preferred. Juicy mortars are also not commonly

used. Depending on the installation, an expansion inhibitor such as a thin cardboard or sheet metal is required.

The benefits of these methods are:

- Release of low oxygen into the steel melt
- Relatively high vacuum and atmospheric stability
- High resistance to low FeO alkaline slag
- Good coverage in cement rotary kiln baking area

The disadvantages of these methods are:

- Sensitivity to hydration in humid climates
- Low resistance to acidic slag
- Severe infiltration of slag after carbon burning
- Excavate parts of the brick where the slag has penetrated
- Reaction of some CaO with SO_3 and CO_2 and formation of salts in cement rotary kilns

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	6000	25341
Landscaping	1665	7032
Construction	20315	85797
laboratory equipment	82610	348890
Utilities	1000	4223
transportation	2420	10220
equipment and machinery	4520	19090
Office equipment	871	3678
Miscellaneous and unforeseen	11922	50351
Total	131143	553862

The ground specification of the project implementation is as follows:

Description	Area (m 2)	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Land	6000	1/000/000	6000	25341

The cost of landscaping is as follows:

Description	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Digging and leveling	6000	150/000	900	3801
Fencing	350	1/500/000	525	2217
Asphalt and pavement paving	400	450/000	180	761
Green space and lighting	600	100/000	60	254
Total			1665	7032

Building Information:

Description	Building type	Area	Unit Price (Rials)	Total (Million Rials)	Total- Euro
Production	Niches	1400	5/700/000	7980	33703
Raw materials and supplies	Niches	1400	5/700/000	7980	33703
Office building and services	Official	160	20/000/000	3200	13515
Utilities	Niches	130	6/000/000	780	3295
Guard		25	15/000/000	375	1584
Total		3115		20315	85797

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	1022

Transportation:

Description	Technical Specifications	Cost (Million Rials)	Cost (Euro)
Forklifts	3 ton	2400	10136
Pickup	Nissan	790	3337
Riding	Samand	650	2745
Other		2100	8869
Total		4520	19090

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.

The world's leading companies producing the main equipment for the dolomite bricks production process can be listed as follows:

Shibang Group, Henan Tenic Machinery, IMM, Ntto, …

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 amou	Currency (Euro)	cost (million rials)	Rial sum (million rials
1	Extruder	1	27451	6500	6500
2	Box Feeder	1	24495	5800	5800
3	Roller mill	2	15626	3700	7400
4	Hoffman Furnace	2	26185	6200	12400
5	Mixer	2	15204	3600	7200
6	Hydraulic Press	2	14782	3500	7000
7	Silage of materials	2	16048	3800	7600

8	High material	2	10136	2400	4800
9	Oven dryer	1	13937	3300	3300
10	Vibration screen	1	9291	2200	2200
11	Conveyor	5	5913	1400	7000
12	Air compressor	1	7179	1700	1700
13	Weighing system	1	9291	2200	2200
14	Other cases	1	31717	7510	7510
Total- Million Rials				82610	
Total- Euro				348890	

laboratory Equipment:

Number	Name	Currency (Euro)	Rial Cost (Million Rials)	Rial sum million) (rials
1	laboratory equipment	4223	1000	1000
2				
Total		1000		

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	4/000/000	8
9	Waiting chair comfort	5	12	3/000/000	15
10	Dining table and chair	1 Series	37	9/000/000	9
11	Computer	6	190	45/000/000	270
12	Printer and Scanner	5	63	15/000/000	75
13	Fax	3	25	6/000/000	18
14	Telephone	8	8	2/000/000	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	5 Series	13	3/000/000	15
19	Central central system	1	296	70/000/000	70
Total(Million Rials)		871			
Total (Euro)		3678			

Working Capital Costs:

Name	Description	Cost (Million Rials)	Cost- Euro
Raw materials and packaging	60 Days	154500	652507
salary	30 Days	1154	4873
Energy costs	30 Days	245	1035
revolving fund	15 Days	174	735
Total		156073	659150

Production costs:

Description	Cost (Million Rials)	Cost (Euro)
Cost of raw materials and packaging	927000	3915040
Salary Cost	13843	58463
Energy costs	2938	12409
Cost of maintenance	10120	42740
Unforeseen cost of production	1249	5274
Administrative and sales costs	9552	40342
Costs of financial facilities	9647	40743
Insurance costs	8042	33964
Depreciation cost	500	2112
Depreciation expense before operation	3932	16606
Total	986823	4167693

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	Dolomite	1	Ton	45000	13/000/000	Internal	585000
2	Qatar	0/04	Ton	1800	120/000/000	Internal	216000
3	Packing materials	38	A thousand numbers	1710000	18129	Internal	31000
4	Other						95000
Total- Million Rials							927000
Total - Euro							3915040

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 area is not very risky because in addition to the domestic market there is easily great potential for exporting this product to neighboring countries and if for any reason the applicant intends to do so. It should act cautiously and with the highest advantages of other industrial units in this regard and minimize project risk by examining further the strengths and weaknesses as internal factors as well as opportunities and threats as external factors.

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	3	24	72	1181	4988
Line Administrator	Man	2	24	48	787	3323
skilled worker	Man	3	23	69	1132	4781
Semi-skilled worker	Man	5	22	110	1804	7619
worker	Man	10	21	210	3444	14545
Service	Female	2	21	42	689	2910
Guard	Man	2	21	42	689	2910
Driver	Man	1	21	42	689	2910
Secretary	Female	2	21	42	689	2910
Total		35			13843	58463

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	1/450/000	648	940	3970
Water Consumption	Cubic meters	70/000	1973	138	583
Gas	Cubic meters	1/860/000	1000	1860	7855
Total				2938	12409

10- CONDITIONS OF ECONOMIC AND COMMERCIAL SUPPORT

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

Most of the production units supply part of the machinery from overseas. The machines will enter the country after initial tests and no technical problems. The current customs duty on such machines is about 10 percent of the price of foreign machines. On the other hand, production units whose products are exported abroad require payment of customs duties. Fortunately, in recent years, export incentives have been adopted to encourage domestic producers to export, which has led to increased exports.

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

The government's program in recent years has been to support small-scale and early-stage projects, along with government-sponsored programs such as providing facilities to economically justified projects.

Following is the condition of these facilities for industrial projects.

1 .In the Fixed Investment section, the following items shall be included in the calculation for the long-term banking facility with a coefficient of up to 70% of the fixed investment.

1-1 - Buildings and landscaping designs, machinery and equipment, installations and workshop equipment are calculated at a 60% coefficient.

1-2- External machinery is calculated at 90 percent if excluded in the project, and at the other end, at 75 percent.

1-3- If the volume of foreign machinery investment in fixed investment is less than 70%, the items referred to in paragraph 1.1 shall be calculated to receive the Rial Facility with a coefficient of 70%.

2 .It is possible that the projects that reach the exploitation stage will be required to provide 70% of the banking network.

3 - Rial facility interest rate on long-term and short-term loans at 12% interest rate and 2% foreign exchange rate interest rate and financial costs of approximately 1.25% of the lending facility rate and FX interest rate for deprived areas. Percentage is constant.

4 .The period of participation, respiration and repayment in rial and foreign exchange facilities shall be considered up to a maximum of 8 years in view of the nature of the project in terms of profitability and return on investment.

5 .The maximum duration of financing from the reserve account shall be 10 years for underdeveloped and deprived areas.

In addition to the financial facilities, there are tax exemptions for some areas as follows:

1 .Implementation of the plan in industrial estates will include 80% tax deduction for the first four years of operation.

2. The Company shall be exempt from taxation in the excluded areas for the first 10 years of operation.

3 - Taxes for ordinary areas (excluding industrial settlements and deprived areas) are set at 25% of gross profit.

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

- Considering the above mentioned, dolomitic brick production in Iran is negligible and considering that the production of such bricks has many advantages, its production in the country according to available resources (dolomite) seems quite reasonable.
- Due to the technical and economic calculations carried out for this project and the appropriate rate of return on capital it is necessary to establish a dolomitic brick production unit (refractory and non-refractory) in the country.
- 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)	27000	45000	33750	45000	45000

prime cost	22 million rials/Per ton- 93 Euro
Selling prices of products	29 million rials/Per ton- 122 Euro
Total Sales	1/305/000 Million Rials- 5511464 Euro
Percentage of sales at the point head to head	11
Profit	315/000 Million Rials- 1330354 Euro
Gross Value Added	373813 Million Rials- 1578741 Euro
Net Value Added	359761 Million Rials- 1519395 Euro
Ratio of gross value added to total sales	0/29
Ratio of net added value to total sales	0/28
Ratio of gross value added to investment	0/30
Net Present Value(NPV)	239346 Million Rials- 1010840 Euro
Return of capital	4