



Islamic Republic of Iran

Ministry of Economic Affairs and Finance

General Department of Economic Affairs and Finance of North Khorasan

The Heat Treatment

Bojnourd Special Economic Park

Center of Investment Services of North Khorasan

2021 April

Summary of Technical-Economical Pre-Feasibility Study

The name: Heat Treatment

Sector: Industrial

Subsector: Metal Products

ISIC Code: 2892312376

The owner of:

Organization of Economic Affairs and Finance (North Khorasan)



The ADDRESS:

Iran, North Khorasan, Bojnourd

Table of Contents

1	Abstract.....	4
1.1	Project Profile - Summary Sheet.....	4
2	Project Location.....	6
2.1	Province: North khorasan.....	6
2.2	The County: Bojnourd	6
2.2.1	Agriculture Section Advantages.....	6
2.2.2	Tourism Section Advantages	6
2.2.3	Mine and Industry Section Advantages	7
2.2.4	Urban Development Section Advantages	7
2.3	The Project: Heat Treatment	8
2.4	Access to the Infrastructures	8
3	Technical Specifications of Plan.....	8
3.1	Product	8
3.2	Project's Requirements	9
3.3	Space and Infrastructure Required	10
3.3.1	Equipment and Machinery	11
3.3.2	Raw Material and Intermediate Components.....	12
3.3.3	Management and Human Resources	12
4	Market Study and Competition.....	13
4.1	Examining Supply and Demand Trends	13
5	Financial Projection	15
5.1	The Cost Estimate	15
5.2	Break-Even Analysis.....	16
5.3	Sensitivity Analysis of IRR.....	17
6	Duration of Project Operation.....	18
7	Incentives, Features And Advantages of Project	18

1 Abstract

1.1 Project Profile - Summary Sheet

Table 1: Summary Sheet

Project Introduction			
Project Title	Heat Treatment		
Sector	Industrial		
Sub Sector	Metal Products		
Location	Iran, North khorasan, Bojnourd		
The County	Bojnourd		
Products / Services	Heat Treatment on Steel (MO40)		
Annual Nominal Capacity	400		Ton's
The Raw Material	Various Steel Parts for Hardening		
Employment	17		Person
Land Area	4,762		m ²
Floor Area	1,730		m ²
Energy and Water Consumption	Water Consumption	10,000	m ³ in year
	Electricity Consumption	240	KW
	Gas Consumption	300,000	m ³ in year
Fixed Capital	161,835		Million Rial
Working Capital (The First Year)	2,561		Million Rial
Payback Period	5.2		Year
Net Present Value (NPV)	86,489		Million Rial
Internal Rate Of Return (IRR)	32		%
Modified Internal Rate of Return (MIRR)	23		%
Break Even Point	41		%
The Exchange Rate (Dolar)	240,000		Rial
Description	The ultimate goal of this project is to increase exports of steel products, and reduce its imports.		

Table 2: Legal Authorizations

Licensure Status	
Descriptions	Issuance Status
Principal Agreement (Establishment licensure)	☒
Land Allocation	☒
Environmental Inquiry	☒
Possibility of Water Supply	☒
Possibility of Electricity Supply	☒
Possibility of Electricity Supply	☒
Possibility of Gas Supply	☒

Table 3: Total Investment

Descriptions	Local Currency Required			Foreign Currency Required (Million Euro)	Total (Million Euro)
	(Million Rial)	Rate	Equivalent in (Million Euro)		
Fixed Capital	161,835	240,000	0.67	0	0.67
Working Capital	2,561		0.01	0	0.01
Total Investment	164,396		0.68	0	0.68

- Value of foreign equipment / machinery: 0 Million Euro
- Value of local equipment / machinery: 0.11 Million Euro
- Value of foreign technical know-how: 0 Million Euro
- Value of local technical know-how: 0 Million Euro
- Net present value (NPV): 1.7298 Million Euro (for %20)
- Internal Rate of Return (IRR) (for 5 years): %32
- Payback period: 5.2 year

Table 4: General Information

Company Profile	
Project Type	Establishment <input checked="" type="checkbox"/>
Company Name	North Khorasan Organization of Industry, Mine and Trade
Contact Person (Name and Position)	Morteza HoseyniMasoom
Email	smt.nkh1383@gmail.com
Mobile	09153864144
Tel	05831552
Website	nkh.mimt.gov.ir
Address	North Khorasan Province, Bojnurd, North Khorasan Organization of Industry, Mine and Trade
Company's Legal Structure	Government <input checked="" type="checkbox"/>

2 Project Location

2.1 Province: North khorasan

2.2 The County: Bojnourd

Bojnourd is the capital city of North Khorasan Province, Iran. It is about 701 km from Tehran. Bojnourd is located in the plains enjoying a mild and mountainous weather.

There are several reason for investing in bojnourd, such as:

2.2.1 Agriculture Section Advantages

- Suitable and diverse climatic conditions and having relatively suitable rainfall
- Having far more livestock per capita than the national average
- Having a considerable supply of diverse fruits
- The Possibility of establishing agricultural conversion industries in industrial parks

2.2.2 Tourism Section Advantages

- Having the presence of different ethnicities and producing handicrafts related to the culture of each ethnic group
- Being in a special geographical position and traveling 24 million passengers annually (ten percent of the total number of traveling passengers in the country) through North Khorasan

2.2.3 Mine and Industry Section Advantages

- Having large industries of alumina, steel, piping, petrochemical, cement and the availability of the development of industrial activities in downstream industries and creating a value chain.
- Conducting mineral exploration studies in Bojnourd, and valuable minerals for processing
- The existence of the Bojnord special economic zone has distinct advantages, including the shortest distance to the provincial capital among all special economic zones in the country, as well as its proximity to the Bidak industrial town.

2.2.4 Urban Development Section Advantages

- Appropriate and significant justification of urban and commercial projects and plans according to the characteristics and advantages of tourism, agriculture and industrial areas.
- The existence of transferable lands with suitable location.
- The need for commercial and tourism spaces in Bojnord due to the low per capita of these spaces.

This project will be construct in part 27 and 28 with coordinates (521568, 4146949) in Bojnourd Special Economic Zone. Proposed location of project is shown in Figure 1.

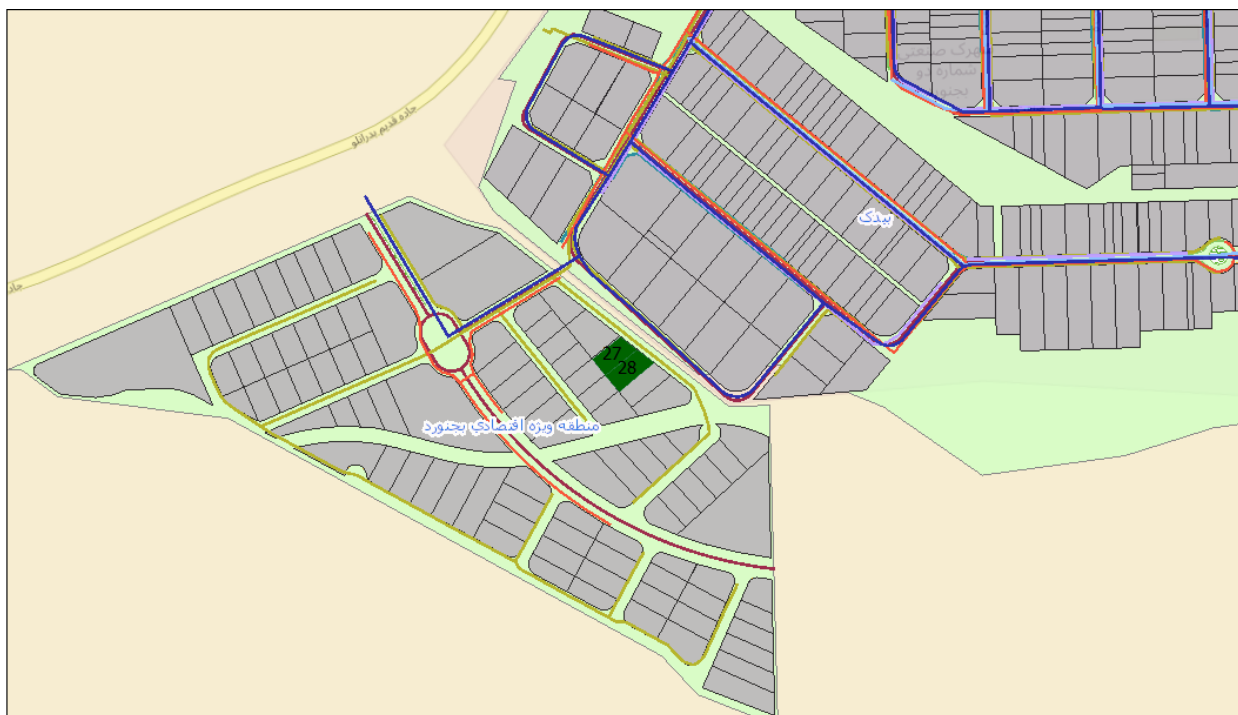


Figure 1: Location of Proposed Land in Bojnourd Special Economic Zone

2.3 The Project: Heat Treatment

2.4 Access to the Infrastructures

Table 5: Access to Infrastructures

No.	Needed Infrastructures	Distance to the Project	The Supply Infrastructures
1	Water	0	is provided
2	Electricity	0	is provided
3	Gas	0	is provided
4	Telecommunications	0	is provided
5	High way	<1 km	is provided
6	Sub way	0	is provided
7	Airport	8	is provided
8	Amirabad Port (Behshahr)	417	is provided
9	Bandar Abbas Port	1,493	is provided
10	Rail way station of Joveyn	170	is provided
11	Rail way station of Jajarm	192	is provided

3 Technical Specifications of Plan

3.1 Product

Table 6: Project Specifications Based on ISIC Code

The Project	ISIC Code	Customs Tariff	Environmental Category
Heat Treatment	2892312376	Service	4

Heat treatment involves a wide range of activities. Due to the widespread use of heat treatment on steel, in this project, the MO40-steel is desired, of course, it should be noted that the hardening of most common steels can be done similarly. Hardened steels have different shapes and different applications and different standards have been defined according to their application. The use of hardened steels is generally for the oil and gas industry, refineries, tools, etc. These steels' main applications are in the oil and gas industry and tool steel, and even in the automotive, military, and other industries.

Undoubtedly, the most important reasons for justifying a project are based on its economic considerations. Gaining a suitable share of the domestic or foreign market, expanding the target market, and having appropriate financial and economic indicators (NPVR, IRR), and so on are among the most important goals of an economic enterprise to create or develop an industrial plan. In addition, the national and macroeconomic aspects of the project should be considered.

Also, the study of the effect of project implementation on social and cultural indicators at the national and regional levels such as unemployment, labor migration, cultural effects, and finally the political considerations of the feasibility study, both nationally and internationally, can justify the necessity of implementing a project. Getting out of dependence on the outside, increasing domestic production, etc. can be studied and analyzed in this section.

3.2 Project's Requirements

During the heat treatment of steel, the physical, chemical, and metallurgical properties of steel change during certain processes, and this steel is used for various purposes.

In fact, heat treatment of steel is done to achieve the desired physical and chemical properties of the steel part and the desired part has the best possible performance for the intended application. There are different types of heat treatment of steel, during each of which, metals and their properties change and are used for different purposes. The hardness and other mechanical properties of many sheets of steel and some non-ferrous metals can be altered by heat treatment. Steel is an alloy made of iron and carbon. The mass percentage of carbon determines the ability to perform heat treatment on steel. Low-carbon steels contain 0.03 to 0.3 percent carbon, medium-carbon steels contain 0.35 to 0.55 percent carbon, and high-carbon steels contain 0.6 to 1.5 percent carbon (cast irons contain more than 2% of carbon). The higher the carbon content of the steel, the higher its hardness. Low-carbon steels do not have enough carbon for effective hardening, and other methods must be used to increase their surface hardness.

3.3 Space and Infrastructure Required

Table 7: Land Purchase Costs (Million Rial)

Specifications	Area (m^2)	Price per m^2	Cost		
			Paid Cost	Needed Fund	Total
land	4,762	0.6	0	2,857	2,857

Table 8: Site Preparation and Development Costs (Million Rial)

Description	Working Capacity	Unit	Unit Price	Paid Cost	Needed Fund	Total
Excavation	1,500	cm	0.3	0	450	450
Wall Construction and door	$2*(50+95) = 290$	m	9	0	2,610	2,610
Street Construction (5% of the amount of land)	238	Sm	7	0	1,666	1,666
Green Space and Lighting (1% of the amount of land) treet construction	48	Sm	8	0	384	384
Total				0	5,110	5,110

Table 9: Civil Works, Structures and Buildings Costs (Million Rial)

Description	Area (m^2)	Unit Price	Paid Cost	Needed Fund	Total
Production Hall	1,200	25	0	30,000	30,000
warehouse	300	30	0	9,000	9,000
office building	200	45	0	9,000	9,000
Guardroom	30	45	0	1,350	1,350
Total	4,340	-	0	54,350	54,350

Table 10: Infrastructures

No	Description	Unit	Annual Consumption	Unit Cost (Rial)	Total (Million Rial)
1	Water consumption	m^3	10,000	7,000	70
2	Electricity consumption	<i>Kwh</i>	1,000,000	1,100	1,100
3	Gas consumption	m^3	300,000	1,200	360
4	Petrol	<i>Litr</i>	3,600	30,000	110
5	Unforeseen	5% of the above items			157
Total					1,797

3.3.1 Equipment and Machinery

Table 11: Plant Machinery and Equipment Costs(Million Rial)

Description	Unit Cost	Costs Required				Total
		Local Costs	Costs of Currency		Cost to Complete	
			Rate	(Million Euro)		
Quenching Bath	400	800	240,000	0	0	800
Multifunctional hardening furnace	5,100	20,400		0.08	0	20,400
Tempering furnace	3,800	19,000		0.08	0	19,000
overhead crane	3,000	6,000		0.02	0	6,000
Pallet jack	80	80		0	0	80
Miscellaneous tools	2,000	2,000		0	0	2,000
Total cost of machinery		48,280		0.11	0	48,280

The exchange rate is: 1 € = 240,000 Rial

3.3.2 Raw Material and Intermediate Components

Table 12: Raw Material and Intermediate Components (Million Rial)

Description	Unit	Total Consumption of the Raw Material	Price per Unit of Raw Material	Annual Cost of Providing Material
Raw material & Packaging	ton	-	-	200
Salary	Rial	-	-	1,995
Energy costs (water, electricity and fuel)	L/KW/CM	-	-	1,797
Repair and maintenance	Rial	-	-	6,976
Total		-	-	10,968

3.3.3 Management and Human Resources

Table 13: Salary of Administrative Staff (Million Rial)

No.	Position	Number of Shifts	Personnel per Shift (No.)	Total Staff (People)	Monthly Salary (per Person)	Annual Salary
1	manpower (in Production sector)	-	-	10	55.5	6,660
2	manpower (in Administrative sector)	-	-	7	63.21	5,310
Total				17	-	11,970

- Number of skilled personnel required: 15
- Number of non- skilled personnel required: 2
- Number of expert personnel required: 10
- Total number: 17

4 Market Study and Competition

4.1 Examining Supply and Demand Trends

The amount of domestic supply or production of heat treatment based on production licenses (according to the information of the ministry of industry, mine and trade) from 2015 to 2020 is as follows.

Table 14: The Amount of Domestic Supply of heat treatment

Year	Nominal Capacity (Tons)
2015	13,259
2016	14,009
2017	14,009
2018	20,959
2019	20,959
2020	20,959

The real production capacity of active units in 2015 up to 2019 is shown in Table 15.

Table 15: The Real Production Capacity of Active Units in 2015 up to 2020

Year	Nominal Capacity (Tons)
2015	13,259
2016	14,009
2017	14,009
2018	20,959
2019	20,959
2020	20,959

The following chart shows the prediction of production according to the Table 15 based on linear regression.

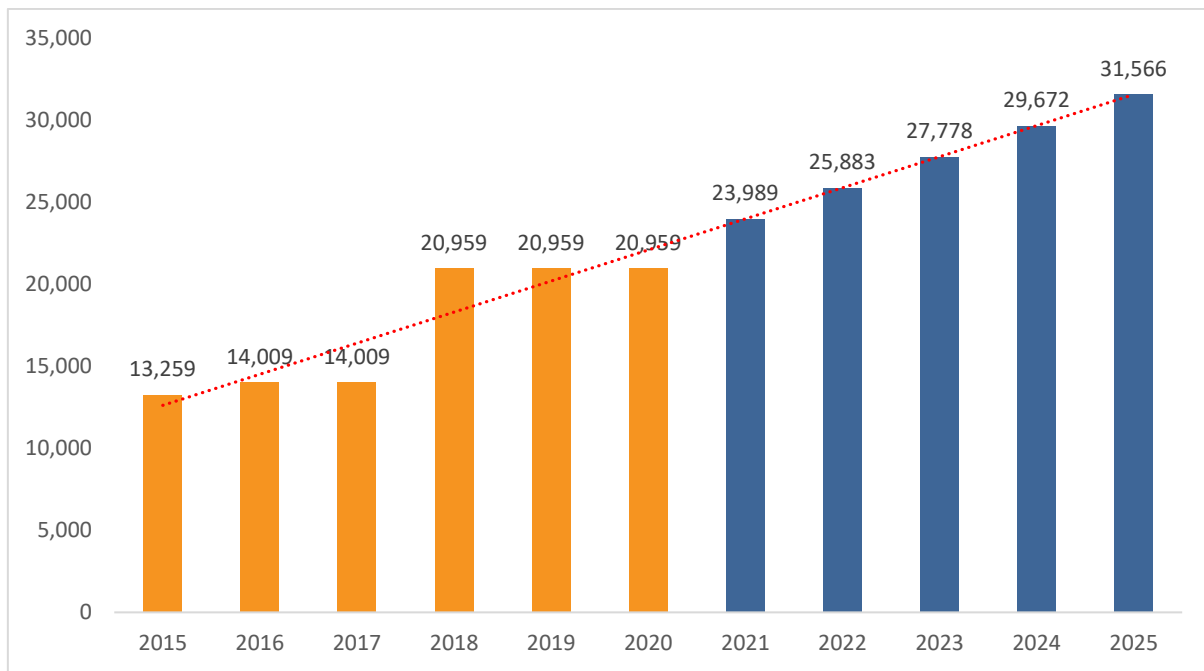


Figure 2: The Prediction of Production

As Figure 2 shows, the amount of heat treatment production is increasing. Since heat treatment is a service and extensive work, there is no customs code for it, so the analysis of this part, which includes import, export and demand, is removed.

In Table 20, the information of the units that have obtained a license is provided based on the amount of progress according to the information of the ministry of Industry, Mine and Trade.

Table 16: The Amount of Progress of Units that have License

Progress Percent	Capacity (Ton)
0% - 25%	340,290
25% - 50%	3,000
50% - 75%	17,500
75% - 100%	17,500

According to the above table, construction license up to a capacity of 340,290 tons have been given, while the current production of the country is 21,000 tons, so it is obvious that the country needs at least 320,000 tons. Therefore, the factory of this project with a capacity of 400 tons has no problem selling its product.

5 Financial Projection

5.1 The Cost Estimate

Table 17: Total Investment (Million Rial)

No.	Subject	Cost
1	Fixed Capital	161,835
2	Working Capital	2,561
Total investment		164,396

Table 18: Fixed Capital (Million Rial)

Subject	Paid Cost	Cost Required				Total cost
		Local Cost	Foreign Exchange Cost		Needed Fund	
			Rate	(€)		
Land purchase	0	2,857	240,000	0.01	0	2,857
Landscaping	0	5,110		0.02	0	5,110
Building	0	54,350		0.22	0	54,350
Equipment and machinery	0	48,280		0.2	0	48,280
Laboratory and workshop supplies and equipment	0	2,655		0.01	0	2,655
Facilities	0	27,132		0.11	0	27,132
Transportation	0	3,900		0.01	0	3,900
Office and services equipment	0	976		0	0	976
Pre-operation costs	0	1,863		0	0	1,863
Unforeseen (10% of the above items)	0	14,712		0.06	0	14,712
Total		161,835			0.67	0

Table 19: Working Capital (Million Rial)

Subject	Day	Total
Packaging material (2 months raw materials and packaging)	60	200
Salary (2months salary)	60	1,995
Imprest fund (15 days of water, electricity, fuel and repair costs)	15	366
Total	0	2,561

Table 20: Fixed and Variable Costs

No.	Production Cost	Fixed Cost		Variable Cost	
		%	Cost	%	Cost
1	Raw material	0	0	100	0
2	Energy & utility	20	359	80	1,438
3	Repair & Maintenance	20	1,395	80	5,581
4	Production salary	70	8,379	30	3,591
5	Depreciation	100	13,204	0	0
Total production costs			23,338		10,609
Per unit cost			58.34		26.52

5.2 Break-Even Analysis

Table 21: Break-even Analysis

Period	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Break-even ratio (%)	40.81	38.71	36.80	35.07	33.23	31.05	29.84	28.74	27.74	26.83

5.3 Sensitivity Analysis of IRR

Table 22: Sensitivity Analysis of IRR

Variation (%)	Sales Revenue	Increase in Fixed Assets	Operating Costs
-20.00%	23.72%	37.89%	34.17%
-16.00%	25.41%	36.47%	33.70%
-12.00%	27.05%	35.16%	33.22%
-8.00%	28.66%	33.95%	32.74%
-4.00%	30.23%	32.82%	32.26%
0.00%	31.77%	31.77%	31.77%
4.00%	33.29%	30.79%	31.28%
8.00%	34.78%	29.87%	30.79%
12.00%	36.25%	29.00%	30.30%
16.00%	37.70%	28.18%	29.81%
20.00%	39.13%	27.41%	29.31%

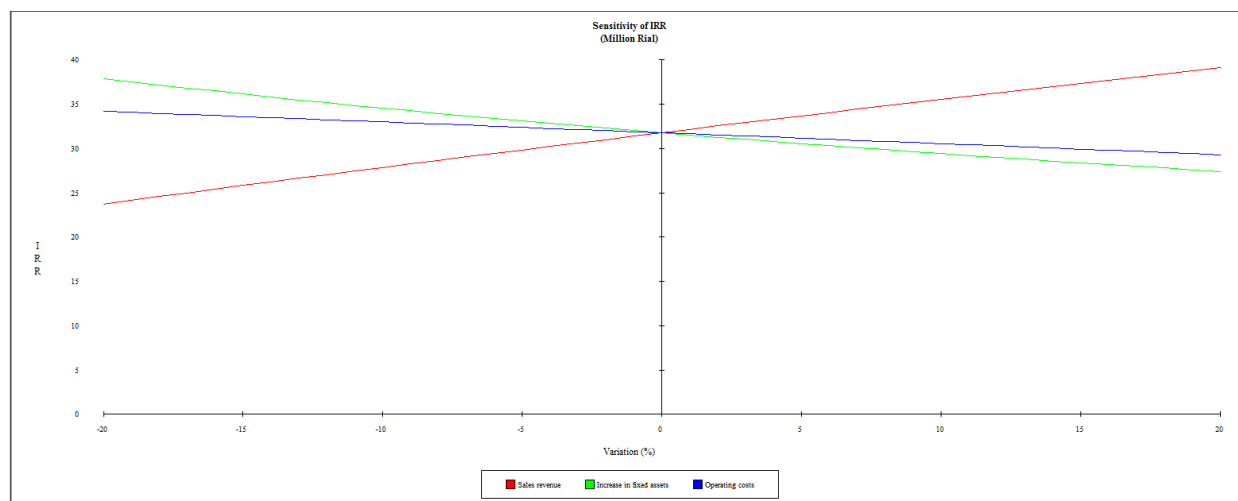


Figure 3: Sensitivity Analysis of IRR

6 Duration of Project Operation

The time of doing early stages and completing its process is about 21 months.

Table 23: Action Plan and Implementaion Schedule

Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Land Purchase	■	■																						
Constructing Buildings		■	■	■	■	■	■	■	■	■	■	■	■	■	■									
Execution of Facilities											■	■	■	■	■	■	■	■	■	■	■	■		
Order, Purchase of Machinery										■	■	■	■	■	■	■	■	■	■	■				
Landscaping														■	■	■	■	■	■	■	■			
Machinery Strat-up and Trial Production																	■	■	■	■	■			

7 Incentives, Features And Advantages of Project

North Khorasan Province is a province located in northeastern Iran. Bojnord is the capital of the province. This province contains many historical and natural attractions, such as mineral water springs, small lakes, recreational areas, caves and protected regions, and various hiking areas. Advantages of the agriculture of this province involves favorable and diverse climatic conditions and other parameters affecting growth.