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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

S.F. PROJECT - IRA-16

C/F COUNTRY: IRAN

MASTER DEMAND STUDY FOR

MECHANICAL AND CAPITAL GOODS PRODUCTS

1972 - 1987

PART II

S/F 1. MECHANICAL ENGINEERING

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Date: April, 1974

C O N T E N T S

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1. PREFACE

1. PREFACE

Abnormal growth rate of all kinds of industries in Iran in the next fifteen years (the Fifth up to Seventh Five-Year Plans) will substantially raise the needs of machinery and equipment both for new plants and for modernization and replacement in existing ones.

Till now the majority of machinery and equipment was secured by imports, only insignificant part was covered by local production.

The state of mechanical engineering in Iran, mainly of classical mechanical engineering (production of capital goods) is not satisfactory. Machinery and equipment produced now in Iran is of old design, very often 40-50 years back the temporary state of technology in the most countries. Frameters of these machineries, above all productivity etc. are only fragment of those ones produced by competition. Machines are mostly of rigid structure (design), but due to low quality of materials used, mainly of low quality of castings and forgings this is not guarantee of function without any troubles. Machines and equipment are individually produced, made to order. There are no fundamental measuring instruments in existing workshops and therefore measurements of components and parts are adopted to counterparts. Interchangeability of components and parts therefore does not exist. When one component is worn out, the new one must be adopted to counterpart, i.e. the counterpart is supplied to repair shop where the spare part is produced in the same way.

Also technical outfit of plants and workshops is mostly unsufficient. There are only basic universal machine tools installed. For omitted complicated jobs which should be performed by special machine tool, demanding high skilled labour is performed by primitive, manual operation on universal machine tools, demanding lower skilled labour. Two examples: milling, which represents in advanced factories [illegible] need operation (ratio of lathes to milling machines is 2 to 1) is replaced in Iran partly by shaping machines, partly by drilling machines, so the ratio of lathes to milling machines is [illegible] (in practice).

Gears are produced only in the simplest way by dividing method on universal milling machines, i.e. these gears are suitable only for low speed transmissions. In 1347 (1968-69) were only two small gear hobbing machines in the whole Iran installed. There were not any gear shaping, grinding and lapping machines at all.

The author of this study visited all big mechanical engineering plants and approximately 150 workshops and found out that upto year 1349 (1970-71) there was no jig boring machine, thread grinding machine, calibre grinding machine etc. installed in Iran. The first machine tools of this kind are installed in new plants in Metallurgical and Engineering Plant in Tabriz, in Machine Building Plant in Arak, Tractor Manufacturing Plant in Tabriz etc.

One of the biggest problems of modern mechanical engineering industry in Iran are skilled workers, In chemical, food and textile industry skilled and high skilled workers represent 15-25% of total labour, in classical mechanical engineering skilled and high skilled workers represent 50 - 65%. Iranian workers are skillful but without theoretical knowledge they cannot master this job. The first steps were done in last years for training of skilled workers - welders, lathe operators, milling operators, etc. Big factories like Metallurgical Engineering Plant in Tabriz, Machine Building Plant in Arak, Tractor Producing Plant in Tabriz, Azmayesh Company in Tehran have had their own training centers for different kinds of professions for mechanical engineering industry, but their capacity is unsufficient.

TABLE 1

Summary Statistics of Mechanical Engineering Establishments in Iran in 1347 (1968/9) (without Transport Equipment Industries) according to the "Iranian Industrial Statistics 1968" published by the Bureau of Statistics of the Ministry of Economy

	Metal Products Industries	Machinery Manufactg. Industries	Total
Total number of establishments	22,196	979	23,175
from these large establishments	502	67	569
Total persons engaged	67,157	5,149	72,306
from these owners, employers, and family members	27,564	1,289	28,853
Estimate of fixed capital on total establishments before depreciation 10^6 Rials	4,752	1,459	6,211
Total new investments in the industrial establishments in 1347 (1968/9) - 10^6 Rials	1,966	290	2,256
Value of gross output 10^6 Rials	12,779	2,085	14,864
Gross value added 10^6 Rials	4,422	487	4,909

TABLE 2

Summary Statistics on Mechanical Engineering Establishments located in [illegible] Province in 1347 (1968/9) according to the "Iranian Industrial Statistics [illegible]"

		Metal Products Industries	Machinery Manufactg. Industries	Total
[illegible] establishments		7,977	326	8,303
[illegible] persons engaged		33,474	2,715	36,189
[illegible] owners, employers, and family [illegible]		8,085	346	8,430
[illegible] (before depreciation)	10^6 Rls.	926	175	1,101
[illegible] output	10^6 Rls.	8,880	1,802	9,682
[illegible]	10^6 Rls.	2,552	344	2,896

TABLE 3

Total workers engaged in Metal Working Industries, according to the Census in Iran in the year 1345 (1966/7)*

Locksmiths, tool makers and machine tools operators	42,235	workers
Fitters of machinery and equipment	5,585	"
Maintenance workers	48,485	"
Tinsmiths, welders and other metal workers	28,725	"
Total	125,030	"

* Including workers in electrical equipment manufacturing industries, transport equipment industries and in maintenance shops of food, textile, chemical basic metals etc. industries

TABLE 4

Time Series of the Value of Output, Value-added, Total Employees, Wages and Salaries of Manufacturing in Various Years throughout Iran, according to the "Iranian Industrial Statistics 1968" published by the Bureau of Statistics of the Ministry of Economy

	1341 (1962/3)	1342 (1963/4)	1343 (1964/5)	1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Value of Output 10^6 Rls.							
Metal products industries	5,993	5,575	7,625	7,123	8,342	10,928	13,320
Machinery manufg.indust.	95	142	253	465	598	1,745	1,907
Total:	6,088	5,717	7,878	7,588	8,940	12,673	15,335
Value-added 10^6 Rls.							
Metal products industries	2,496	3,173	3,009	2,597	3,361	4,431	4,422
Machinery manufg.indust.	75	229	323	345	393	429	487
Total	2,571	3,402	3,332	2,942	3,754	4,860	4,909
Total Employees*							
Metal products industries	17,813	19,287	21,370	28,657	31,118	35,337	39,593
Machinery and transport equipment indust.	17,654	18,685	20,103	22,349	22,656	25,647	16,122
Total:	35,467	37,972	41,473	51,006	53,774	60,974	55,715
Wages and Salaries 10^6 Rls							
Metal products industries	454	479	650	863	896	1,110	1,496
Machinery & transport equipment indust.	610	549	957	893	937	1,086	696

* without owners, employers and family members.

2. STANDARDIZED COMPONENTS AND PARTS

2. STANDARDIZED COMPONENTS AND PARTS

2.01 Bolts, Nuts, Rivets, Pins and Washers

According to the used technology, bolts, nuts, rivets, pins and washers are:

1.1 Black bolts, nuts, rivets and washers cold prssed ; this technology is used for bolts and nuts up to approximately M16, exceptionally up to M24, for rivets up to diameter 16 mm, exceptionally up to diameter 24 mm and for washers of any size.

1.2 Black bolts, nuts, rivets and washers hot prssed - this technology is used for bolts and nuts from approximately M16 onward, exceptionally from M12 onward for rivets from approximately dia. 16 mm onward.

2. Bright Bolts, Nuts, Pins and Washers

Bright bolts, nuts and washers are turned on turret lathes or automatic lathes.

The foreign trade statistics of Iran compiled under tariff number 728, 729A, 719B, 766B2 and 784A deal with black as well as bright bolts, nuts, rivets, pins and washers.

Imports of Bolts, Nuts, Rivets, Pins and Washers in tons

Tariff No.		1345 (1966/7)	1346 (67/68)	1347 (68/69)	1348 (69/70)	1349 (70/71)	1350 (71/72)
728	Rivets, pins, washers	182,2	110,9	234,6	389,2	863,3	380,0
729A	Steel coach screws	154,4	208,1	1019,8	2204,3	1546,5	948,5
729B	Steel nuts, bolts, screws, hooks	3606,7	3806,0	6297,0	6945,9	6227,3	5269,6
766B2	Copper nuts, bolts, washers, hooks	7,1	9,9	18,2	27,4	18,9	17,1
784A	Aluminium bolts, nuts, screws, rivets	1,3	6,9	37,7	30,3	4,4	13,5

Source: Foreign Trade Statistics of Iran

It is estimated, by the Author of this study, that in tariff No.728 - 15%, in 729A - 60%, 729B - 10%, 766B2 - 5% are bright bolts, nuts, washers and pins, the remaining being black bolts, nuts, rivets and washers.

1. **Black Bolts, Nuts, Rivets and Washers**

There are four producers of black bolts, nuts, rivets and washers in Iran at present:

Cyrus Arjomand, Tehran (Shahriar Bolts and Nuts Co. Tehran)
Karkhaneh Mich va Parch Khodkar (Mr. Hamidaen), Tehran
Karkhaneh Eng. Enayati, Tehran
Shid Industrial Co., Tehran (only rivets)

Total production of these four units, according to the Research Centre for Industrial & Trade Development of the Ministry of Economy, was approximately 8,000 tons in 1347 (1968/9) and 9,000 tons in 1348 (1969/70).

		1347 (1968/69)	1348 (1969/70)
Production of black bolts, nuts rivets and washers	tons	8,000	9,000
Imports of black bolts, nuts, rivets and washers	"	6,700	7,500
Consumption of black bolts, nuts, rivets and washers	"	13,700	16,500

From above given data is seen that the existing plants are covering only 58.3% and 44.5 % respectively of total consumption.

Forecast of Demand and Production of Black Bolts, Nuts, Rivets and Washers in tons

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	21,400	36,000	57,000	83,000
Production	"	12,000	23,000	48,000	80,000

Forecast of demand for black bolts, nuts, rivets and washers has been made by the Author of this Study and is based on projected growth of production of all kinds of machinery and Equipment in Iran.

The differenes between demand and production will be imported - mostly special types of black bolts, nuts, rivets and washers. New capacities built in the next years should be specialised in production of bolts, nuts, washers, pins and rivets in metric system, as in the future metric system will be used in all factories demanding these connecting parts. Existing firms are producing these products in inch system.

Description of Existing Machinery and Equipment

The biggest producer, Cyr us Arjomand is equipped with automatic as well as semi-automatic machines for productios of black bolts, nuts, washers, cold pressed as well as hot pressed. Other producers are equipped with semi-automatic machines for production of black bolts, nuts, and washers cold pressed.

2. Bright Bolts, Nuts, Pins and Washers

There is no specialized firm for production of bright bolts, nuts, pins and washers in Iran. Some firms, having big consumption of bright bolts, nuts and washers are producing these components and parts for themselves, for example G.E.I. Rasht, etc. Also new factories like Metallurgical Engineering Plant in Tabriz, etc. will produce part of their consuption of bright bolts, nuts, and washers in their own shop equipped with automatic lathes.

As already sentioned the foreign trade statistics of Iran compiled under tariff No.728, 729A, 729B, 766B2 and 784A deal with black as well as bright bolts, nuts, rivets, pins and washers. It is estimated that import of bright bolts, nuts, rivets, pins and washers was approximately 900 tons in 1347 (1968/9) and 950 tons in 1348 (1969/70).

Forecast of Demand, Production & Shortage of Bright Bolts, Nuts and Washers

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	1350	2650	4700	7500
Production	"	180	1200	3400	6900
Shortage	"	1170	1450	1300	600

The above given forecast of demand for bright bolts, nuts and washers has been made by the Author of this Study and is based on projected

growth of production of all kinds of machinery and equipment in Iran. The relatively high growth rate of demand and production, mainly in the Seventh Five-Year Plan is due to the fact that there will be high growth rate of production of precision products like machine tools, cars etc. with high consumption of bright bolts, nuts and washers.

2.02 Needles and Pins

Needles and pins are mostly imported, only a small quantity is produced in Iran.

Imports of Needles and Pins in kgs

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
730A	Sewing needles	8,222	17,852	55,712	15,416	7,233	13,876
730B	Quilting needles	2,267	2,219	7,811	3,201	1,830	2,864
730C	Knitting needles	1,077	2,438	2,258	2,948	6,931	3,588
730D1-2	Other needles	4,122	1,430	3,884	3,395	3,490	3,976
731A	Pins, safety pins	67,983	109,591	104,960	111,413	184,918	49,746
731B	Hair pins	18,105	12,817	6,890	2,004	4,302	403
	T o t a l	101,776	146,347	181,515	168,377	208,704	74,453

Source: Foreign Trade Statistics of Iran.

There are no statistical data about production of needles and pins.

Ilco Tehran - The biggest firm, specialised in production of hair pins; number of employees - 15. According to the Ministry of Economy, Bureau of Statistics the production of hair pins in 1347 (1968/9) was 360,000 pcs.

Sharbiaf Tehran - Production programme: needles and pins; Number of employees - 12.

Saraf Tehran - Production of safety pins; number of employees - 10.
It is estimated that production of the future will remain static.

2.03 Steel wire nails for wood

There are 7 factories and workshops in Iran at present producing nails made of steel wire:

1. Tick-Tack Co. Ghasvin

This factory started the production in 1346 (1967/8); the installed capacity was 2000 tons/year of steel wire nails. The factory is employing 61 workers and has own wire drawing section.

The production of steel nails in 1348 (1969/70) was

106,349 cartons á 25 kg (2658.7 tons)

in 1349 (1970/1) 113,183 cartons á 25 kg (2854.5 tons)

Modern factory with new machinery and equipment.

2. Fars Co., Tehran

Production of steel wire nails, wood screws, wooden shoe nails, and nooks, capacity 3000 tons/year total. Total production was 105,000 cartons á 25 kg in 1348 (1969/70) i.e. 2625 tons/year.

The factory is also drawing wire and producing wire nets.

3. Orkers Co., Tehran

This firm is collaborating with Fars Co. Tehran. The factory has 75 workers and is producing steel wire nails for wood, capacity 1,500,000 packages á 1 kg. (1500 tons/year). Other production programme: Steel bolts and nuts, galvanized and ordinary wire nets.

4. Iran Co., Tehran

The factory was established in 1338 (1959). Now the capacity is 4000 tons/year of steel wire nails for wood and wooden nails for shoes. Total production in 1348 (1969/70) was 118,983 cartons á 25 kg(2974.6 tons), in 1349 (1970/1) was 113,112 cartons á 25 kg. (2827.8 tons).

5. Asar Nail Iran, N.A.M. Co., Rezaiyeh

No data available.

6. Sherkate Michsani Asarfar Rezaiyeh

New factory, just now going into operation.

Production of Steel Wire Nails in tons

	1343 (1964/5)	1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Production	4,399	4,648	7,340	7,252	10,479

Source: Iranian Industrial Statistics, Ministry of Economy, Bureau of Statistics.

Import of Nails in tons

Tariff No.		1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
727A1	Steel wire nails of more than 3 cm length	2,8	7,8	19,8	6,6	11,2
727A2	Steel wire nails of not more than 3 cm length	14,6	120,8	26,7	29,8	35,3
727D	Steel fancy nails	307,3	131,6	113,0	93,1	23,9
727E32	Other steel nails	272,1	152,3	139,1	10,1	25,2

Source: Foreign Trade Statistics of Iran.

There are mostly special steel wire nails imported (steel heel nails, steel fancy nails, etc.)

The existing capacity for production of normal steel wire nails is not yet utilized. It is not anticipated that the market will substantially grow in the future as steel wire nails are used primarily for connection of solid wood, which is in the last years more and more replaced by plastics etc.

Forecast of Demand and Production of Steel Wire Nails

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Consumption	tons	11,300	14,200	16,500	19,000
Production	"	11,200	14,200	16,500	29,000

The above given forecast of demand for steel wire nails has been made by the Author of this Study and is based on forecasted consumption of solid wood (plus additional quantity for other materials).

There is a need of new capacity after year 1356 (1977/8) to meet all requirements of Iranian market.

2.04 Wooden Nails for Shoes

There is one factory in Iran at present producing wooden nails for shoes on big scale.

Shomal Co., Rasht

This factory was established in 1346 (1967/8) with a capacity of 1500 tons/year. The actual production is not known.

It is presupposed that in the future the consumption of wooden nails for shoes will be reduced as the shoe industry is using more and more other methods by which the sole is attached to the uppers - for example by vulcanizing, glueing, etc.

There are no data about imports and total production in Iran available.

2.05 Horse Shoe Nails

Small quantity of simple horse shoe nails is forged in small forge shops by hand. The majority of demand is covered by imports.

Import of Horse Shoe Nails

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
727B	Demand tons	81,1	205,4	196,0	114,9	107,6	161,6

Source: Foreign Trade Statistics of Iran

It is presupposed by the Author of this Study that the demand of horse shoe nails will be lower in the future as the number of horses and other beasts of draught will be reduced.

As the demand is and will remain low, it is not advisable to build a new, specialized plant for this production, but it is possible to produce horse shoe nails in a new forge shop with other forged products.

2.06 Barbed Wire

There are two firms in Iran at present, producing barbed wire, Sherkate Tolide Sime Khardar, having capacity of 1350 tons/year

and new factory which started the production just recently, Folad Khuzestan, capacity 2000 tons/year.

Production of Barbed Wire

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Production	tons	750	697	200

Source: Iranian Industrial Statistics, Bureau of Statistics of the Ministry of Economy

Imports of Barbed Wire

Tariff No.			1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
[illegible]	Barbed wire	tons	[illegible]	1858,3	1772,0	[illegible]	[illegible]

Source: Foreign Trade Statistics of Iran

Forecast of Demand, Capacity, Production & Shortage of Barbed Wire

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	2900	5200	8800	12200
Capacity existing	"	3350	3350	3350	3350
New capacity	"	-	2000	6000	10000
Production	"	1800	4800	8500	12000
Shortage	"	1100	400	300	200

Forecast of demand for barbed wire has been made by the Author of this study on the basis of growth rates applied to imports and production in the year 1345 (1966/7) and 1350 (1971/2).

Description of Existing Machinery and Equipment

Both factories are equipped with modern, semi-automatic and automatic machines. It is advisable to extend the existing capacity in the Fifth, Sixth and Seventh Five-Year Plans (see above).

2.07. WELDING ELECTRODES

There are four factories in Iran at present, producing welding electrodes - Ama Co. Tehran, having capacity about 12000 tons/year, Electrode Iran Tehran (part of Ama. Co.), Kaveh Co. Tehran - production about 500 tons/year and OK (Khoran) Co. Tehran - commenced production only in end 1969 (1348) production approximately 500 tons/year in 1349 (1970/1).

Imports of Welding Electrodes in tons

Tariff No.	Welding Electrode	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	[illegible]
874-1	Carbon Electrodes	94,0	196,9	223,5	273,1	110,3	[illegible]
874-2	Welding rode coated with flux materials	813,6	351,1	421,2	446,9	396,5	[illegible]
878-2	Welding electrodes	-	54,6	280,9	679,8	118,1	[illegible]
	T o t a l	907,6	502,6	925,6	1399,8	624,9	[illegible]

Source: Foreign Trade Statistics of Iran

Production of Welding Electrodes in tons

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	[illegible]
Welding electrodes	tons	4260	4930	6[illegible]	[illegible]

Source: Bureau of Statistics of the Ministry of Economy.

Some special electrodes for example carbon electrodes, electrodes for welding of alloy steels, electrodes having dia. below 2,5 mm or over 6 mm are and will be imported.

Forecast of Consumption, Production & Shortage of Welding Electrodes in ton

Welding electrodes		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	[illegible]
Consumption	tons	14000	24500	37000	[illegible]
Production	"	12000	23000	36000	[illegible]
Shortage	"	2000	1500	1000	1000

The above given forecast of demand of welding electrodes has been made by the Author of this Study on the basis of projected growth of consumption of steel - see Master Demand Study for Capital Goods Industry, Part I,10 Basic Metal Industries.

Description of Existing Machinery, Equipment and Process

From above given factories, only Ama Co. Tehran is buying rods and in wire drawing department having capacity of 10000 tons/year in one shift is producing steel wire for production of welding electrodes as well as steel wire for other consumers (see Wire Drawing). Production programme includes mild steel electrodes, low hydrogen electrodes, stainless steel electrodes, hard facing electrodes, cast iron electrodes, non-ferrous electrodes, electrodes for cutting and heat and creep resistance electrodes.

Drawn steel wire of required quality is cut to prescribed length on wire shearing machine.

Coating material is crushed, washed, granulated, ground, weighed, mixed, kneaded, premoulded, on the press electrodes are coated, the ends of electrode are cleaned and then electrodes are dryed in drying chamber. Dryed electrodes are checked, counted, packed and expeditied.

It is presupposed that in each five-year plan the capacity will be enlarged either by new plant or the existing plants will be extended. Wire drawing department could be utilized for more than 2 shifts and therefore new capacity would be built in the Sixth Five-Year Plan.

2.08 HELICAL SPRINGS

According to the used technology, helical springs are:

1. Cold wound - this technology is used up to dia.of wire 10 or 12 mm
2. Hot wound - this technology is used from dia. of wire 8 or 10 onward.

There is one factory producing cold wound helical springs - Spring Factory Boukhamian Tehran and one factory producing small helical springs for their own use - EGI Rasht. Total production of these two factories was approximately 300 tons/year in the year 1348(1969/70).

Imports of Helical Springs According to the Foreign Trade Statistics of Iran

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
732B	Vehicle helical springs	84080	109825	83009	251069	184952	[illegible]
7320	Furniture springs	15427	8553	15895	16380	[illegible]	[illegible]
732D	Other springs	318355	239246	327944	[illegible]	[illegible]	[illegible]
	T o t a l	417862	357624	426848	467944	543797	[illegible]

Under Tariff No. 732D are helical springs of any diameter of wire other than for vehicle and for furniture and leaf springs other than for vehicle. Approximately 50% of these springs are helical springs cold wound. Licence has been issued for another 300 tons/year.

Description of Existing Machinery and Equipment

Mostly modern machines - automatic machines for helical spring making, adjusting machine for eyes, half-eyes, spreaders, benders, grinders etc.

Forecast of Demand Production and Shortage of Helical Springs

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	880	1550	2600	3800
Production	"	540	1100	2250	3650
Shortage	"	340	450	350	150

The above given forecast has been made by the Author of this Study on the basis of the forecasted growth rates of production and repairs of cars, trucks, tractors, buses, minibuses, mopeds, motorcycles, waggons and machinery and equipment with helical springs.

The difference between consumption and production will be imported - mostly special types of helical springs, needed in small quantities. New factory should be equipped with automatic machines for helical spring making, cold as well as hot wound.

2.09 - 2.10 CHAINS

Chains are important elements used in mechanical engineering for transmission of power etc. There are the following kinds of chains:

1. Link chains with short or long links, calibrated or non calibrated. Link chains are used as binding chain for transportation of goods, as lifting chains at lifting devices or as snow chains for vehicles etc.

2. Roller chains. They are used mostly for transmission of power at bicycles, motorcycles etc.

3. Other types of chains - for example Gall's chains, Ewart chains etc.

Import of Chains - in tons

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
726A	Snow chains for vehicles	84,3	146,1	191,9	645,0	462,3	156,6
726B	Transmission chains for pedal and motorcycles	65,9	59,2	84,4	69,3	76,5	148,7
726C1	Chains, weighing not more than 0,5 kg/1 metre	55,0	63,6	63,4	90,9	58,0	75,2
726C2	Chains, weighing between 0,5 kg and 1 kg/1 metre	55,7	53,0	38,7	49,2	50,9	53,0
726C3	Chains, weighing between 1 kg and 3 kg/1 metre	47,8	73,2	76,7	91,9	45,9	31,4
726C4	Chains, weighing more than 3 kg/1 metre	101,6	222,9	263,0	438,4	1774,9	563,5

Source: Foreign Trade Statistics of Iran.

2.09 LINK CHAINS

There is no production of link chains in Iran at present, therefore all link chains are imported. It is estimated by the Author of this Study that in tariff No. 726A - 100%, in 726C1 - 75%, in 726C2 - 80%, in 726C3 - 85% and in 726C4 - 90% are link chains, the remaining being roller chains and other types of chains.

Forecast of Demand of Snow Chains in tons

	1351 (1972/3)	1356 (1977/8)	[illegible]	[illegible]
Demand	520	960	1630	[illegible]

The above given forecasted demand of snow chains has been made by the Author of this Study on the basis of growth rates applied to imports in the years 1345 (1966/7) until 1350 (1971/2). Projected growth rates were derived by correlation with expected levels of [illegible] cars, trucks, buses, minibuses, etc.

If it is in the future compulsary to equip all cars, buses, minibuses, [illegible] etc. with snow chains, the demand would be substantially higher than given above.

Forecast of Demand of Other Link Chains in tons

		1351 (1972/3)	1356 [illegible]	[illegible]	[illegible]
Demand	tons	1360	2420	[illegible]	

The forecasted demand of other link chains than snow-chains has been made by the author of this Study on the basis of growth rates applied to imports in the years 1345 (1966/7) until 1350 (1971/2).

Based on the forecasted demand of snow chains and other link chains it is advisable to build a new, modern plant in the Fifth Five-Year Plan and to extend it in the Seventh Five-Year Plan.

Forecast of Demand, Capacity, Production & Shortage of Link Chains

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Total demand	tons	1880	3380	5500	8400
Capacity	"	-	5000	5000	8000
Production	"	-	2800	5000	8000
Shortage	"	1880	580	500	400

According to the author of this Study, it is advisable to build one medium-size factory or two or more small units in the frame of small scale industry in the Fifth Five-Year Plan and to extend it in the Seventh Five-Year Plan.

Description of Machinery, Equipment and Process

Link chains are produced in modern factories on semi-automatic or automatic machines. Each machine is producing complete chain, i.e. it is performing all operations (forming of wire or rod to prescribed shape, cutting it into prescribed length and welding the links). Some chains are metal plated.

2.10 ROLLER CHAINS

There is no production of roller chains in Iran at present, therefore all of them are imported.

Forecast of Demand, Capacity, Production & Shortage of Roller Chains

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand Bicycles	pcs.	15,000	180,000	290,000	350,000
Mopeds	"	18,000	45,000	80,000	110,000
Motorcycles	"	16,000	40,000	90,000	120,000
Others & replacement	"	11,000	25,000	50,000	60,000
Total demand	pcs.	60,000	290,000	510,000	640,000
Capacity	"	-	300,000	640,000	600,000
Production	"	-	150,000	400,000	600,000
Shortage	"	60,000	140,000	110,000	40,000

The above given forecast has been made by the Author of this Study on the basis of forecasted production of bicycles etc. - see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part II, 3. Transport Equipment Industries.

It is advisable to start the production of roller chains for [illegible] motor and motorcycle in the Fifth Five-Year Plan and to [illegible] of Sixth and Seventh Five-Year Plans. The demand is big enough for economical production.

Description of Machinery, Equipment and Process

All components and parts are produced on special automatic machines like automatic presses, automatic rolling machines etc. Assembly of these chains is performed on special automatic assembly machines like special automatic rivetting machines etc. The [illegible] production of roller chains has the capacity 100,000 per [illegible] of roller chains.

2.11 BALL, ROLLER AND NEEDLE BEARINGS

Till now all ball, roller and needle bearings used in Iran are imported.

Import of Ball, Roller and Needle Bearings in kg.

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	[illegible]
856	Ball, Roller, and Needle Bearings in kg.	696723	811208	781186	980298	107[illegible]	[illegible]

SKF Iran Co., Tehran was formed in collaboration with SKF in Sweden in 1348 (1969/70). This company is scheduled to manufacture a total of 5 million ball, roller and taper roller bearings by 1354 (1975/6). Production started in 1350 (1971) by assembly of imported components and parts. The full production programme - approximately 120 sizes of ball, roller and taper roller bearings will be reached in three phases. The majority of production programme represent ball bearings types 62 and 63. Balls and rollers will be produced in the third phase, taper roller bearings will be assembled from imported components and parts. From the first calculations it is seen, that there will not be an adequate market for all products in Iran, mainly in the Fifth and Sixth Five-Year

Plans and that some bearings must be exported. It is therefore not presupposed that the plant will be expanded in the Sixth and Seventh Five-Year Plans.

Production of Ball, Roller and Taper Roller Bearings

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Ball, Roller and Taper Roller Bearings pcs.	1,200,000	5,000,000	5,000,000	5,000,000

3.01 HOUSEHOLD HOLLOWWARE

Household hollow-ware is partly imported, partly produced in Iran.

Import of Household Hollowware

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
740A	Household hollowware without finishing	tons	11,8	63,5	126,0	131,6	2,9	2,4
740B	Household hollowware, polished	tons	158,6	235,6	176,3	179,6	29,2	20,9
740C	Household hollowware painted, varnished	tons	29,1	29,4	29,8	31,5	34,8	42,3
740D	Household hollowware, enamelled	tons	109,7	115,7	37,6	31,6	24,0	32,2
740E2	Household hollowware not listed elsewhere	tons	115,2	99,4	141,0	83,9	79,3	84,2
768B	Household, kitchen copper ware not listed elsewhere	tons	0,6	0,8	1,2	0,2	0,1	0,8
782-1	Aluminium pressure cookers	pcs	43565	60554	51540	246219	48821	32083
		tons	117,6	161,7	145,6	128,0	129,6	89,8
782-2	Aluminium household kitchenware, not listed elsewhere	tons	37,7	42,4	68,8	48,4	47,1	66,6
	T o t a l	tons	580,3	748,5	726,3	634,8	347,0	339,2

Source: Foreign Trade Statistics of Iran

There are not reliable data about the production of household hollowware as there are hundreds of small workshops in bazaars, producing aluminium hollowware from square or round sheets, cut to prescribed size in the factory, which is rerolling aluminium sheets (see Master Demand Study for Mechanical and Capital Goods Products 1972/1987 Part 1., 10. Basic Metal Industries). In the same way is produced household hollowware, made of brass or copper.

Production of Household Hollowware in the Year 1347 (1968/9)
According to the Iranian Industrial Statistics 1968

Enamelled kettles and teapots	170,000 pcs
Enamelled ware*	89,000 pcs
Copper vessels*	3,696,000 kgs.
Pressure cookers	17,500 pcs
Sherbet and tea sets	105,000 pcs
Aluminium vessels**	9,849,750 kgs.
Metal vessels	970,000 pcs
Ice and refrigerator trays	105,000 pcs
Salt-cellars	47,000 pcs

* Mostly copper or brass pots etc.

** Mostly aluminium pots etc.

Most probably the biggest producer of household hollowware is the firm Three Stars Tolidi Tehran - The main production programme is stainless steel household hollowware.

Production of Aluminium and Copper Vessels

		1342 (1963/4)	1343 (1964/5)	1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1068/9)
Aluminium vessels	tons	3075	5537	6137	10836	9323	9850
Copper Vessels	"	1822	3505	2568	1441	3441	3696

Source: Iranian Industrial Statistics 1968, Ministry of Economy, Bureau of Statistics.

Each year new production licenses are issued for production of new kinds of household hollowware - for example in the year 1352 (1973/4) the licence was issued for production of aluminium pans and pots with tephlon to Mr. Omady in Kerman, capacity 42000 pots and 120000 pans per annum in one-shift operation.

Forecast of Demand, Production and Shortage of Household Hollowware Made of All Kinds of Metals

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	14,900	24,300	38,500	54,000
Production	"	14,550	24,000	38,200	53,800
Shortage	"	350	300	300	200

The above given forecast has been made by the Author of this Study on the basis of the production and imports in the year 1347 (1968/9). Projected growth rates were derived by correlation with expected levels of gross national product and by reference to per capita consumption of household hollowware in other countries.

3.02 TABLE WARE, SHUTTING KNIVES, RAZOR BLADES AND OTHER CUTLERS GOODS

Table ware, shutting knives, razor blades and other cutlers goods are partly isported, partly produced in Iran. Simple, cheap table ware and other cutlers goods are produced in Iran, luxury table ware and other cutlers goods made of stainless steel, silver plated etc. are isported.

Imports of Table Ware, Shutting Knives, Razor Blades and Other Cutting Blades

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
802A	Metal table knives in a single piece	tons	57,7	39,7	29,1	19,2	26,1	[illegible]
802B1	Table knives with wood handles	tons	1,1	1,2	0,6	0,4	[illegible]	[illegible]
802B2	Table knives base metal handles	tons	7,2	9,1	3,0	3,3	[illegible]	[illegible]
802B3	Table knives with blades precious metal plated or with handle of ivory, mother of pearl etc.	tons	8,1	1,1	0,5	1,5	1,4	[illegible]
803-1	Kitchen knives	tons	49,4	60,4	44,7	63,7	93,0	[illegible]
803-2	Knives for shopmen	tons	-	-	-	14,4	[illegible]	[illegible]
804A	Shutting knives, pen-knives, pocket knives with wood handles	tons	4,4	5,4	13,6	12,1	11,6	[illegible]
804B	Shutting knives, pen-knives, pocket knives [illegible] metal handles	tons	14,3	6,8	12,6	15,9	8,3	[illegible]
804C	Shutting knives, pen-knives with handles of ivory, mother of pearl etc.	tons	2,0	0,8	1,0	0,3	0,6	0,7
804D	Shutting knives, not listed elsewhere	tons	5,1	2,1	4,1	10,3	3,8	4,3
805	Knife blades	tons	7,5	5,6	5,8	13,5	8,0	11,1
806B1	Safety razor blades without finish	tons	0,3	0,2	0,4	0,1	-	0,1
806B2	Safety razor blades with finish	tons	155,6	277,6	165,1	119,6	212,6	232,7
806C	Other razors, their blades	tons	3,0	2,5	4,1	1,2	0,8	1,1
807-1	Scissors with finish	tons	63,8	57,9	123,2	76,7	66,0	85,0
807-2	Scissor blades without finish	tons	1,1	-	1,1	1,2	0,1	-
808A	Pruning sheares	pcs	18932	21774	47358	84980	59502	64969
		tons	7,2	8,7	16,2	26,9	21,6	24,0
808B11	Electric hair [illegible]	1000 pcs	100,5	101,0	127,6	111,0	102,7	141,3
		tons	25,5	25,9	37,6	39,7	27,4	36,6

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (19[illegible]/2)	
808B12	Parts of non-electric hair clippers	tons	0,8	0,7	0,1	10,1	2,6	
808B2	Non-electric clippers for animals	pcs	28	3	-	-	-	50
		tons	0,1	-	-	-	-	0,1
808C11	Pencil sharpners	tons	32,9	37,4	19,2	[illegible]	16,9	
808C12	Pencil sharpening machines	pcs	9827	19055	7765	12060	10233	8335
		tons	5,1	7,1	2,5	4,5	[illegible]	3,6
808C13	Sharpener blades	"	1,7	3,8	6,8	[illegible],4	4,8	7,1
808C14	Letter openers	"	1,6	[illegible],1	[illegible],0			
808C2	Can and bottle cap openers	"	4,2	9,5	11,6	14,[illegible]	[illegible]	8,0
808C31	Manicure, pedicure sets, cased	"	0,2	0,5	1,3	0,2	0.2	0,3
808C32	Nail files and clippers	"	25,9	3,1	13,2	2,3	1,[illegible]	1,2
808C33	Nail clippers	"	-	11,3	24,6	21,7	39,[illegible]	10,6
808C34	Other sets for manicure	"	-	-	-	[illegible]	[illegible]	[illegible],8
808C41	Eyelash curlers	"	0,9	0,7	0,5	0,2	[illegible],[illegible]	1,5
808C42	Cutlers goods, not listed elsewhere	"	2,2	3,2	10,9	1,7	2,[illegible]	1,8
809A1	Metal spoons and forks	tons	332,6	398,4	592,3	455,8	521,0	816,8
809A2	Metal spoons and forks with plating	tons	6,5	1,2	8,5	9,7	5,1	11,4
809B1	Spoons and forks with wood handles	tons	6,1	4,9	4,9	5,5	22,0	12,2
809B2	Spoons and forks with metal handles	tons	1,1	1,1	2,9	2,6	3,3	0,4
809B31	Spoons, forks with metal handles, precious metal plated	tons	2,0	1,8	1,6	4,3	5,6	5,6
809B32	Spoons, forks with handles of ivory, mother of pearl etc.	tons	5,0	0,9	1,3	0,3	7,0	3,1
810-21	Salad spoons, forks and tungs	tons	0,8	1,0	0,7	1,5	0,2	0,3
810-22	Other metal table ware	tons	153,1	89,8	30,5	46,7	64,3	49,7
	T o t a l	tons	995,7	1082,5	1198,1	1007,6	1225,7	1461,0

Source: Foreign Trade Statistics of Iran

There are many small work shops in Iran, located mostly in Zanjan and its environs, producing cutlers goods and table ware, mainly shutting knives, kitchen knives, tea spoons etc. These shops are mostly producing complete products, but some of them are importing semi-finished components and parts like knife blades, safety razor blades without finish, sharpeners blades etc. (see Imports above) and sharpening and or assembling them.

Production of Table Ware, Shutting Knives, Razor Blades, and Other Cuttlers Goods in the Year 1347 (1968/9)

		1000 pcs or sets	1000 Rials
Knives	1000 pcs	2221	22520
Cutlery	1000 sets	1221	60925
Fruit cutlery	1000 sets	10	300
Sherbet and tea-spoons	1000 sets	18,5	1180
Nut eating sets	1000 sets	10	6000
Carpet weaving scissors and combs	1000 sets	25,1	2538
Shaving blades	1000 pcs	42000	42000
Pencil sharpeners	1000 pcs	4272	2840
T o t a l			148303

Source: Iranian Industrial Statistics 1968, Bureau of Statistics of the Ministry of Economy

It is estimated by the Author of this Study that the above given statistics are not giving complete picture about the production of cutlers goods, shaving blades, pencil sharpeners etc. as the production of many small shops is not involved in the above mentioned statistics.

Description of Machinery, Equipment and Process

The equipment of most existing work shops is not adequate, the production is labour intensive and the productivity is low.

[illegible] of components and parts are made by cold pressing on presses or simple mechanical eccentric presses. Some parts [illegible] knife blades etc. are forged, mostly by hand. The [illegible] tea spoons, forks) are made of aluminium and [illegible] by [illegible] casting or pressure diecasting. Knife blades [illegible] and then sharpened.

It is advisable to modernize and rebuild the existing workshops and to start the production of luxury table ware in new factories. The machinery and equipment is too expensive and the capacity [illegible] is advisable to solve the problem of modernization of existing workshops in the form of cooperatives or small scale industry, i.e. [illegible] of operations like cold pressing of different components and parts, forging of knife blades and spoons on forging [illegible] could be performed in specialized workshop and semi-finished products could be sold to the existing workshops, where the labour intensive operations are performed.

It is advisable to produce luxury steel table ware, scissors, manicure and pedicure sets etc. in new, modern factories built in the scope of the small scale industry. Production of scissors could be combined with production of special surgical instruments like scalpels, special scissors etc. The demand of special surgical instruments is and will remain low for economical production in a specialized factory producing only surgical instruments. The combination of the production of scissors with surgical instruments will result in the best utilization of installed machinery and equipment.

As the stainless steel table ware is imported very often to Iran at dumping prices it would be necessary to impose protective tariff on stainless steel table ware and other luxury table ware.

Forecast of Demand, Production and Shortage of Table Ware, Shutting Knives, Razor Blades and Other Cutlers Goods

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1350 (1987/8)
Demand	tons	2220	3040	4250	5680
Production	"	820	1350	2430	4000
Shortage	"	1400	1690	1820	1880

Forecast of demand for table ware, shutting knives, razor blades and other cutlers goods has been made by the Author of this Study on the basis of growth rates applied to imports and production in the years 1345 (1966/7) until 1350 (1971/2). Projected growth rates were derived by correlation with expected levels of gross national product and by reference to per capita consumption of table ware and other cutlers goods in other countries. Low growth rates are due to the fact that some cutlers goods will be in the future partly replaced by other products, which are not included in this chapter - for example safety razors and safety blades will be replaced by electric shavers, non-electric hair clippers by electric hair clippers etc.

3.03 HURRICAN LAMPS

Hurrican lamps are specially designed petrol lamps used mostly in villages for home as well as for outside lighting. Lamps are so designed that the wind does not blow them out.

There are many workshops producing these lamps in Iran on small scale and big quantity is imported.

Import of Hurrican Lamps

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
812D1-1	Hurrican lamps pcs.	605678	724083	725395	917706	476209	870969
812D1-2	Parts of Hurrican Lamps kg.	815	1518	11896	16779	154	48

It is believed that the market for hurrican lamps will remain static in the future, as hurrican lamps will be partly replaced by electrical lamps and torches, but local production will replace imports.

Forecast of Production of Hurrican Lamps - According to the Author of this Study

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Production pcs.	180000	420000	640000	850000

3.04 S A MO V A R S

A samovar [illegible] a small equipment [illegible] boiling water [illegible] for heating is mostly petrol, [illegible] and [illegible]

The manufacture of samovars is [illegible] handicrafts sector of industry [illegible]. According [illegible] Department of the M[illegible] of [illegible] production of samovars [illegible] as follows:

	1351	1352	[illegible]	[illegible]	[illegible]
Production of Samovars 1000 pcs	[illegible]	182	[illegible]05	[illegible]	[illegible]

It is [illegible] that the market for samovars [illegible] future, as samovars are replaced by modern water boiling equipment ([illegible] tric pots with heating elements etc.) One company [illegible] to manufacture samovars on a mass production. The biggest [illegible] is [illegible] Co., [illegible] nickle [illegible] kerosene samovars made of [illegible] or nickle [illegible] water storage capacity of 3 up to [illegible] and 20 litres. [illegible] is employing over 100 workers and is producing also portable heaters kerosene heated and six models of gas stoves.

Forecast of Demand, Capacity, and Production of Samovars According to the Author of this Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	1000 pcs.	1000	1000	950	900
Capacity	1000 pcs.	1200	1200	1200	1200
Production	1000 pcs.	1000	1000	950	900

3.05 PRESSURE LANTERNS

Pressure lanterns are produced in Iran on small scale basis. There are no production statistics available, but it is estimated that local production was approximately 70,000 pcs/year.

Import of Pressure Lanterns

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
812D22	Pressure lanterns	pcs	81728	105971	47477	54989	45451	3979

Source: Foreign Trade Statistics of Iran

It is assumed that the market for pressure lanterns will remain unchanged in future, as pressure lanterns will be partly replaced by electrical lamps, but local production in the near future will replace the imports, i.e. in 1356 (1977/8) there will be only local production (approximately 140,000 pcs/year).

Forecast of Demand, Production and Shortage of Pressure Lanterns, According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	150000	140000	130000	120000
Production	pcs	140000	140000	130000	120000
Shortage	pcs	10000	-	-	-

3.05 SEWING MACHINES

There is no production or assembly of sewing machines in Iran at present even when the market is big enough for economical production - see imports.

Imports of Sewing Machines

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
847A1	Sewing machines, hand or foot operated	pcs	108749	79793	158256	176994	131054	166021
847A2	Embroidering machine	"	212	469	1658	841	250	514
847A4	Zig-zag sewing machines	"	163	52	117	68	168	14
847A5	Other sewing machines	kg	20154	29020	63602	112536	38815	100971
847B	Sewing machines frames	"	110571	52709	46564	41338	82444	50646
847C	Parts of sewing machines	pcs	68255	39217	80076	73288	86961	35165

Source: Foreign Trade Statistics of Iran

Sewing machines for shoemakers, tariff No. 847A3 - see Special machinery and equipment for production of shoes. Electric motor for sewing machines see Electric Motors.

IMDBI has prepared a proposal to set up a plant to manufacture 60,000 sewing machines yearly (smallest economical unit). It is hoped that during 1352 (1973/4) the project can be finalized in partnership with an international company.

New unit will reach the full capacity at the end of the Fifth Five-Year Plan. As the plant will cover only part of the needed quantity of sewing machines, it is believed that the capacity of this unit will be doubled in the Sixth Five-Year Plan - see forecast.

Forecast of Demand, Capacity, Production and Shortage of Sewing Machines

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	160000	[illegible]0000	220000	240000
Capacity	"	-	60000	120000	180000
Production	"	-	60000	120000	180000
Shortage	"	-	130000	100000	60000

Forecast of demand for sewing machines has been made by the Author of this Study on the basis of growth rates applied to imports in the years 1345 (1966/7) until 1350 (1971/2). Projected growth rates were derived by correlation with expected levels of gross national product and by reference to per capita consumption of sewing machines in other countries.

Description of Machinery, Equipment and Process

Production of sewing machines needs precision castings - mostly grey iron castings; some models of sewing machines (portable type) are made of aluminium pressure die-casting. The problem of precision castings should be solved in the Fifth Five-Year Plan.

Components and parts are machined on single purpose machine tools, automatic machine tools or universal machine tools with special jigs and fixtures.

3.06 WATER METERS

There is one firm producing water meters in Iran at present:

Abfar Ind. Corp. Tehran

This firm got a licence for production of water meters for domestic purpose up to 5 cu.m/hour (3 cu.m/hour, 5 cu.m/hour), capacity 60,000 pcs/year in the first stage and 100,000 pcs/year in the second stage. The factory is partly producing components and parts in Iran, partly importing from Compagnie des Compteurs (France).

The factory has an own foundry for brass shell castings of body and cover and in the future there will be also manufacture of some components and parts made of synthetic materials, mainly thermoplastic parts.

In the first stage only 2 parts are machined: body and cover and the water meter is assembled in the plant mostly from imported components and parts. In the future also other parts will be produced in the factory or purchased in Iran (screws etc.). The production started in 1349 (1970/1).

Import of Water Meters

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
918-2	Water meters pcs	104676	122378	162570	145058	226628	43005

Source: Foreign Trade Statistics of Iran

Forecast of Demand and Production of Water Meters

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	120000	140000	160000	190000
Production	"	140000	130000	150000	180000

The forecast of demand and production in the Fifth up to Seventh Five-Year Plans has been made by the Author of this Study on the basis of the construction of new buildings (Code No.400), forecasted construction of new water mains plus replacement of existing water meters.

There is no need to increase the capacity of the existing plant in the case there will be no change of production programme (production of bigger sizes of water meters).

3.07 GAS CYLINDERS

There are two firms producing gas cylinders for compressed propane-butane gas (LPG gas): Butane Gas Co. Tehran and Iran Gas Co. Tehran. Two other firms purchased machinery and equipment from abroad, but they did not start the production.

Both firms are producing bottles with capacity from 2 kg up to 12 kg. of compressed gas (mostly used types). Butane Gas Co. is preparing production of bigger bottles most probably up to 50 kg. capacity.

Production of Gas Cylinders

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Iran Gas Co. Tehran	pcs	20000	51200	108000	97000	110000
Butane Gas Co. Tehran	"	4400	23300	28000	69000	119000
T o t a l	pcs	24400	74500	136000	166000	229000

Source: Research Centre for Industrial and Trade Development of the Ministry of Economy.

Import of Cylindric Tanks and Vessels for Storing of Compressed or Liquified Gas

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
722-1	Tanks and vessels	pcs	124519	139364	178050	115035	28810
		tons	2723	2550	3254	3366	1332
722-2	Components & parts	"	-	72	1671	369	256

Source: Foreign Trade Statistics of Iran

In the above given tariff numbers are included imports of cylinders for oxygen and other gases.

According to the Bureau of Statistics of the Ministry of Economy, the consumption of LPG gas in households as well as in the industry was growing as follows:

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Consumption of LPG	tons	26168	39253	58000	82000	108000

Forecast of Consumption of LPG

		1351 (1972/3)	1353 (1974/5)	1355 (1976/7)	1356 (1977/8)	1357 (1978/9)
Consumption of LPG	tons	164700	223400	275200	297200	312000

Source: Research Centre for Industrial and Trade Development of the Ministry of Economy

Forecast of Demand, Capacity, Production and Shortage of Gas Cylinders

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	290000	440000	530000	600000
Existing Capacity	"	400000	400000	400000	400000
New Capacity	"	-	200000	200000	200000
Production	"	280000	440000	530000	600000
Shortage	"	10000	-	-	-

The above given forecast of demand of gas cylinders for the years 1351 and 1356 (1972/3 and 1977/8) and figures for the years 1361 (1982/3) and 1366 (1987/8) were exterpolated, by the author of this study.

The low growth rate in the Sixth and Seventh Five-Year Plan is due to the fact, that in big cities like Tehran, Shiraz, Esfahan etc. the households will be supplied by cheap piped gas.

The safety valves needed for gas cylinders are till now imported. As the demand will be in next future very high, it is advisable to produce these valves in Iran (see Valves).

3.08 GAS PRESSURE REGULATORS

Gas pressure regulators, used for reduction of pressure of gas from cylinder to pressure needed in burner (approximately 1,015 atm) are all imported. Based on the forecasted demand of gas cylinders there is forecasted the demand and production of gas pressure regulators by the Author of this Study.

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand of gas pressure regulators	pcs	140000	220000	265000	300000
Capacity	"	-	150000	300000	[illegible]
Production	"	-	130000	265000	300000

The demand of gas pressure regulators will in the future so high that the production of them will be feasible and therefore it is advisable to produce them in Iran in the Fifth Five-Year Plan.

In 1351 (1972/3) the Ministry of Economy issued licence for the production of gas pressure regulators and valves to the Persi Gas Co. Ghazvin. Planned capacity of the plant is [illegible] gas pressure regulators/year and 250000 valves for gas cylinders/year.

3.09 KEROSENE SPACE HEATERS

When we are not taking into account open-gate fires burning wood, coal, charcoal, etc., the main form of domestic heating equipment in Iran at the present time is kerosene heater.

All kerosene space heaters are produced in the country, only flow controls with or without safety features are imported. In 1349 (1970/1) there were 15 firms engaged in the manufacture of kerosene fired space heaters with safety feature and unknown number of firms producing kerosene space heaters without safety feature spread throughout the country. The leading firms are concentrated in Tehran, Tebriz, Esfahan and Mashad. There are no reliable data about the past production. According to the estimates of the Organization for Small Scale Industries and Industrial Estates of Iran the production was:

		1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Space heaters with safety feature	pcs	55000	64000	76000	91000	99000	110000
without safety features	"	89000	99000	110000	122000	135000	150000
Space heaters - total	"	144000	163000	186000	213000	234000	260000

Production of Space Heaters According to the Research Centre for Industrial and Trade Development of the Ministry of Economy

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/7)
Arj Co. Tehran	pcs	38600	17600	50900	68150
General Industrial Co. Tehran	"	5530	7830	11785	13400
Azmayesh Co. Tehran	"	23100	19350	20400	18000
Sorghabi Co. Tabriz	"	1000	1100	1470	2400
Iran Kartooz Co. Tehran	"	600	1018	2500	1750
Polar Co. Esfahan	"	2160	2200	1850	210
Kolman C. Tehran	"	1400	1582	2556	2700
The other	"	-	227100	207800	342000
T o t a l	"	72390	277780	299261	450502

Production of Space Heaters According to the Bureau of Statistics of the Ministry of Economy

		1342 (1963/4)	1343 (1964/5)	1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Space heaters	pcs	169000	217000	213000	237000	302000	808000

Source: Iranian Industrial Statistics 1968

Comparison of the data given above shows significant differences. The data contained in the first tables (estimates of the Organization for Small Scale Industries and Industrial Estates of Iran) are concerned with kerosene space heaters whilst the data in the second and third table relates to all space heaters. The third table most probably contains the large numbers of small portable kerosene heaters which are used both for heating and cooking.

Forecast of Demand of Kerosene Fired Space Heaters* Author of this Study

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Kerosene space heaters pcs	300000	400000	470000	[illegible]

* Without small portable kerosene heaters.

It is assumed that all kerosene fired space heaters will be produced in Iran, i.e. the existing capacity will be [illegible]. Forecast of demand of space heaters is based on the forecast [illegible] struction of new buildings and it was taken into account that modern houses will be built with central heating and that also electric and gas space heaters will be used.

Some leading firms, producing kerosene space heaters:

Arj Corp. Tehran

The factory is producing 9 models of stationary kerosene space heaters with heating capacities ranging from 4000 to 22,000 kcal/hour. The factory is also producing water heaters, gas ranges, desert coolers, refrigerators etc. It is equipped with modern machinery and equipment, mechanical presses, welding equipment and separate assembly line.

Azmayesh Co. Tehran

Azmayesh Co. is producing 11 models of space heaters. Output of units produced range from 5000 kcal/hour to 12000 kcal/hour. Kerosene space heaters are produced and assembled on the same facilities which are used for other consumer durable goods like desert coolers, refrigerators etc.

General Industrial Co. Tehran

Two models, produced by this factory have output 8800 kcal/hour and 13200 kcal/hour. All sheat metal work including assembly and painting is undertaken in the factory. Kerosene space heaters are produced on the same facilities which are used for desert coolers etc.

Ali Nassab Co. Tehran - Trade Mark Blue Flame Alora

This factory is producing only 3 types of portable kerosene heaters - capacity 1100 kcal/hour, 1700 kcal/hour and 2000 kcal/hour. The factory is also producing gas stoves and samovars.

Polar Co. Tehran

This factory is producing stationary kerosene space heaters for houses - the smallest model has a capacity of 965 kcal/hour, the biggest 58000 kcal/hour. One kerosene space heater having a capacity of 55000 kcal/hour is designed for workshops and plants and one type for orchards. The factory is also producing water heaters.

Volta Co. Tehran

Production of kerosene space heaters (heating capacity is not given) and desert coolers.

Sorkhabi Co. Tabriz

Production of 9 types of portable and stationary space heaters (heating capacity is not given).

3.10 KEROSENE AND GAS WATER HEATERS

Kerosene water heaters are produced in Iran over 30 years; in the last decade production of gas water heaters also started. There are at present 7 firms producing kerosene and gas water heaters.

Production of Kerosene and Gas Water Heaters

	1341 (1962/3)	1343 (1964/5)	1345 (1966/7)	1346 (1967/8)	1349 (1970/1)
Water Heaters pcs	17816	37522	29903	30360	43875

Details about production of Kerosene and Gas Water Heaters in pieces

	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
General Industrial Co., Tehran	23335	23172	23173
Asmayesh Co., Tehran	7174	7947	8484
Arj Co., Tehran	7376	6100	8430

../..

	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Polar Co., Esfahan	2400	2097	2400
Irankar Tous Mashad	455	560	750
Zeh Co. Tehran	-	-	-
Taliabi Co., Tehran	-	-	705
Total	41540	39876	43875

Capacity of Existing Plants in 1349 (1970/1)

General Industrial Co., Tehran	30,000 pcs/year
Azmayesh Co., Tehran	10,000 "
Arj Co., Tehran	15,000 "
Polar Co. Esfahan	3,000 "
Irankar Tous Mashad	1,000 "
Zeh Co. Tehran	n.a.
Taliabi Co. Tehran	n.a.

Flow controls with or without safety feature are imported. Technical data about some products:

Arj Co., Tehran

The production of kerosene water heaters in this factory started 32 years ago. Now the factory is producing 3 models of kerosene water heaters with capacities of 25, 30 and 50 gallons and 1 model of gas water heater, capacity 30 gallons.

Polar Co., Esfahan

There are produced 2 sizes of gas water heaters and one size of kerosene water heater; their capacity is not given.

General Industrial (Gas) Company, Tehran

The biggest producer of water heaters in Iran. The factory is producing 2 sizes of kerosene heated water heaters, capacity 30 and 45 gallons; one size gas heated - capacity 40 gallons; one model gas and/or oil heated - capacity 120 gallons and one model electric heated, capacity 25 gallons, 4 or 6 kW.

The production of kerosene water heaters is now predominant but after the piped gas will be supplied in Shiraz, Tehran, Esfahan and Tabriz for domestic consumption, the production of gas water heaters will be substantially raised.

Import of Non-Electric Water Heaters

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
838B5	Non-Electric Water Heaters pcs	2508	3217	5732	4918	8102	12121

Source: Foreign Trade Statistics of Iran

Forecast of Production of Kerosene and Gas Water Heaters

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Production of Water Heaters pcs	48000	65000	80000	95000

The consumption of kerosene and gas water heaters is limited by the fact that in the future more central heating units and more electric water heaters will be in operation than now.

3.11 FLOW CONTROLS FOR KEROSENE SPACE AND WATER HEATERS

Flow controls for kerosene fired space heaters and for water heaters, produced in Iran are till now imported. There are efforts to produce this flow controls in Iran in the frame of small scale or medium scale industry. The Organization for Small Scale Industries and Industrial Estates of Iran prepared "Industry Analysis and Planning Report on Manufacture of Flow Controls for Oil Fired Space Heaters" (May 1971). The recommended capacity of one small scale unit is 95,000 pcs/year.

It is assumed that either one medium scale unit or more small scale units will be built.

Forecast of Demand and Production of Flow Controls

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand of flow controls pcs	346000	465000	550000	615000
Production of flow controls pcs	-	200000	400000	600000

3.12 GAS COOKING APPLIANCES AND SPACE HEATERS

The use of gas cooking appliances and space heaters started in Iran approximately 15 years ago; production started in 1339 (1960/1). Since that time the demand and production of gas cooking appliances has increased significantly. Now the production is practically meeting the entire demand for these appliances.

Import of Gas Cooking Appliances and Space Heaters

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 ('70/1)	1350 ('71/2)
735A4	Kitchen stoves, ranges	tons	51,8	0,5	0,3	0,5	0,2	0,1
735A6	Parts of kitchen stoves, ranges	tons	43,4	-	-	-	-	-
735B12	Gas heaters	pcs.	14	32	17	9	4	10
		tons	0,8	0,6	0,6	0,4	0,2	0,1
735B14	Parts of gas heaters	tons	9,2	-	0,2	-	-	0,1
735B25	Gas stoves	pcs.	464	229	148	273	359	253
		tons	30,3	14,5	7,6	16,6	16,7	19,7
735B26	Kitchen gas ranges	pcs.	1	1	4	1	1	-
		tons	0,1	0,1	0,2	0,1	0,3	-
735B27	Gas ovens	tons	1,0	0,2	1,1	0,4	0,2	4,2
735B28	Parts of gas ovens	tons	170,0	22,1	30,0	1,7	1,8	3,8
T o t a l			306,6	38,0	40,0	19,7	19,4	28,0

Source: Foreign Trade Statistics of Iran

Production of Gas Cooking Appliances with Capacity of Producing Plants According to the Research Centre for Industrial & Trade Development of the Ministry of Economy

		Production 1348 (1969/70)	Production 1349 (1970/1)	Capacity	
Butane Gas Co. Tehran	pcs	29000	50000	50000	
Persi Gas Co. Tehran	"	46500	47000	60000	
Iran Gas Co. Tehran	"	46400	47000	60000	
Zeh Co. Tehran	"	24450	24500	30000	
Universal Co. Tehran	"	5250	10500	12000	
Fer Gas Co. Tehran	"	6350	6500	10000	
Arj Co. Tehran	"	1750	3000	25000	
Azmayesh Co. Tehran	"	1760	2000	20000	
Te Dou Co. Tehran	"	8000	8200	10000	
Do Gas Co. Tehran	"	7900	4000	10000	
Varasteh Co. Tehran	"	3630	3650	5000	
Orsa Gas Co. Tehran	"	3000	3000	8000	
Kalori Gas Co. Tehran	"	2780	2800	8000	
Butane Gas Co. Tehran	"	3000	3000	50000	
B.M. Gas Co. Tehran	"	2000	2100	3000	
The other	"	25460	33930	30000	approx.
T o t a l	"	217230	251180	421000	

Production of Gas Cooking Appliances

		1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Production	pcs	9036	10688	63827	110000	217230	251180

Source: Bureau of Statistics, Ministry of Economy except for 1348, 1349 (Research Centre for Industrial and Trade Development of the Ministry of Economy).

Short Description of Existing Companies

Butane Gas Co. Tehran

Start of Production: 1345 (1966/7) - manufacture of ylinders, 1347 (1968/9) manufacture of gas cooking appliances.

Production Programme: Six models of cookers and seven models of gas ranges.

Imported Components: Valves, timers, thermostats; some components are purchased from outside companies in Iran.

Machinery & Equipment: Modern factory with well equipped press shop, assembly shop and painting shop.

Persi Gas Co. Tehran

Start of Production: 1343 (1964/5) in collaboration with [illegible] Italy, now collaborating with Zanussi.

Production Programme: Two models of 3-burner gas range, one model of four-burner type with cabinet and four models of cookers.

Imported Components: Valves, timers, thermostats. [illegible] are interested in setting up a plant to produce valves for gas cooking appliances.

Machinery & Equipment: Modern factory with big pressing shop (mechanical and hydraulic presses up to 300 tons capacity), modern welding shop, surface treatment shop, enamelling shop, assembly shop equipped with pneumatic tools and painting shop.

Iran Gas Co. Tehran

Start of Production: 1343 (1964/5) under the name Karkhanejate Gighegas in the collaboration with Jenny Co. Denmark.

Production Programme: Six models of gas cookers and six models of gas ranges.

Imported Components: Pipe fittings, valves, timers, thermostats.

Machinery & Equipment: Well equipped pressing shop, welding shop, Assembly shop and painting shop. All enamelling work is done outside the factory.

Zeh Co. Tehran

Start of Production:	1343 (1964/5)
Production Programme:	Six models of cookers, four models of gas ranges, one model of gas range with cabinet and one model of single burner gas stoves.
Imported Components:	Pipe fittings, valves, timers, thermostats.
Machinery & Equipment:	Pressing shop, welding shop, assembly shop and painting shop.

Universal Co. Tehran

Start of Production:	1345 (1966/7)
Production Programme:	Five models of gas ranges, two models of ranges with cabinets and seven models of cookers.
Imported Components:	Pipe fittings, valves, timers, thermostats and burners.
Machinery & Equipment:	Well equipped press shop, welding shop, galvanising shop, chromium plating shop, painting shop, enameling shop (Universal Co. is enamelling parts for other plants) and assembly shop with two assembly lines.

Arj Co. Tehran

Start of Production:	1347 (1968/9) Licence agreement with Tappan (Italy)
Production Programme:	Two models of gas ranges, one model of gas ranges with cabinet and five models of cookers.
Imported Components:	Pipe fittings, valves, thermostats, burners.
Machinery & Equipment:	Press shop is common for other products, other shops like welding shop, painting shop and assembly shop are designed for production of gas cooking appliances only.

Azmayesh Co. Tehran

Start of Production:	1346 (1967/8)
Production Programme:	One model of gas range, two models of gas range with cabinet and three models of cookers.
Imported Components:	Pipe fittings, valves, timers, thermostats and glass.
Machinery & Equipment:	The company uses machinery and equipment which are used for other products like space heaters and desert coolers (including assembly line).

Varasteh Co. Tehran

Start of Production:	1346 (1967/8)
Production Programme:	Two models of combined cookers (electric heating plates with gas heating plates) and three models of gas ranges with cabinet.
Imported Components:	Pipe fittings, valves, timers, thermostats.
Machinery & Equipment:	The same as for production of space heaters and evaporative coolers.

Butane Gas Co. Tehran

Start of Production:	1345 (1966/7)
Production Programme:	Six models of cookers and seven models of gas ranges.
Imported Components:	Pipe fittings, valves, timers, thermostats
Machinery & Equipment:	Press shop, burner production, welding shop, enamelling shop, painting shop, assembling shop.

Forecast of Demand and Production of Gas Cooking Appliances and Space Heaters

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	280000	360000	430000	490000
Production	"	280000	360000	430000	490000

The above given forecast has been made by the Author of this Study on the basis of growth rates applied to production in the years 1340 (1965/6) until 1349 (1970/1). Forecast of demand is slightly higher than the Metra's forecast.

7.13 BATH TUBS, BASINS, TOILETS ETC.

All bath tubs are now imported, but there are no data about the imports, as bath tub is no self-contained group in the "Foreign Trade Statistics of Iran".

The forecast of the demand in the Fifth up to Seventh Five-Year Plans is based on the construction of new buildings (Code No. 400) plus replacement of existing ones.

Forecast of Demand of Bath Tubs According to the Author of this Study

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Bath tubs - total pcs	53000	102000	160000	240000

There are bath tubs made of grey iron castings (cast and enamelled) and bath tubs made of steel sheets (pressed and enamelled).

Forecast of Demand of Bath Tubs Made of Iron Castings and Steel Sheets According to theAuthor of this Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Cast bath tubs	pcs	43000	78000	98000	135000
	tons	4300	7800	9800	13500
Steel sheets bath tubs	pcs	10000	24000	62000	105000
	tons	300	720	1860	3150

Some flats will be fitted only with shower, i.e. there will be need for basins for collecting the waste water.

Forecast of Demand of Basins According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Basins - total	pcs	9000	20000	40000	72000

Forecast of Demand of Basins for Collecting the Waste Water Made of Iron Castings and Steel Sheets According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Cast basins	pcs	5000	8000	12000	20000
	tons	200	320	480	800
Steel sheets basins	pcs	4000	12000	28000	52000
	tons	60	180	420	780

Forecast of Demand of Washing Basins for Dishes

There are three kinds of washing basins for dishes:

1. Washing basins made of enamelled steel sheets
2. Washing basins made of stainless steel sheets.
3. Washing basins made of enamelled grey iron castings

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Washing basins - steel sheets, enamelled	sets	8000	12000	20000	28000
Washing basins - stainless steel sheets	sets	40000	70000	110000	170000
Washing basins - grey iron castings enamelled	sets	6000	8000	10000	12000
T o t a l	sets	54000	90000	140000	200000

Source: Author of This Study.

The remaining flats will be equipped with concrete or plastic washing basins for dishes, or will be without washing basins.

Toilets

Some toilets (turkish type) are made of enamelled steel sheets or enamelled grey iron castings.

Forecast of Demand of Toilets, According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Toilets - cast iron	pcs	6000	8000	10000	12000
Toilets - steel sheets	pcs	8000	12000	20000	28000
T o t a l	pcs	14000	20000	30000	40000

As already mentioned, there is no production of above mentioned items, but the production will start soon.

Enamelled Cast Items

Pars Metal Co. Tehran

This firm asked Ministry of Economy for issuing a licence for this production programme and capacity:

- bath tubs	45,000	pcs/year
- basins for collecting the waste water (for showers)	5,000	" "
- Washing basins for dishes	20,000	" "
- Syphons (enamelled)	10,000	" "
- Toilets	10,000	" "

If the license will be issued for the above given capacity, the production will cover more or less the present demand; in the future there will be need for new capacity.

Recapitulation of Demand, Capacity, Production & Shortage of Cast Items According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Bath-tubs					
Demand	pcs	43000	78000	98000	135000
Existing capacity	"	-	45000	45000	45000
New Capacity	"	-	-	40000	40000
Production	"	-	45000	80000	130000
Shortage	"	43000	33000	18000	5000
Basins (for showers)					
Demand	"	9000	20000	40000	72000
Existing capacity	"	-	5000	5000	5000
New Capacity	"	-	-	30000	70000
Production	"	-	5000	30000	70000
Shortage	"	9000	15000	10000	2000
Washing Basins for Dishes					
Demand	"	6000	8000	10000	12000
Capacity	"	-	20000	20000	20000
Production	"	-	8000	10000	12000
Shortage	"	6000	-	-	-
Toilets					
Demand	"	6000	8000	10000	12000
Capacity	"	-	10000	10000	10000
Production	"	-	8000	10000	10000
Shortage	"	6000	-	-	2000

Items made of Enamelled Steel Sheets

There are three firms at present time, buying steel sheets pressings of bath tubs and other products and enamelling them.

The biggest firms are Pama Co. Tehran and Laaba Pars Co. Tehran. The demand of all items made of enamelled steel sheets will be big

enough in 1356 (1977/8) for economical production of pressings in Iran, i.e. the machinery and equipment will be well utilized.

It is advisable to produce all items made of enamelled steel sheets in Iran at the end of the Fifth Five-Year Plan.

Recapitulation of Demand, Capacity, Production and Shortage of Items made of Enamelled Steel Sheets, According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Bath tubs					
Demand	pcs	10000	24000	62000	105000
Capacity	"	-	30000	60000	90000
Production	"	-	24000	60000	90000
Shortage	"	10000	-	2000	15000
Basins (for showers)					
Demand	"	4000	12000	28000	52000
Capacity	"	-	12000	24000	36000
Production	"	-	12000	24000	36000
Shortage	"	4000	-	4000	16000
Washing Basins for Dishes					
Demand	"	8000	12000	20000	28000
Capacity	"	-	12000	24000	24000
Production	"	-	12000	20000	24000
Shortage	"	8000	-	-	4000
Toilets					
Demand	"	8000	12000	20000	28000
Capacity	"	-	12000	24000	24000
Production	"	-	12000	20000	24000
Shortage	"	8000	-	-	4000

3.14 RADIATORS FOR CENTRAL HEATING

From different kinds of radiators for central heating are produced in Iran at present three types:

1) Radiators made of grey iron castings
2) Radiators made of steel sheets (pressed and welded)
3) Radiators made of extruded aluminium pipes.

1- Radiators Made of Grey Iron Castings

There are two producers of radiators made of grey iron castings - Zigma Company, Tehran and Irfo Company, Tehran.

Zigma Co. Tehran

The capacity of this factory is approximately 4500 tons of radiators made of grey iron castings, but the production in 1349 (1970/1) was approximately 2500 tons per year. The factory is also producing steam boilers for central heating. All castings are produced in own foundry and machined in machining shop. Fittings for radiators are purchased outside the factory.

IRFO Company, Tehran

The factory is producing radiators made of grey iron castings and boilers for central heating. The production of radiators made of grey iron castings was 2500 tons in 1349 (1970/1). All castings are produced in own foundry. Fittings for radiators are purchased outside the factory.

2- Radiators Made of Steel Sheets

There are five producers of radiators made of steel sheets in Iran at present: Atmosfere Co. Tehran, Iran Gulf Co. Tehran, General Industrial Co. Tehran, Ajir Company, Tehran and the Iran Pipe and Machine Manufacturing Co. Tehran. Most of them started production few years ago, the last one started the production in year 1350 (1971).

Iran Gulf Co. Tehran

The biggest factory producing radiators for central heating made of steel sheets. The production in 1348 (1969/70) reached 130000 sq.m. of heating surface, the installed capacity is approximately 200000 sq.m.

Atmosphere Co. Tehran

The second biggest factory producing radiators made of steel sheets. The production in 1348 (1969/70) was 135000 sq.m. of heating surface, the installed capacity is approximately 160000 sq.m.

Ajir Co. Tehran

The production of radiators made of steel sheets was 70000 sq.m. of heating surface, in 1348 (1969/70). It is expected that the production in the future will reach 100000 sq.m.

General Industrial Co. Tehran

This firm produced only 5000 sq.m. of radiators made of steel sheets in 1348 (1969/70).

The Iran Pipe and Machine Manufacturing Co. Tehran

The production started in 1350 (1971), the first products were installed at the exhibition in 1350 (1971). The capacity as well as production is not known.

Description of Machinery and Equipment

Mostly modern machinery and equipment. Components and parts are pressed on mechanical presses and then welded on automatic or mechanical stem welders, spot welders and special flare welders. None of the above mentioned firms is producing valves and fittings for radiators.

3- Radiators made of Extruded Aluminium Pipes

There is one producer of radiators for central heating made of extruded aluminium pipes.

Techno Company, Tehran

The production started just recently. The production comprises 5 models, having total height of 400 mm, 600 mm, 1000 mm and 2500 mm and each model is produced with one upto 16 columns. The smallest radiator has heating surface of 0,33 s^2 - 176 Kcal/hour, the biggest one has 32,96 s^2 - 17600 kcal/hour (hundred times bigger than the smallest one).

The total capacity as well as production is not known;it is estimated that the production in 1349 (1970/1) was about 100 tons.

Import of Radiators for Central Heating

Tariff No.			1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
737A	Plain radiators	tons	539,6	367,7	267,2	226,1	471,3
737B1	Parts of plain radiators	tons	201,4	289,1	3,1	21,1	0,1
737B2	Painted, varnished radiators	tons	150,9	79,0	8,1	40,0	41,7
	T o t a l	tons	891 9	735,8	278,4	287,2	453,1

Source: Foreign Trade Statistics of Iran.

It is hard to prepare a forecast of demand as well as production of different types of radiators as it is not known which type of radiators will be prefered by customers in the future. As there will be a tendency to build sulty-story buildings in the future, which need special medium pressure radiators it is envisaged that the fourth type of radiators - steel pipes combined with aluminium sheets will be used and later on will be produced in Iran.

Forecast : Demand, Production and Shortage of Radiators for Central Heating

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Total demand	tons	12400	20500	30700	40700
Production:					
Radiators made of cast iron	"	7000	10000	12000	14000
Radiators made of steel sheet		4800	9500	17500	25000
Radiators made of aluminium pipe	tons	200	500	800	1100
Radiators made of steel pipes with aluminium sheets	tons	-	200	400	600
Total production		12000	20200	30700	40700
Shortage		400	300	-	-

The forecast of demand and production of radiators for central heating in the Fifth upto Seventh Five-Year Plans has been made by the Author of this Study on the basis of the construction of new buildings (Code No.400) plus replacement of existing radiators.

In accordance with the tendency in other countries the growth rate of the demand of radiators made of grey iron casting will be lower than the growth rate of the demand of radiators made of steel sheets.

3.15 - 3.17 SAFES AND STEEL FURNITURE

The majority of safes and steel furniture is produced in Iran; only special types of safes and furniture are imported.

Import of Safes and Steel Furniture

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
738A1	Safes	pcs	-	2	-	1	-	40
		tons	-	1,3	-	1,2	-	36,1
738A2	Strong doors for strong rooms	tons	44,9	1,3	5,4	0,5	4,8	35,9
738B	Caskets, safety boxes	pcs	225	471	181	67	116	389
		tons	5,3	4,8	6,2	3,7	3,4	14,9
739A1	Operating furniture and furniture for theatre	pcs	70	93	55	68	77	37
		tons	15,8	21,9	15,2	15,8	19,5	9,9
739A2	Dentists furniture	pcs	80	145	156	69	110	210
		tons	17,3	23,0	19,6	11,7	15,8	28,0
739A3	Parts of furniture operating, theatre, dentists	tons	15,2	43,6	35,3	11,5	6,6	7,3
739B1	Dressing tables	pcs	-	-	4	1	2	-
		tons	-	-	0,1	0,1	0,2	-
739B2	Tables fitted with drawers	pcs	1	15	68	75	1	64
		tons	0,1	0,8	38,6	4,1	0,1	1,7
739B3	Other furniture and parts thereof	tons	179,2	90,9	30,7	39,2	68,2	180,4
T o t a l		tons	267,8	187,6	161,1	87,8	118,6	314,2

Source: Foreign Trade Statistics of Iran

3.15 PRODUCTION OF STEEL FURNITURE FOR KITCHEN

There are many firms in Iran, producing steel furniture for kitchen. According to the Ministry of Economy, Research Centre for Industrial and Trade Development, production of steel furniture for kitchen was as follows:

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
Production	tons	955	1370	1861	1599	1872	2191

Details About the Production in the Year 1348 (1969/70)

Sherkate Sahami Kharbasian Tehran	205 tons
Sherkate Sahami Zol Faghari Tehran	220 tons
Sherkate Sahami Moofer Daker Tehran	150 tons
Moumenzadeh Tehran	85 tons
Kafarian Tehran	11 tons
Arjuni Tehran	30 tons
Moofari Tehran	48 tons
Reza Jaafari Tehran	30 tons
Amiri Tehran	150 tons
Dor Mali Tehran	117 tons
Dorosti Tehran	78 tons
Zarabi Tehran	157 tons
Ghachi Tehran	7,5 tons
Zohre Tehran	72 tons
Sedaghat Tehran	50 tons
Others	188,5 tons
Total	1599 tons

Source: Research Centre for Industrial and Trade Development of the Ministry of Economy.

From the above given figures is seen, that the majority of producers of kitchen steel furniture are small workshops with minimum mechanisation (mostly hand operated sheet metal forming machines and transformer welding machines)

Forecast of Demand, Production and Shortage of Kitchen Steel Furniture

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	2560	4400	7000	10800
Production	"	2520	4350	7000	10800
Shortage	"	40	50	-	-

The above given forecast of demand of kitchen steel furniture has been made by the Research Centre for Industrial and Trade Development of the Ministry of Economy for the year 1351 (1972/3) and by the Author of this Study until the year 1366 (1987/8) on the basis of growth rates of new flats to be built in next fifteen years. It is advisable to extend the existing capacity and to mechanize the production process.

3.16 FIRE PROOF SAFES AND STRONG DOORS

Fire proof safes and strong doors for strong rooms are partly imported (see tariff nusbers 738A1 and 738A2), partly produced in Iran.

Production of Fire Proof Safes and Strong Doors

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Production - total	pcs	1592	2205	7850	12060	9560
Khoram Tehran	pcs	292	400	170	4190	512
Piman Tehran	pcs	-	30	30	n.a.	n.a.
Kaveh Tehran	pcs	200	300	7000	4025	n.a.
Ostad Tehran	pcs	100	900	-	n.a.	420
Sean Sanat Tehran	pcs	-	215	150	n.a.	248
Iran Sanat Tehran	pcs	1000	360	500	350	n.a.

Source: Research Centre for Industrial & Trade Development

Forecast of Demand, Production and Shortage of Fire Proof Safes and Strong Doors

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	12000	17700	25000	35000
Production	pcs	11800	17550	24900	34900
Shortage	pcs	200	150	100	100

Using 1349 (1970/71) as the base year and the historical annual rate of increase of production, figures for the years 1351 (1972/3) until 1366 (1987/8) were exterpolated, by the Author of this Study.

There is no need of new factory, as the existing firms have enough capacity to cover demand in the next ten years.

3.17 OTHER STEEL FURNITURE

There are tens of small scale and medium scale firms, producing other steel furniture.

According to the Iranian Industrial Statistics 1968, the production in 1347 (1968/9) of other steel furniture was as follows:-

Metal chairs	399,964 pcs
Book racks	7,150 pcs
Utensil racks	4,811 pcs
Metal cupboards	30,533 pcs
Clothes racks	17,600 pcs
Towel racks	7,200 pcs
Metal beadsteads	15,000 pcs
Writing tables	10,234 pcs
Office room metal furniture	78,858 pcs
School desks and benches	658 pcs
Laboratory and hospital equipment	10,218 pcs
Rotating metal chairs	350 pcs
Metal desks	5,960 pcs
Files	4,080 pcs
Cartex	100 pcs
Metal cribs	12,166 pcs
Other household equipment	45,360 pcs

Description of Machinery, Equipment and Process

From the technological point of view and material used, there are three groups of steel furniture:

1. Furniture made predominantly of steel sheets like fireproof safes and strong doors for strong rooms, furniture for kitchen, metal cupboards etc.

Machinery and equipment: guilotine shears, sheet bending machines, mechanical press brakes, eccentric presses, plate bending rolls, plate and strip levelling rolls, electric transformer welding machines, spot welding machines, painting boots with spraying guns etc.

2. Furniture made predominantly of steel tubes and light weight sections like metal chairs, school desks and benches, metal beadsteads etc.

Machinery and equipment: alligator shears, section cropping machines, tube bending machines, section bending rolls, electric transformer welding machines, butt welding machine, double wheel grinding and polishing machines, electroplating, etc.

3. Furniture made of steel sheets and/or steel tubes and lightweight sections combined with wooden or plastic parts.

Machinery and equipment: The same as above, but additionally wood-working machines like wood band or circular saws, wood planning machines, wood moulding machines, wood grinding and polishing machines, etc.

Forecast of Demand, Production and Shortage of Safes and Steel Furniture

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	18800	42500	76000	125000
Production	tons	18500	42000	75000	124000
Shortage	tons	300	500	1000	1000

Forecast of demand and production of steel furniture and safes has been made by the Author of this Study on the basis of the production and imports in the year 1347 (1968/9). Projected growth rates were derived by correlation with expected levels of gross national product.

There is enough capacity in the existing plants and workshops, but technological process, machinery and equipment should be improved.

3.18 LOCKS, KEYS, HINGES AND FITTINGS FOR FURNITURE, DOORS & WINDOWS

Locks, keys, hinges and fittings for furniture, doors and windows are partly imported, partly produced by some small factories and shops.

Imports of Locks, Keys, Hinges & Fittings for Furniture, Doors and Windows in tons

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
733-1	Locks made of steel	240,7	294,9	413,1	618,0	313,2	182,9
733-2	Padlocks made of "	520,2	545,7	490,6	618,7	640,2	766,4
733-3	Bolt locks," " "	36,7	4,8	25,3	5,4	11,0	-
733-4	Parts of locks, made of steel	12,2	23,9	58,4	10,6	8,4	2,9
733-5	Bicycles padlocks	58,6	87,4	41,9	45,0	58,3	95,0
733-6	Keys	1,8	1,5	14,5	20,5	31,5	31,1
734A	Locks and fittings for furniture, doors and windows, made of steel plain	248,0	235,8	265,2	262,1	256,6	238,0
734B	Locks and fittings for furniture, doors and windows - painted, varnished, enamelled	310,5	297,4	407,7	372,8	721,9	885,9
734C	Locks etc. with parts of other metals	30,6	48,3	76,7	84,6	87,8	135,0
734D	Locks etc. silvergilt and decorated	0,7	1,6	3,4	0,5	5,7	0,1
767A1	Locks made of copper	31,7	14,1	39,5	73,3	18,0	12,3
767A2	Padlocks made of "	62,0	31,8	25,8	32,2	38,1	82,0
767A3	Bolt locks " " "	0,5	1,8	-	-	-	0,3
767A4	Keys and parts of locks made of copper	2,7	3,1	1,9	11,5	15,0	9,0
767B1	Fitting made of copper for furniture, doors and windows, metal plated	0,1	-	0,2	1,5	0,2	10,8
767B2	Fittings made of copper for furniture etc. plain	7,5	7,8	25,9	30,7	54,7	44,4
	T o t a l	1564,5	1599,9	1390,1	2187,8	2260,6	2496,1

Source: Foreign Trade Statistics of Iran

Production of Locks, Keys, Hinges and Fittings for Furniture, Doors and Windows According to the Research Centre for Industrial and Trade Development of the Ministry of Economy

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Mehrpah Co.	tons	48	45	48,7	61,5	90
Loulah Sazie Iran	"	112,3	98,4	139,5	135,9	149,1
Loulah Sazie Fouladi	"	40	28	48	72	70
Loulah Azar	"	33	30	36	58	63
Kofte Sazie Jahani	"	72	77	60	75	90
Kofte Sazi Mehr	"	161	173	195	245	269
Others	"	281	275	301	298	327
T o t a l	"	747,3	726,4	828,2	945,4	1058,1

Production, Imports, Exports and Demand of Locks, Hinges and Fittings for Furniture, Doors and Windows

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Production	tons	747,3	726,4	828,2	945,4	1058,1
Imports	"	1564,5	1599,9	1890,1	2187,8	2260,6
Exports	"	-	-	1,7	2,8	2,8
Demand	"	2311,8	2326,3	2716,6	3130,4	3315,9

Forecast of Demand and Production of Locks, Hinges and Fittings for Furniture, Doors and Windows

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	Tons	3800	6700	10800	16500
Production	"	1120	2300	4800	9800
Shortage	"	2680	4400	6000	6700

The above given forecast of demand has been made by the Author of this Study and is based on projected growth of construction of housing, industry and trade buildings and production of furniture.

Though the existing capacity is not fully utilised, it is advisable to extend the existing shops or to build new, modern shops or plants, mainly for those items, which are imported in big quantity - for example locks, padlocks, bicycle padlocks etc.

Description of Machinery, Equipment and Process

Mostly used operations at the production of components and parts of locks, padlocks, hinges and fittings for furniture, doors and windows are cold forming operations such as embossing, blanking, bending and shallow drawing on eccentric presses. Other operations, like turning, milling, drilling and welding are used only occasionally.

3.19 METAL WINDOWS, DOORS, WINDOW AND DOOR FRAMES

Wood in Iran is extremely expensive and therefore the majority of windows, doors, window and door frames for modern houses and factories are made of metal.

At present time metal windows, doors, window and door frames are mostly made of light steel profiles, normal steel profiles, steel sheets and strips. Only small part of these products is made of aluminium profiles and sheets.

Now, when Iran is producing its own aluminium ingots and profiles, the ratios of aluminium windows etc. to steel ones will be much higher. Price of aluminium windows, doors etc. will be only slightly higher, or even the same as those made of steel as the weight of aluminium doors, windows etc. is substantially lower than those made of steel, but the life of products made of aluminium profiles will be longer, as the corrosion does not affect so much aluminium as steel. Also maintenance of products made of aluminium is cheaper than those made of steel (steel products must be protected by painting etc.)

All metal windows, doors, window and door frames are produced in Iran; there is no import of these products from abroad.

Production of Metal Windows, Doors, and Window and Door Frames

		1342 (1963/4)	1343 (1964/5)	1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Production	tons	37928	53649	37932	44993	74021	72903

Source: Iranian Industrial Statistics 1968 - Ministry of Economy, Bureau of Statistics.

Metal windows, doors, window and door frames are produced on small scale in hundreds of workshops, spread throughout the country. The biggest producers of these products are most probably some firms, producing light steel products (see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part I, 10. Base Metal Industries). They are using short ends of light profiles for the production of windows etc.

Forecast of Demand, Production and Shortage of Metal Windows, Doors, Window and Door Frames

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	98000	165000	250000	350000
Production	tons	98000	165000	250000	350000
Shortage	tons	-	-	-	-

The above given forecast of demand of metal windows, doors, window and door frames has been made by the Author of this Study on the base of forecasted covered area of housing and city building, private and public construction of industry and trade - see Code No. 400 - Construction of Building.

Description of Machinery, Equipment and Process

As already mentioned, there are hundred of small workshops, producing metal windows, doors, window and door frames on small scale. Machinery and equipment of these workshops is very simple. One or more welding transformers or rotary electric welding machines, hand operated lever shear, hand operated guillotine shear, sawing machine (simple circular sawing machine or hack-sawing machine), hand operated steel bending machine and exceptionally section cropping machine, mechanical press brake and eccentric press. Only big producers are using special welding machines like spot welding machines, butt welding machines etc.

It is presupposed that in the future workshops will be extended and modern machines will be used.

3.20 STEEL STRUCTURES FOR HOUSING, CITY, TRADE AND INDUSTRY BUILDINGS

All steel structures for housing, city and trade buildings and the majority of steel structures for industry buildings is made in Iran. In this chapter are not delt supporting (technological) steel structures, they are included in special machinery and equipment for different industries.

Civil engineering firms are either producing steel structures themselves or there are specialized firms, producing steel structures for civil engineering firms as sub-contractors.

Forecast of Demand, Production and Shortage of Steel Structures for Housing City, Trade and Industry Buildings

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	770000	1430000	2750000	4400000
Production	"	770000	1430000	2750000	4400000
Shortage	"	-	- -	- -	-

The above given forecast of demand has been made by the Author of this Study on the base of forecasted covered area of housing and city building, private and public construction of industry and trade. Calculation of demand see Code number 400 - Construction of Building, Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part I, 11.

There are hundreds of civil engineering firms or specialised mechanical engineering workshops, producing steel structures mainly for housing on small scale and few medium-size and big firms, specialised in this field of production. The biggest firms are:

Machine Building Plant in Arak

It is the biggest, most modern factory for production of steel structures, material handling machinery and equipment, plate and tube

vessel manufactures, earthmoving and road-making equipment, construction and orushing machines etc.

According to the revised tentative annual programme (production-mix) for the year 1353 (1974/5) this factory should produce medium and heavy steel structures:

road bridges - 800 tons/year
building structures 2000 tons/year
technological structures 1200 tons/year

It is advisable to specialize this factory in the production of special machinery and equipment for cement and food industries, i.e. to avoid the production of medium and heavy steel structures as road bridges and building structures

Cyrous Arjomand Co. Tehran

It is the biggest factory in operation, producing standard and heavy steel structures. This firm has five main sections.

1. Production of standard and heavy steel structures
2. Tank manufacturing
3. Production of cranes, trailers, fire fighting equipment etc.
4. Production of bolts, nuts, rivets and washers
5. Production of light profiles and welded pipes.

Section for production of standard and heavy steel structures has the capacity approximately 10000 tons/year. It has own design office for elaboration of detailed working drawings. There are 450 employees in the section for production of standard and heavy steel structures. This factory supplied all steel structures for Metallurgical Engineering Plant in Tabriz, Leyland Co. in Tehran, Iralco etc. The section for production steel structures is well equipped with modern welding, cutting and other machines.

Iran Steel Structures Co. Tehran

It is a specialized factory for production of light steel structures for industry, trade, stores etc. The capacity of the factory is approximately 8000-9000 tons/year i.e. the factory is able to produce each day steel structures for 1500 sq.m. of stores, workshops etc. up to the span of 75 m.

The factory is collaborating with French firm Soule, i.e. it is following Soule design.

Chakosh Company, Tehran

This factory is producing steel structures, containers, storage tanks and towers. The annual production of the factory is about 5000 up to 6000 tons/year. It is estimated, that the production of steel structures represent approximately 3500 - 4000 tons/year.

Luleh va Machine Sazi Iran Company, Tehran

This factory is producing in mechanical engineering section steel structures, tanks, cranes, special machines etc. The annual capacity of this section is about 2500 tons/year.

Fathi & Son Manufacturing Co. Tehran

There are produced n ot only steel structures, but also overhead electric travelling cranes, special machines etc. in this factory. The annual production of the factory is about 2000 tons.

Ajir Company, Tehran

This factory is producing only steel structures. The capacity of the plant is about 3000 tons, the production approximately 2000 tons/year.

Firoosa Engineering Co. Tehran Karadj Road

One of the items produced in this factory are steel structures of buildings for industry and road bridges etc. The capacity of this factory in the production of steel structures is approximately 5000 tons per annum.

J.D.F. Tehran

Production programme comprises steel structures, road bridges, gates for irrigation, water tanks, overhead cranes, tanks for trucks, storage tanks etc. Total capacity of this plant is 7200 tons per annum,

Nair Pars Co. Tehran

Nair Pars is specialized in the production of steel structures, gates for irrigation and steel tanks. The capacity of this is 3000 up to 5000 tons per annum.

Machinery, Equipment and Process

As already mentioned, there are hundreds of small workshops, producing light steel structures for dwelling houses. Their machinery and equipment is very simple: welding transformers or rotary electric welding machines, section cropping machine, sawing machines (hack sawing machine or circular sawing machine) cutting machines, level and guillotine shears (mostly with mechanic drive), steel bending machine, eccentric press and exceptionally shaping machine, radial drilling machine and butt welding machine.

3.21 STEEL ORNAMENTS ON FACADE, RAILINGS, STEEL FENCES, SCAFFOLDINGS, ETC.

There are hundreds of small firms in Iran producing steel ornaments on facade of dwelling houses, steel railings, steel fences, steel scaffoldings etc. There is no import of these items; all are made in Iran.

Forecast of Demand, Production and Shortage of Steel Ornaments, Railings, Steel Fences, etc.

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	38600	64000	98000	140000
Production	38600	64000	98000	140000
Shortage	-	-	-	-

The above given forecast has been made by the Author of this Study on the basis of past statistics on production of these items and of the construction of new housing and city buildings, private and public construction of industry and trade.

3.22 TINSMITH'S HARDWARE

There are two groups of small workshops, producing tinsmith's hardware. One group is producing mostly tinsmith's hardware for buildings like eaves, roofing, air ducts for cooling system etc. the other one is producing tinsmith's hardware for household like cans etc. There are hundreds of these small shops spread throughout the country.

Forecast of Demand, Production and Shortage of Tinsmith's Hardware for Buildings

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	24100	40600	62000	83000
Production	tons	22700	40600	62000	83000
Shortage	tons	1400	-	-	-

The above given forecast has been made by the Author of this Study on the basis of forecasted growth rates of construction activities - see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part I, 11. Construction Industries (Building, Railway and Dams) and forecasted growth rates of production of desert coolers, see Part II, 4. Electric Power Industry and Electrical Engineering Industry.

Forecast of Demand, Production and Shortage of Tinsmith's Hardware for Households

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8
Desand	tons	9600	18400	32200	42000
Production	tons	7200	18000	32000	42000
Shortage	tons	2400	400	200	-

The above given forecast has been made by the Author of this Study on the basis of production in past years.

Description of Machinery and Process

Most of the existing workshops are equipped only with hand tools; the biggest shops are equipped with hand operated steel metal forming machines like hand operated guillotine shears, circular shears, sheet bending machines etc. In the future also small workshops will be equipped with these machines.

3.23 BOILERS FOR CENTRAL HEATING

Boilers for central heating of houses etc. (low pressure boilers) used in Iran are mostly sectional boilers, partly produced in Iran, partly imported. Old types of these sectional boilers are coke-fired, at present time mostly modernized to oil-fired boilers, modern types are oil-fired sectional boilers and package boilers (for big houses, offices etc.)

Imports of Boilers for Central Heating

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
736-1	Boilers for central heating tons	567,5	425,6	1473,8	1023,3	573,5	1265,0
736-2	Parts of boilers for central heating tons	222,3	52,7	568,8	708,8	425,8	2888,8
	T o t a l tons	789,8	477,3	2042,6	1741,1	998,3	4153,3

Source: Foreign Trade Statistics of Iran.

At present time, there are six producers of boilers for central heating plus firms, assembling and erecting imported boilers:

Lulch va Machinesazi Tehran

This firm is producing sectional boilers, oil-fired of different sizes. Sections of boilers are casted in own grey-iron foundry. The capacity of the foundry in production of sections of boilers is 5 tons/day, but it is not fully utilized.

Sherkate Sanaye Rechtegari, Tehran (former Zigma)

Production of sectional boilers, oil-fired of different sizes, including production of sections casted in own grey-iron foundry. The capacity of the foundry in production of sections of boilers is 1,4 tons/day.

Iran Foolad Co. (IRFO) Tehran

This firm is also producing sections boilers for central heating, oil-fired. Sections of boilers are casted in own foundry. Capacity, as

well as production of sectional boilers is not known; the capacity of foundry was in 1349 (1970/1) 1200 tons of grey-iron castings of all types.

The Iran Pipe and Machine Mfg. Co. Tehran

This firm is producing sectional boilers, oil-fired of different sizes. Capacity, as well as production of sectional boilers is not known.

Sherkate FM Co. Tehran

This firm just recently started the production of small package boilers, oil-fired, type MS 50. (This type was exposed at exhibition "The District Development" in the year 1350 (1971). The capacity, production, as well as percentage of components and parts produced in the factory are not known.

Machine Building Plant, Arak

This factory is producing boilers for central heating as well as industrial boilers.

Boilers for central heating are John Thompson package boilers and auxiliaries, capacity 3000 up to 30000 lbs of steam/hour. It is presupposed, that the production in the 1354 (1975/6) will be 1850 tons/year.

Technoair Co. Tehran

This company is only assembling and erecting sectional boilers, oil-fired. Capacity as well as production is not known.

Hararat Sandj Eng. Co.

This firm is importing sectional boilers De Dietrich and erecting them.

Forecast of Demand, Production and Shortage of Boilers for Central Heating

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Sectional boilers -	Demand tons	4200	4500	6200	8000
-	Production "	3600	4100	6100	7900
	Shortage "	600	400	100	100
Other boilers -	Demand "	800	2900	4000	5500
	Production "	200	2300	3600	5200
	Shortage "	600	600	400	300

The forecast of demand and production of boilers for central heating has been made by the Author of this Study on the basis of the construction of new buildings (Code No.400) plus replacement of existing boilers. Projected growth rates were derived by correlation with expected growth rates of other heating equipments.

.24 L I F T S

Except occasional production of lifts on small scale (for example in year 1347 the production was 18 pcs.) there is no factory in Iran producing lifts on medium scale as its steady programme.

Import of complete lifts (Passenger as well as Industrial) According to the Foreign Trade Statistics of Iran

Tariff No.		1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
833B7	Complete lifts pcs	143	191	145	18[illegible]	231
	kg.	343824	498798	517422	631257	884968

The forecast of the demand of lifts in the Fifth upto Seventh Five-year Plans is based on the construction of new buildings (See Code No.400)

It is presupposed that in the future the construction of multistory buildings will be substantially higher, not only absolutely, but also relatively (i.e. the ratio of multistory buildings to one up to four story buildings will be higher) and therefore the demand of lifts will be substantially higher.

Forecast of Demand of Passenger and Industrial Lifts According to the Author of This Study

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Personal and Industrial lifts pcs	240	450	850	1350

The demand is big enough for production of lifts on medium scale, therefore IMDBI would like forme during 1351 (1972/3) the company for production of passenger lifts, capacity approximately 400 pcs/year - Iran Schindler Lift Company in Ghazvin. It is estimated that the production will reach the full capacity in 1356 (1977/8) fully covering the demand

for passenger lifts and the capacity will be extended in the Sixth and Seventh Five-Year Plans.

Forecast of Production of Lifts According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Capacity	pcs	40	450	880	1500
Production of lifts	pcs	20	400	800	1300

Production of 400 lifts per year is the smallest economical unit with low utilization of machinery and equipment in one shift production. It is therefore advisable to extend the capacity of one plant by additional shift. In the first stage of production up to 400 pcs/year there will be production only of passenger lifts, in the second stage (up to 800 pcs/year) some types of industrial lifts will be produced and in the third stage all types of passenger, industrial and special lifts will be produced.

3.25 PATERNOSTERS

Paternoster is a passenger lift with many cabins, moving continuously on two chains up and down.

As the demand of paternosters is and will remain low even in the future, it is suggested that they will not be produced in Iran. In the opposite case they should be produced in the same factory as passenger lifts (probably at the end of the Seventh Five-Year Plan).

3.26 ESCALATORS

Escalator is a moving stairway, i.e. passenger conveyer in which the steps move upward or downward. The steps are attached to chains, which pass over sprocket wheels.

As the demand of escalators is and will remain low, it is suggested that they will not be produced in Iran. Only in the case the traffic problem of Tehran will be solved by underground railway and

on the main crossings will be subways then the demand of escalators will be high enough for local production. Escalators could be produced either in Machine Building Plant in Arak or in Iran Schindler Lift Company in Ghazvin.

4.01 - 4.02 STEEL CONTAINERS

Most of the steel containers, i.e. steel barrels, drums and cans made of cold rolled sheets are now being manufactured by the Container Materials Cooperation in Abadan (on the same site as Abadan Refinery). Barrels, drums and cans are used for handling products of Abadan and other refineries, i.e. bitumen, kerosene etc. There are no data about the production.

There are plenty of small producers of the steel containers like buckets etc. Also in this case the production is not known.

It is estimated that the consumption of steel in 1347 (1968/9) was of the order of 12,000 tons.

Forecast of Production of Steel Containers According to the Author of This Study

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	136[illegible] (1987/8)
Demand of steel containers tons	12000	17500	24000	32000
Production of steel containers tons	12000	17500	24000	32000
Consumption of steel tons	15360	22400	30720	40960

4.01 TIN CANS FOR FOOD INDUSTRY

There are three groups of factories, producing tin cans for food industry in Iran.

1. Special firms, producing tin cans on medium and big scale

	Licence pcs.	Production 1348 (1969/70) pcs
Ghoti Sazi Iran (Behshahr) Tehran	20,000,000	25,000,000
Pars Steel Co. Tehran	60,000,000	45,000,000
Sanad Cheasi Tehran	5,000,000	3,500,000
Karkhaneh Mohamady (Prime) Tehran	23,000,000	3,000,000
Karkhaneh Seyrafi Tehran	1,000,000	1,000,000
Ata Co. Tehran	8,000,000	5,000,000
Karkhaneh Motlagh Tehran	300,000	300,000
Karkhaneh Golshid Tehran	2,100,000	2,100,000
Karkhaneh Aram, Tehran	700,000	700,000
Karkhaneh Emami Tehran	5,000,000	-
Iran Malta Co. Tehran	30,000,000	-
T o t a l	155,100,000	85,600,000

Source: Research Centre for Industrial and Trade Development of the Ministry of Economy.

2. Special firms, producing tin cans on small scale

There are many workshops in Iran such as Poor Sazi, Teheran, Jahan Teheran, Mohamadi Teheran etc., producing tin cans on small scale. The total production of these workshops in 1348 (1969/70) was 4,000,000 tin cans.

3. Workshops, producing tin cans for own canning factories

Some big firms, producing vegetable oil and canning fruits, meat etc. have their own workshops for production of tin cans. Total production of these workshops was 25,000,000 pcs/year in 1348 (1969/70).

Names of factories, canning different products, having their own production of tin cans: Varamin Vegetable Oil Co., Varamin Narges Vegetable Oil Co. Shiraz, Naz Vegetable Oil Co. Esfahan,

Gol V . . Oil Co. Tehran, Jahan Vegetable Oil Co. Karaj, Khorous Neshan Vegetable Oil Co. Tehran, Shadab Fruit Canning Co. Mashad, Momtaz Fruit Canning Co. Tehran, Charfasl Khoshab Fruit Canning Co. Mashad, Azarshahr Fruit Canning Co. Azarshahr, Karun Fruit Canning Co. Tehran, Kalbas Sazi Arzuman Tehran etc.

Military co-operative in Shahi (meat and vegetable canning) and Bandar Abbas Meat Canning Co. Bandar Abbas are mostly importing semi-finished tin cans.

Total production in 1348 (1969/70) in above given 3 groups of factories was 114,000,000 pcs of tin cans.

Forecast of Demand and Production of Tin Cans for Food Industry According to the Author of This Study

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand of tin cans (1000 pcs)	148,000	330,000	520,000	780,000
Production of tin cans (1000 pcs)	148,000	330,000	520,000	780,000
tons	13,320	29,700	46,800	70,200

The forecast of production of tin cans is based on the forecasted production of canned food.

Description of Existing Machinery and Equipment

Mostly modern plants with automatic and semi-automatic machines.

4.02 TIN CANS FOR OTHER INDUSTRIES

Tin cans are used also in other industries than food industry. The major part of tin cans is used for oil and lubricants. These cans are produced by NIOC factory at Kermanshah.

Forecast of Consumption and Production of Tin Cans for Other Industries According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Oil and lubricants	tons	130,000	180,000	250,000	340,000
Norm: kg of tin plate/ ton of product	kg	90	90	90	90
Consumption of tin plate	tons	11,700	16,200	22,500	30,600
Paints, varnishes, shoe polish etc.	"	12,900	17,300	22,500	27,000
Norm: kg of tin plate/ ton of product	kg	100	100	100	100
Consumption of tin plate	tons	1,290	1,730	2,250	2,700
Total consumption of tin plate	tons	12,990	17,930	24,750	33,300

Description of Existing Machinery and Equipment

Mostly modern, automatic machinery and equipment. In future there will be need of new capacities.

4.03 Fire extinguishers

There is one firm, producing fire extinguishers in Iran at present.

Fazilat Co., Teheran.

This workshop is producing for 10 years fire extinguishers CO_2 type, capacity 1 kg, 3 kg, 6 kg, 12 kg. The production is approx. 24000 pcs/year. Only valves are imported.

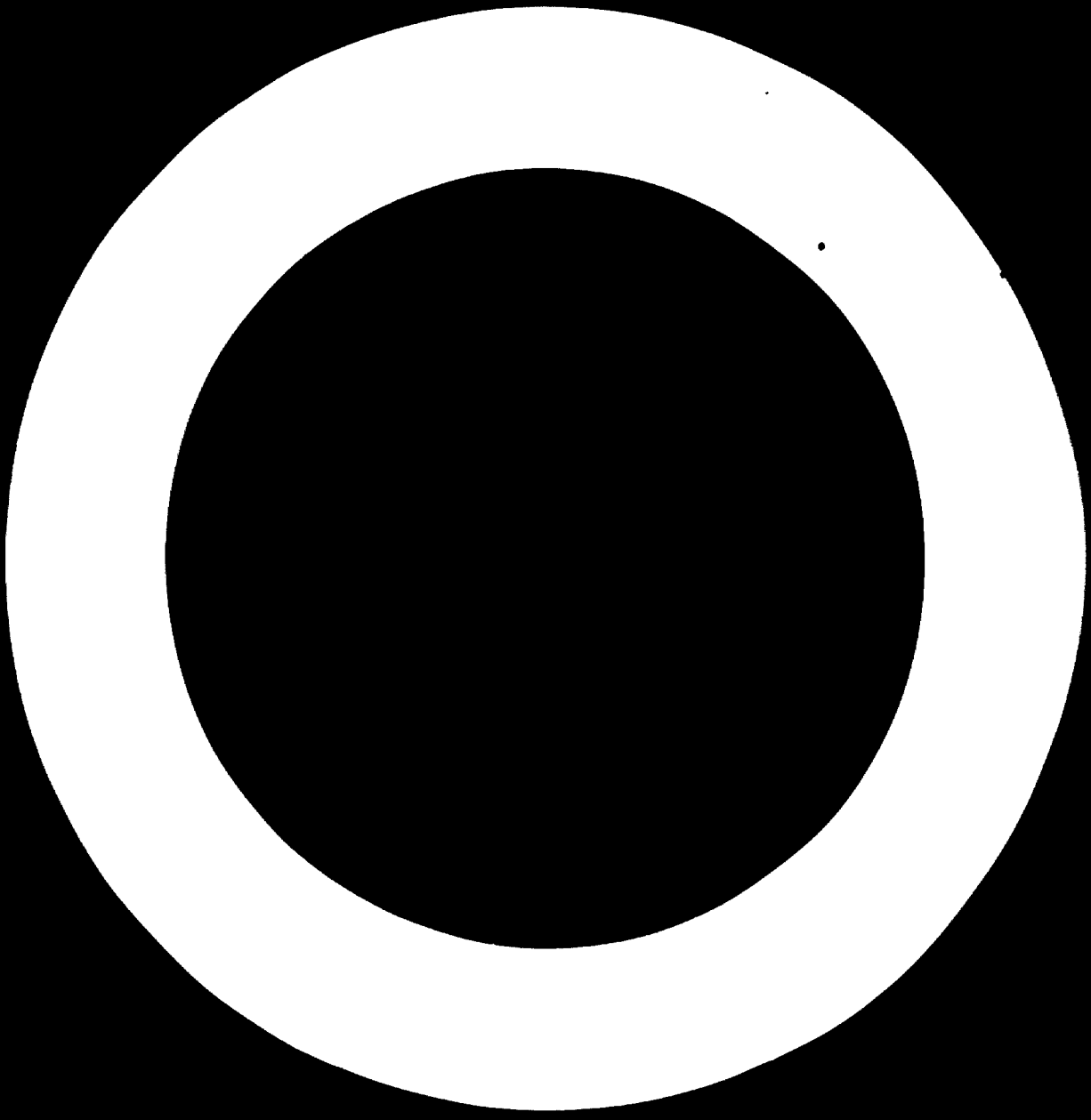
The firm would like to build a new plant with a capacity of 75000 pcs/year with modern machinery and equipment (the body should be pressed from one piece on 300 ton press); the assortment should be enlarged up to a capacity of 50 kg. The proposed capacity of the plant will cover all needs up to approx. 1359 (1980/1).

Other types of fire extinguishers are imported (powder type etc.) It is advisable that also these types will be produced in Iran in the frame of Small Scale Industry.

Forecast of Demand, Production, Capacity and Shortage of Fire Extinguishers According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	55000	95000	150000	220000
Exishing capacity	pcs	30000	30000	30000	30000
New capacity	pcs	-	45000	45000	145000
Production	pcs	32000	48000	70000	140000
Shortage	pcs	23000	47000	80000	80000

If it is compulsory to equip all cars, trucks, busses etc. with fire extinguishers, the demand (and production) would be substructially higher than given above.



Import ... and Weighing Machines According to the Foreign Trade Statis...

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
850A1	Automatic weighing machines	pcs	1597	1808	2295	1502	2739	2535
		kgs	23123	35210	41617	30403	90604	74680
...0B1	Non mobile weighing machines	pcs	26	14	93	73	104	51
		kgs	80662	36397	123416	208397	160325	151181
...0C1	Mobile weighing machines	pcs	514	2427	2642	1083	5097	1822
		kgs	57072	123953	132475	80328	142170	...361
85002	Scales, excl. laboratory	pcs	727	-	28	124	2480	-
		kgs	4308	-	538	242	5986	-
...0C3	Other weighing machines	kgs	40123	42383	63819	34013	10362	32530
...16-1	Precision balances	pcs	1128	1395	1192	1053	1196	933
		kgs	4729	6363	9997	5425	5852	6618

Source: Foreign Trade Statistics of Iran.

As already mentioned, counter-weight scales as well as weighing machines will be replaced in shops and households by semi-automatic or automatic weighing machines. Existing market according to the Foreign Trade Statistics (see above) is big enough for production of these scales and weighing machines in Iran. It is presupposed that in the fifth five-year plan the production of following items will start either in new plants or in the existing ones:

1. Semi-automatic weighing machines for households, weighing capacity up to 10 kgs, production capacity 15000 pcs./year.

2. Personal dial balance, production capacity approx. 8000 pcs./year. Item 1 and 2 might be combined in one plant.

3. Automatic weighing machines, weighing capacity 20 kgs up to 1000 kgs for shops, factories, transport organisations etc. Production capacity 4000 pcs./year.

4. Wagon and lorries bridge weighing machines, capacity up to 100 tons, production capacity 120 pcs./year.

After reaching full capacity all kinds of weighing machines will be produced in Iran, only special continuous weighing machines will be imported from abroad.

Forecast of Demand, Production and Shortage of Semi-Automatic and Automatic Weighing Machines

			1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Semi-automatic weighing machines for households	Demand	pcs	5800	11500	18000	24000
	Production	pcs	-	6000	15000	20000
	Shortage	pcs	5800	5500	3000	4000
Personal dial balance	Demand	pcs	2500	5200	8600	10800
	Production	pcs	-	5000	8000	8000
	Shortage	pcs	2500	200	600	2800
Automatic weighing machines up to 1000 kgs	Demand	pcs	2800	4100	5700	7400
	Production	pcs	-	1600	4000	4000
	Shortage	pcs	2800	2500	1700	3400
Wagon and lorries bridge weighing machines	Demand	pcs	95	140	195	260
	Production	pcs	-	50	120	120
	Shortage	pcs	95	90	75	140

The above given forecast of demand and production has been made by the author of this study and is based on the above given presumptions.

It is advisable to rebuild existing shops producing scales and weighing machines or better to build new, modern factories in the scope of the small scale industry. Forgings, pressings, castings, bolts, nuts and washers, helical springs and components and parts made of plastics, glass etc. will be bought-out in other plants.

4.05 AGRICULTURAL MACHINERY

Agricultural machinery is partly produced in Iran, partly imported from abroad. Agricultural machinery manufacturing industry in Iran is concerned with the maintenance and manufacture of simple farming implements and only maintenance of more sophisticated agricultural machinery.

According to the data from the Ministry of Agriculture there were approx. 20,000 agricultural tractors in operation in Iran in 1349 (1970/71), 12,000 tilers, 1950 large harvesting machines (mainly combine harvesters) and approx. 40,000 pcs. of other machinery and implements like crop picking and harvesting machinery ploughs, balers, seeders, discs, harrows etc. (this excludes simple ploughs, animal drawn machinery and all hand tools).

The data about the production of agricultural machinery and equipment are limited only to few items:

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Pistachio hulling machines	pcs	100	20	100
Ploughs, ploughshares	pcs	252	1670	1000
Rice threshers	pcs	48	28	40
Threshers	pcs	505	576	1300
Lawn-removers	pcs	-	13300	-
Poison sprayers	pcs	2010	4017	6925
Agricul.machinery (non-motor types)	pcs	2714	n.a.	3078
Agricultural hand tools	pcs	274274	104220	249354
Sicles	pcs	n.a.	161630	4280 (1)
Seeders	pcs	n.a.	n.a.	2614

Source: Ministry of Economy, Bureau of Statistics, Iranian Industrial Statistics.

The import statistics are of more help as they are giving under different tariff numbers the mainly used agricultural machinery and equipment.

Imports of Agricultural Machinery:

Tariff No.			1345 (1166/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
829-3	Hand agricultural sprayers	pcs	26519	23599	36353	69711	10866	13592
		kg.	130033	165253	127362	157440	60468	77964
829-4	Machine agricult. sprayers	pcs	1630	8973	4067	3565	8574	1104
		kg.	64669	167045	102495	74597	92686	78389
829-6	Hand sprayers for insecticide use	pcs	257065	234805	516855	515554	495654	365584
		kg.	68249	51811	139981	127888	103171	76217
834-1	Fertilizer spreaders	pcs	94	134	124	170	112	76
		kg.	26241	29773	40453	39736	34426	12651
834-2	Seed drills	pcs	108	658	118	90	96	177
		kg.	84205	70918	73260	78548	72392	38418
834-4	Cultivators	pcs	2004	4238	3328	3484	2891	2739
		kg.	114336	2560387	1124222	1716783	1253158	1189321
834-6	Uprooting Machines	pcs	9	3	16	26	6	7
		kg.	12253	6722	71287	13430	2500	69725
834-7	Agricultural Steam rollers	pcs	-	-	1	-	10	1
		kg.	-	-	320	-	1594	150
834-8	Other ground preparation and cultivation machines	kg.	733896	437018	1258723	942557	333918	187879
834-9	Parts of ground preparation and cultivation machines	kg.	819546	1015	570243	1301456	985510	883664
835-3	Combine Harvesters	pcs	62	369	458	159	88	62
		kg.	290944	1722703	1996273	572911	88663	49197
835-4	Threshing machines	pcs	149	812	411	568	445	9
		kg.	78045	122953	69223	176582	113647	8775
835-5	Grain sorting machines	pcs	10	20	3	71	57	10
		kg.	46981	14891	1805	87763	58224	12653
834-5	Clod crushers, Harrow	pcs	183	50	36	16	14	15
		kg.	83156	23377	31795	11892	24670	18390
835-9	Parts of agricul. machinery	kg.	525817	494642	906945	1702797	793305	745097

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
8360A1	Milling machines	pcs	-	45	1122	294	671	7
		kg.	-	3193	22408	11537	38887	2460
8360B1	Incubators	pcs	10	10	64	128	25	30
		kg.	43689	37316	4204	119473	119173	74500
8360B3	Grass cutters	pcs	4997	2914	5523	4797	8789	3031
		kg.	60954	42030	66976	52978	100173	40349
8360B4	Agricultural machinery equipment not listed elsewhere	kg.	17214	60202	83150	243561	231855	169001
8360B5	Parts of agricultural machinery not listed elsewhere	kg.	62521	122275	70476	299697	39217	39912
Total		kg.	3256749	6133524	6361291	7678648	4454837	3691408

In last years started production, i.e. assembly of modern agricultural machinery and equipment in two factories:

Iran John Deere Arak

The production (assembly from imported SKD components and parts) started in 1348 (1969). This factory is producing also tractors (see Tractors).

Agricultural Machinery and Equipment with Time Schedule

		1350 (1971/2)	1351 (1972/3)	1352 (1973/4)	1353 (1974/5)	1354 (1975/6)	1355 (1976/7) pcs	Local content %
Combine 630	pcs	60	100	210	240	270	300	40%
Baler 219/224	pcs	15	20	30	35	40	50	75%
Spreader 302	pcs	20	50	60	100	140	180	85%
Disc Harrow BW3220	pcs	20	50	170	270	370	500	85%
BW4020	pcs	10	20	30	40	55	70	85%
BW5220	pcs	15	20	25	30	35	40	85%
S220	pcs	-	10	15	20	30	40	85%
Offset Harrow 425	pcs	30	35	55	90	125	160	85%

			1350 (1971/2)	1351 (1972/3)	1352 (1973/4)	1353 (1974/5)	1354 (1975/6)	1355 (1976/7) pcs	Local content %
Plow	83531	pcs	20	30	40	50	65	80	80%
	83541	pcs	20	30	110	180	250	320	80%
	83621	pcs	5	10	80	120	160	200	80%
	F 135	pcs	20	25	35	40	50	60	80%
	F1350	pcs	40	50	60	70	85	100	80%
Rear Blade 80A		pcs	10	15	60	110	165	220	90%
Grain Drill AB 310		pcs	-	30	80	120	160	200	65%
Grain Drill BB		pcs	10	15	25	40	60	80	65%
Flexi Planter 71		pcs	30	40	45	80	115	150	65%
Planter 25B		pcs	15	30	45	80	115	150	65%
Tool bar		pcs	5	7	15	30	45	60	90%

Other machinery and equipment produced by this firm see Tractors, Earthmoving Equipment, Transport Equipment.

The assembly of above mentioned machinery and equipment is performed in temporary building. New premises are under construction, the main hall will have 12,000 sq. m. of covered area. Total production incl. tractors, earthmoving equipment etc. in 1355 (1976/7) will reach approx. 19,500 tons. To reach this target the firm will produce components and parts partly in its own workshops and it would like purchase from other firms not only castings and forgings (mainly from Machine Building Plant in Arak) but also machined components and parts (from Metallurgical and Engineering Plant in Tabriz, Tractor Plant in Tabriz and from Machine Building Plant in Arak). Machine Building Plant had already provided capacity for this cooperation - approx. 2500 tons/year of machined components and parts for agricultural machinery and railway wagon programmes.

Ashtad Iran Mfg. Ind. Co. Ltd. Teheran (Karaji)

This factory is producing not only tillers (see Tillers) but also other agricultural machinery and equipments, small trailers (see Trailers) and water pumps (see Pumps).

Agricultural machinery and equipment-production programme and capacity:

factory is producing two sizes of threshers for rice and wheat [illegible] - type T25-S and T30-S. They could be driven either by electric motor, max 5 HP, or by tiller, tractor etc. All components and parts are produced in the factory. The factory is planning that the production will reach in 1351 (1972/3) 1300 pcs; this quantity seems to be high.

Rice Dryers

The factory is producing three sizes of rice dryers for rice mills and big farms - type DR1, DR15, DR30. The biggest rice dryer has the capacity of 2 tons in 6-10 hours. Burners and ventilators are imported (29% of total CIF price) all other parts are produced in the factory.
Planned production: 1350 (1971/2) - 1050 pcs, 1351 (1972/3) 500 pcs - also these figures seem to be high.

The production from 1352 (1973/4) onward will go substantially down as nearly all rice mills will be saturated by rice dryers.

Forecast of Production of Rice Dryers According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
[illegible]uction	pcs.	400	150	200	[illegible]0

Ploughs

The factory is producing or assembling special ploughs for tillers produced in the factory. The simplest plough is now produced locally, three other types of complicated ploughs are assembled from imported components and parts.

Forecast of Production of Ploughs *

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Locally made ploughs	pcs	2520	3600	4500	5700
Assembled ploughs	pcs	1350	1000	700	400

* The forecast is based on the presupposition that in future more types of ploughs will be produced in the factory.

HM Fab. Moayyeri Teheran

The main production programme of this factory are sprayers (see Sprayers) for agriculture.

The factory is producing also other agricultural machinery and equipment:

Planters - two types (pull type)
Disc Harrows - pull type
Chissl plows - pull type as well as hand operated type
Tooth-type harrows
Plows - four sizes - pull type as well as hand operated
Drums for mixing chemicals (fertilizers) - hand operated

The factory is employing 40 workers (incl. production of sprayers)

Bandameh Co. Tabriz

Workshop producing small agricultural machinery and equipment:
field cultivators - pull type, small size
disc tillers - pull type, small size
disc plows - pull type, small size
mold board plows - pull type, small size
Capacity and production is unknown.

Aras Factory, Teheran

Production Programme: Trailers, two and four wheelers, annual production approx. 50 pcs.
Disc harrows, manually or hydraulically operated, annual production 120 pcs;
Ferrowers, cass type, annual production 120 pcs.
Rollers - annual production 60 pcs;
Manual and hydraulic channel diggers, production 50 pcs/year
Discs for harrows, etc. production per year approx. 5000 pcs.
The factory is collaborating with foreign firms (import of components and parts)

Kesut Afsar, Mashad

Production programme: threshing machines, capacity 60 pcs/year
Beet leaf cutters, capacity 60 pcs/year
Disc harrows, 28 up to 32 discs, capacity 200 pcs/year
Ferrowers, capacity 50 pcs/year
Ridgers - 6 sets, capacity 10 pcs/year

Rollers - capacity 10 pcs/year
Harrows, capacity 30 pcs/year

Ez. [illegible], Mashad

Production programme:
Harrows, capacity 10 pcs/year
Clitowater groomer, capacity 20 pcs/year
Threshing machines, capacity 10 pcs/year
Disc harrows, 28 up to 32 discs, capacity 60 pcs/year
Channel diggers, capacity 5 pcs/year
Forrower, capacity 20 pcs/year
Trailer, capacity 10 pcs/year

Kazemi, Mashad

Production programme:
Harrows, capacity 20 pcs/year
Forrowers, capacity 80 pcs/year
Rollers - capacity 100 pcs/year
Disc harrows - 28 and 32 discs, capacity 100 pcs/year
Trailers, capacity 20 pcs/year
Beet leaf cutters, capacity 30 pcs/year

Ezati, Mashad

Production programme:
Threshing machines, capacity 20 pcs/year
Disc harrows - 28 and 32 discs, capacity 100 pcs/year

Khamsei, Mashad

Production programme:
Threshing machines, capacity 10 pcs/year
Disc harrows - 28 and 32 discs, capacity 50 pcs/year

Naeimi, Mashad

Production programme:
Disc harrows - 28 and 32 discs, capacity 35 pcs/year

Sahar Kiz, Mashad

Production programme:
Disc harrows - 28 and 32 discs, capacity 35 pcs/year

Khagavi, Mashad

Production programme:
Disc harrows - 28 and 32 discs, capacity 50 pcs/year

Konseni, Mashad

Production programme:
Disc harrows - 28 and 32 discs, capacity 50 pcs/year

Molazemi, Mashad

Production programme:
Disc harrows - 28 and 32 discs, capacity 55 pcs/year

Kaveh, Shiraz

Production programme:
Trailers, capacity 50 pcs/year (production in 1348 - 1 pc)
Disc harrows, capacity 50 pcs/year (production in 1349 - 0)
Threshing machines, capacity 20 pcs/year (production in 1349 - 5 pcs)
Channel diggers, capacity 2- pcs/year (production in 1349 - 0)

Hadadian, Shiraz

Production programme:
Trailers, capacity 40 pcs/year (production in 1349 - 1 pc)
Disc harrows, capacity 40 pcs/year (production in 1349 - 1 pc)
Threshing machines, capacity 20 pcs/year (production in 1349 - 5 pcs)
Channel diggers, capacity 15 pcs/year (production in 1349 - 0)

Daghigh, Shiraz

Production programme:
Trailers, capacity 30 pcs/year (production in 1349 - 10 pcs)
Channel diggers, capacity 15 pcs/year (production in 1349 - 4 pcs)

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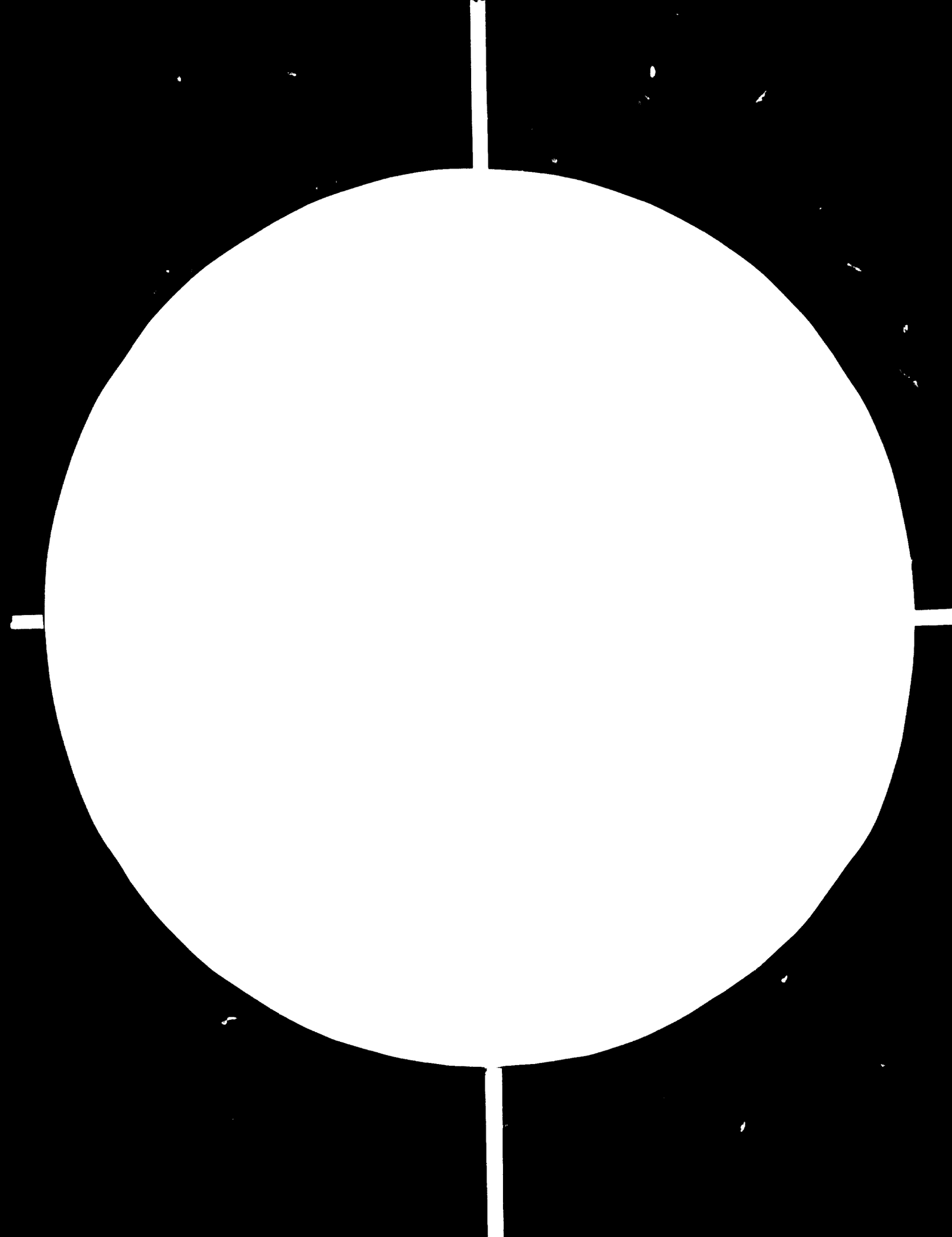

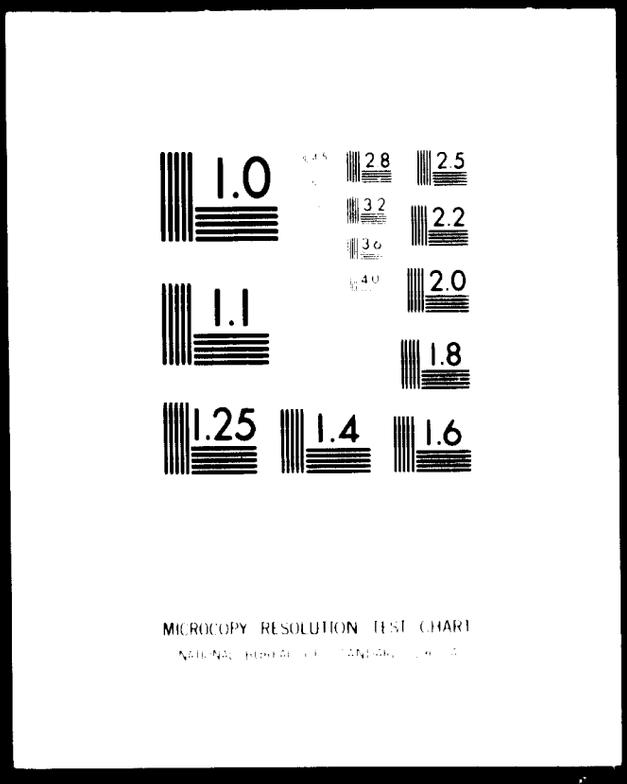

Khaleei, Shiraz

Production programme:
Trailers, capacity 30 pcs/year (production in 1349 - 10 pcs)
Channel diggers, capacity 15 pcs/year (production in 1349 - 5 pcs)

Iran Technick, Tabriz

Production programme:
Threshing machines, capacity 150 pcs (production in 1349 - 2 pcs)
Trailers 3 and 6 tone, hydraulic tipper - capacity 200 pcs (production in 1349 - 2 pcs)
Trailers 3 and 6 tons, manual tipper - capacity 100 pcs (production in 1349 - 1 pc)
Disc harrows with wheels, 24 and 32 discs, capacity 400 pcs/year (production in 1349 - ? pcs)
Disc harrows, without wheels 24 and 32 discs, capacity 300 pcs/year (production in 1349 - 3 pcs)
Harrows, capacity 300 pcs/year (production in 1349 - 1 pc)

Milani, Tabriz

Production programme:
Disc harrows with or without wheels, 24 and 32 discs, capacity 200 pcs/yea. (production in 1349 - 4 pcs)
Trailers 3 and 4 tons, capacity 120 pcs/year (production in 1349 - 3 pcs)

Alipour, Rasht

Production programme:
Manual threshing machines, capacity 900 pcs/year (production in 1349 - 30 pcs)
Sprayers - capacity 200 pcs/year (production in 1349 - 8 pcs)
Barley driers - capacity 800 pcs/year (production in 1349 - 20 pcs)
Peeling machines - capacity 500 pcs/year (production in 1349 - 20 pcs)

Ensaf, Rasht

Production programme:

Wheat threshing machines, capacity 200 pcs/year (production in 1349 - 60 pcs)
Rice threshing machines - capacity 900 pcs/year (production in 1349 - 144 pcs)
Oil seeds threshing machines - capacity 1500 pcs/year (production in 1349 - 240 pcs)
Rice driers - two sizes - capacity not given (production in 1349 - 0)
Trailers 1 ton - capacity not given (production in 1349 - 0)
Slough and half slough plows - capacity is not given
Harrows
Wheat pickers
Rice shovels

Hossein Zadeh and Dadkhah, Esfahan

Production programme:

Threshing machines capacity 50 pcs/year (production in 1349 - 20 pcs)
Rollers, two sizes, capacity 55 pcs/year (production in 1349 - 30 pcs)
Trailers, capacity 49 pcs/year (production in 1349 - 20 pcs)
Forrowers, capacity 70 pcs/year (production in 1349 - 50 pcs)
Channel diggers - capacity 40 pcs/year (production in 1349 - 20 pcs)
Harrows with wheels and without wheels - capacity 70 pcs/year (production in 1349 - 40 pcs)
Disc harrows - capacity 180 pcs/year (production in 1349 - 120 pcs)

Husseinzadeh, Esfahan

Production programme:

Threshing machines, capacity 60 pcs/year (production in 1349 - 20 pcs)
Disc harrows - capacity 140 pcs/year (production 110 pcs/year)
Harrows with or without wheels - capacity 55 pcs/year (production in 1349 - 40 pcs)
Channel diggers - capacity 40 pcs/year (production in 1349 - 18 pcs)
Forrowers - capacity 60 pcs/year (production in 1349 - 45 pcs)
Rollers - two sizes, capacity 55 pcs/year (production in 1349 - 40 pcs)
Trailers - capacity 40 pcs/year (production in 1349 - 20 pcs)

achinery, Esfahan

Production programme:

Threshing machines, capacity 40 pcs/year (production in 1349 - 18 pcs)

Trailers - capacity 30 pcs (production in year 1349 - 20 pcs)

Rollers - two sizes - capacity 42 pcs/year (production in 1349 - 20 pcs)

Forrowers - capacity 55 pcs/year (production in 1349 - 50 pcs)

Channel diggers - capacity 35 pcs/year (production in 1349 - 15 pcs)

Harrows with or without wheels - capacity 95 pcs/year (production in 1349 - 45 pcs)

Disc harrows - capacity 120 pcs/year (production in 1349 - 100 pcs)

Maintenance and Reparishops for Agricultural Machinery

Sanguin Truck, Esfahan

Pordakhti, Kermanshah

Yousef Shahi, Shahabad

Yousef Shahi, Zohab

Karolian, Hamedan

Keshman Co. Ltd., Hamedan etc.

Even when we take into consideration that some firms exaggerated their capacity more than ten-times, it is seen that the existing capacity is not well utilized. Details about production of all kinds of trailers (industrial as well as agricultural) see Trailers.

It is estimated that total production of agrioultural machinery and equipment (except tractors and trailers) in 1348 (1970/1) was approx. 6000 tons and the import was 7667 tons (see import of agrioultural machinery). Based on these assumptions the forecast of demand and production of agricultural machinery is as follows:

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand of Agricultural Machinery	tons	19,600	29,400	41,200	55,000
Production of Agrioultural Machinery	tons	10,200	21,800	33,500	49,200

The existing capacity should be in the sixth five-year plan substantially enlarged to cover maximum of demand.

4.06 [illegible]

Classification of Compressors

Compressors are used for compressing the air and other gases. They could be classified in different ways - either from the point of view of type, use, working pressure, drive etc.

1. Classification according to the type: Piston compressors - single or multicylinder compressors in line or balanced-opposed compressors, single- or double-acting compressors, single-stage or multi-stage compressors, diaphragm compressors, centrifugal compressors, rotary compressors, helical screw compressors etc.

2. Classification according to the use: air compressors, oxygen compressors, compressors for other gases, charging compressors, starting compressors, refrigerator compressors etc.

3. Classification according to the working pressure: low-pressure compressors up to 6 atmospheres and high-pressure compressors-over 6 atmospheres.

4. Classification according to the drive: hand operated compressors, diesel powered compressors, electric motor-driven compressors, etc.

Imports of Compressors

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
828-1	Air pumps	pcs	2398	17991	34584	39258	39316	5708
		tons	47,8	49,1	46,5	128,8	76,7	21,7
828-3	Air and gas compressors	pcs	9119	9349	18853	25420	20109	33652
		tons	691,4	1461,0	1294,8	1845,4	1099,9	1583,0
828-7	Dye sprinkler compressors	pcs	353	53	5101	367	143856	-
		tons	4,5	5,6	41,0	16,7	1315,6	-
828-11	Parts of compressors, blowers, ventilators	tons	876,7	1442,7	2486,8	6346,8	2033,1	2174,6
Total		tons	1560,4	2958,4	3869,1	7337,7	4525,3	3779,3

Source: Foreign Trade [illegible] of Iran.

Imports of tyre pumps see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part II-2 Automobile Industry, imports of refrigerator compressors see Part II-4 Electrical Engineering.

At present time, there are only two producers of small piston air compressors in Iran:

Technopol Co. Esfahan

It is a workshop producing small mobile piston air compressors, capacity approximately 4 cu. m./hour, max. pressure 6 atmospheres for tyres inflating, spraying colours etc. According to the Iranian Industrial Statistics, Bureau of Statistics of the Ministry of Economy, the production in 1347 (1968/9) was 158 pieces.

Metallurgical and Engineering Plant in Tabriz

Metallurgical and Engineering Plant in Tabriz will produce according to the detailed project report small mobile and stationary compressors, having capacity 6 cu.m. per hour and pressure 6 atmospheres. The capacity of this plant is 1000 pcs/year in one shift operation.

It is estimated that the production will start in the year 1353 (1974/5) most probably in collaboration with British firm Comprair. The production programme will embrace more sizes of piston compressors from small up to medium sizes. It is estimated that the full capacity will be reached after the year 1356 (1977/8).

Classification of Imported Air and Gas Compressors, Tariff No. 828-3, According to the Weight

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
Class I - up to 100 kg	pcs	8328	7965	17038	22472	17614	30220
Class II- over 100 kg up to 500 kg	pcs	691	1255	1710	2625	2054	3080
Class III- over 500 kg	pcs	100	129	105	323	541	342
Total	pcs	9119	9349	18853	25420	20109	33652

The above given classification has been made by the author of this study on the base of the Foreign Trade Statistics of Iran.

Class. I includes not only small piston air compressors up to the pressure 6 atmospheres for tyres inflation, colours spraying etc. but also spare compressors for minibuses, buses, trucks and tractors (but without those, supplied with complete engines).

In Class. II are given mostly medium size piston air compressors, stabile as well as mobile used for pneumatic tools like rock drills, pick hammers, peaving breakers etc., compressors for starting big diesel engines and compressors in small compressor houses.

Class. III contains biggest compressors of all types.

Forecast of Demand, Production and Shortage of Air and Gas Compressors

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Class. I* (up to 100 kg)					
Demand	pcs	14400	21500	30000	38000
Production	pcs	250	1000	10000	20000
Shortage	pcs	14150	20500	20000	18000
Class. II (100 up to 500 kg)					
Demand	pcs	3150	5400	8400	11700
Production	pcs	-	-	3000	6000
Shortage	pcs	3150	5400	5400	5700
Class.III (over 500 kg)					
Demand	pcs	430	800	1360	2200
Production	pcs	-	-	-	-
Shortage	pcs	430	800	1360	2200

* Without compressors for minibuses, buses, trucks and tractors. Forecast of compressors for automobiles and tractors see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part II-4 Automobile Industry.

The above given forecast has been made by the author of this study partly on the basis of growth rates applied to imports in the years 1345 (1966/7) until 1350 (1971/2) - class. I, partly on projected growth of different kinds of industries which [illegible] air and gas compressors like mining and non-metallic mineral products industries, chemical industry, basic metal industry, etc.

From the above given forecast it is seen that it is feasible to start the production of air compressors in the Metallurgical Engineering Plant in Tabriz, or better in a new, specialized plant.
New plant could be specialized not only in the production of stabile and mobile piston air compressors of small and medium size (class. I and class. II), but also in the production of compressors for buses, minibuses, trucks, tractors etc. (see Part II-4 Automobile Industry)

4.07-4.09 PUMPS

Pumps may be divided into many different types, according to the following points:

According to the liquid transported there are water pumps, pumps for contaminated water, for sewerage, for oils, chemicals, etc.

According to the mechanism of liquid transportation, there are piston pumps, diaphragm pumps, centrifugal pumps (one and multi-stage) rotary pumps, hydraulic vane pumps, jet pumps, etc.

According to the drive (operation) there are hand operated pumps, electric driven pumps, turbine driven pumps, etc.

According to the temperature of liquid transported there are pumps for normal temperature and high temperature.

According to the working pressure, there are low pressure pumps, medium pressure pumps and high pressure pumps.

According to the special design, there are for example, deep well pumps, mine pumps, etc.

Pumps mostly used in Iran are water pumps either hand operated or driven by electric motor or diesel engine mostly of centrifugal type; also deep well pumps are very often used.

4.07 HAND PUMPS

There are many small shops producing hand operated water pumps in Iran at present. Total quantity of hand pumps produced in Iran in the last year is not known, but it is estimated that it is in the range of 5000 pcs/year.

Some hand pumps are being imported up to now.

Import of Hand Pumps

			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
827B3-1	Hand Pumps	pcs	11,218	8,420	10,084	4,952	5187	8304

Source: Foreign Trade Statistics of Iran.

It is assumed that there will be no growing market for hand pumps in the future. To cover all needs of the Iranian market the existing shops should be expanded or new, modern factory with a capacity of approx. 5000 pcs/year should be built.

4.08 MOTOR WATER PUMPS

Motor water pumps used in Iran are mostly one or multi-stage centrifugal pumps. They are used not only for agricultural irrigation, but also in factories, dwelling houses, etc. There are no data given on the total number of water pumps used in factories and dwelling houses, only the number of pumps for agricultural irrigation is known. According to "Water requirements for Agricultural Irrigation in Iran" by the Stanford Research Institute the number of wells for agricultural irrigation and average depth of wells by regions in 1348 (1969/70) was:

Region	River pumps	Shallow Wells		Semi-Deep Wells	
		Number	Average Depth	Number	Average Depth
Azarbayjan	200	3380	7	1080	19
Esfahan	100	-	-	1650	17
Teheran	-	-	-	2940	23
Khorrasan	50	350	7	1000	24
Khuzestan	1920	-	-	-	-
Kermanshah	530	-	-	2380	12
Fars	310	-	-	8430	21
Kerman	-	2[illegible]0	7	2520	25
Caspian	460	1[illegible]0	8	5760	2[illegible]
Total	3580	6[illegible]	-	25760	-

Forecast of River Pumps, Shallow Wells and Semi-Deep Wells for Agricultural Irrigation (according to the Stanford Research Institute).

	1348 (1969/70)	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)
River Pumps	3580	4150	5300	6800
Shallow Wells	6050	7000	8940	11410
Semi-Deep Wells	25760	29820	36690	45340
Total	35390	40970	50930	63550

Import of Motor Water Pumps

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
827B2-2 Motor pumps with dia. of more than 3", motor 3/5 HP and above, 3-phase current	-pcs	10,133	10,738	8,973	3,729	4789	7711
	-kg	4,995,076	4,177,522	3,116,441	1,108,763	747274	991468
	-1000 Rls.	576,571	489,672	363,342	158,011	126575	187811
827B3-2 Pumps for liquids not listed elsewhere	-pcs	25,722	54,956	50,826	25,290	20086	20174
	-kg	348,234	484,107	575,869	411,456	380648	686553
	-1000 Rls.	69,194	97,818	119,937	103,440	73542	146673

Source: Foreign Trade Statistics of Iran.

In Tariff No. 827B3-2 are given motor driven water pumps with suction pipe dia. less than 3", or with motor less than 3/5 HP or with single-phase electric motor. The majority of these water pumps is used for desert coolers-small pumps with single phase electric motor 1/60 up to 1/25 HP. It would be feasible to produce these pumps incl. electric motors in Iran.

Tariff No. 827B3-2 Estimated Import of Pumps for Desert Coolers and of Other Pumps

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)
Pumps for desert coolers	pcs	16,577	48,270	43,348	19,761
	kg	58,047	114,079	124,760	114,280
	1000 Rls.	16,374	39,098	41,992	34,262
Other Pumps	pcs	9,145	6,686	7,478	5,529
	kg	290,187	340,028	451,109	297,176
	1000 Rls.	52,820	58,720	77,945	69,178

"Other Pumps" are mostly small centrifugal pumps which might be produced in the Metallurgical Engineering Plant in Tabriz.

The imported quantity of pumps for desert coolers is small in comparison with production of desert coolers; either some coolers are without pumps and/or some pumps are given under Tariff No. 827B3-4 - "Parts of Pumps not listed elsewhere".

Forecast of Demand of Centrifugal Water Pumps

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
River pumps	new	190	300	380	480
	replacem.	350	440	560	720
Shallow wells	new	320	400	500	650
	replacem.	580	750	960	1220
Semi-deep wells	new	1360	1730	2200	2830
	replacem.	2480	3050	3900	5000
Centrifugal pumps in factories and dwelling houses	new	800	1000	1100	1200
	replacem.	4800	5500	5500	6200
Total		10840	13170	14900	18300

Production of Water Pumps in Iran

		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)
Water Pumps	pcs	4890	6398	3803	5951

Source: Research Centre for Industrial and Trade Development of the Ministry of Economy.

Metallurgical and Engineering Plant in Tabriz started in 1350 (1971) production of centrifugal water pumps, suction dia. 2" up to 10"; projected capacity is 10,000 pcs/year and will be reached in 1353 (1974/5). With existing capacity in shops producing already centrifugal pumps the production in Iran will cover the needs up to approx. 1355 (1976/7). After this year either Metallurgical and Engineering Plant in Tabriz will start the production in the second shift, or new capacities will be at disposal in existing workshops.

4.09 DEEP WELL PUMPS

Deep well pumps are very often used in Iran for irrigation purpose, in factories as well in dwelling houses.

Number of Deep Wells for Agrioultural Irrigation and Average Depth of Wells in 1346 (1967/8)*

Region	Number (pcs)	Average Depth (m)
Azerbayjan	298	63
Esfahan	587	57
Teheran	2700	90
Khorrasan	2628	58
Khuzestan	-	-
Kermanshah	244	62
Fars	524	50
Kerman	903	76
Caspian	1146	45
Total	9030	

* According to the "Water Requirements for Agrioultural Irrigation in Iran 1967-1982" by the Stanford Research Institute.

There are no data giving the total number of deep wells used in factories and in dwelling houses.

Import of Deep Well Pumps

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
827B2-1 Deep Well Pumps	pcs	2671	2731	1511	1462	747	306
	tons	5048,6	3061,5	1960,1	850,5	182,9	134,4
827B2-3 Parts of Deep Well Pumps	tons	2031,2	801,7	2511,3	1157,4	429,3	1306,6

Forecast of Deep Wells for Agricultural Irrigation*

		1346 (1967/8)	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)
Deep Wells	pcs	9030	11,590	14,790	18,880

* According to the "Water Requirements for Agricultural Irrigation in Iran 1967-1982" by the Stanford Research Institute.

There are two firms, producing deep well pumps in Iran:

Peerless Co., Teheran

The production started in 134[illegible] (1970). The capacity of the plant is 1500 pcs/year. The production in 1350 (1971/2) was approx. 600-700 deep well pumps with mechanical drive (gear box).

The factory intends to start the production of submerged electric deep well pumps.

Omran Co., Esfahan

This workshop is producing deep well pumps; parameters as well as capacity of the workehop are not known.

Forecast of Demand of Deep Well Pumps

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Deep well pumps for agricultural irrigation	new	500	640	810	940
	replacem.	600	780	990	1260
Deep well pumps for factories and dwelling houses		600	750	900	1000
Total		1700	2170	2700	3200

In the above given data electric submerged deep well pumps (mostly in factories and dwelling houses) are included, which are not yet produced in Iran. The existing factories should expand their production programme as well as their capacity.

Forecast of Production and Shortage of Deep Well Pumps

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Production	pcs	1400	2000	2600	3100
Shortage	pcs	300	170	100	100

4.10 HYDRAULIC TURBINES

As already given in "Production of Elsotric Energy", hydro power plants are playing big part in the electric utilities under Ministry of Water and Power Management.

Hydro Power Stations of Iran Power System (Ministry of Water and Power Management)

		1347 (1968/9)	1348 (1969/70)	1349 (1970/1)
Number of hydro generation stations		4	4	5
Installed capacity of hydro gener. stations	MW	309	462	517
Percentage of total installed capacity	%	30.7%	35.2%	36.9%
Generation - hydro gener.stations	MWh	854756	1335739	1,670,932
Percentage of total generation	%	35.7%	42%	39.4%

Source: the Ministry of Water and Power.

Turbine Characteristics of Hydro Electric Power Stations in Operation (without small units)

Hydro Electric Power Plant	Year Starting Operation	Characteristic of Turbine					No. of Units	Total Output MW
		m	cu.m	rpm	Type	Output HP		
Mohammad Rezashah Pahlavi Dam	1348 (1969)	154	49	250	V.F.	90,000	4	260
	1350 (1971)	154	49	250	V.F.	90,000	4	260
Amir Kabir Dam	1340 (1961)	147	35	300	V.F.	60,000	2	91
Shahbanou Farah Dam	1347 (1968)	63	34	250	V.F.	25,000	5	87.5
Farahnaz Pahlavi "	1348 (1969)	50	54	166.7	V.F.	32,000	1	22,5
Shah Abbas Kabir "	1349 (1970)				V.F.	24,500	3	55.2
Aras Dam	1349 (1970)				V.F.	15,000	2	22
Shahpour Dam	1350 (1971)				V.F.	4,250	2	65.8
Darius Kabir Dam	1350 (1971)				V.F.	14,000	1	10
Kurosh Kabir Dam	1350 (1971)				V.F.	14,000	1	10

V.F. = Francis turbine with vertical shaft.

New Hydraulic Power Stations Under Construction

Hydro Electric Power Plant	Output KW	Remarks
Farahnaz Pahlavi Dam	22,500	1 unit 22,500 KW already in operation
Reza Shah Kabir Dam	1,000,000	
Jiroft Dam	15,000	
Lar Dam	140,000	

All these hydro electric power stations will be completed up to 1357 (1978/9) or 1358 (1979/80). Till now there are no new projects from year 1358 (1979/80) onward.

Import of Hydraulic Turbines

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
824-1 Hydraul. turbines and engines	pcs	38	16	29	1	1	1
	tons	62,6	463,2	350,3	231,0	0,2	0,1
824-2 Parts of hydraulic turbines & engines	tons	449,0	211,0	268,9	721,2	109,8	72,4

Source: Foreign Trade Statistics of Iran.

Forecast of the Installed Hydro-Electric Power

	1351 (1972/3)	1356 (1977/8)
Installed hydro-electric power MW	803	1823

Source: The Fifth Five-Year Plan.

From the above given data and from estimated demand for next years it is seen that it is not possible to produce hydraulic turbines in Iran now as well as in the future; only few simple items for completion of hydraulic power plants like thrash racks etc. could be produced in Iran. It is possible to solve the production of hydraulic turbines in the frame of RCD countries as joint venture plant (most probably built in Turkey).

4.11 VALVES AND FITTINGS

Classification of Valves and Fittings

Valves are used for regulating the flow of liquids or gases in pipelines which pass through them. They could be classified in different ways - either from the point of view of use, or the working pressure, the inner diameter, the type, the shape, the control etc.

1. **Classification According to the Use**

There are two main groups of valves and fittings.
- Non Industrial Valves, taps and fittings used in household (kitchen, bathroom, toilet, for central heating etc), mostly made of non-ferrous metals, the inner dia up to 2".
- Industrial valves and fittings used in different kinds of industries.

2. **Classification According to the Working Pressure**

Low pressure valves and fitting - approx. to 10atm working pressure
Medium pressure valves and fittings - approx. 10 atm to 60 atm working pressure
High pressure valves and fittings above 60 atm working pressure

3. **Classification According to the Raw Material Used for Valve Casting**

Cast iron for low pressures and small or medium inner diameters
Cast steel for medium pressures and medium or big inner diameters
Cast stainless steel for chemicals
Non ferrous castings for household valves and fittings, for chemicals
Forged steel - for highest pressures and temperatures.

4. **Classification According to the type**

Gate valves - used mostly for control of water or other liquids
Globe valves - used mostly for control of steam
Safety valves for control of steam and gases under pressure
Stop valves - for control of liquids as well as gases.

Check valvee - ueed mostly in vertical pipelines

Lift check valves - preventing automatically the reverse flow

Swing check valves - used for different kinds of liquids or gases

Gogle valves - used for different kinde of gases at low pressure trottling"

Non-return valves (flap valves)

Regulating gate valves - regulating the quantity of water or other liquids

Aerating and deaerating valves - used for water or other liquids

Pressure reducing valves - for steam or gasee

Two-way and three-way valves, ohange valves, mixing valvee

Cocks and flug valves, pressure gauge cooke

Foot valves and strainers

Float valvee

Taps, faucets

Hydrants with covers etc.

Fittings: Suction strainers

Rubber compensators, mounting adapters, stuffing box compensators

Gas filters

Expansion joints

Condensing loops

Steam traps, separators and strainers

Water level indicators, sight windows

Other fittings like flanges, hande, elbows etc. eee respective chapters

5. Classification According to the connection of Valves to the Pipeline

Flanged ends

But weldi..g ends

Sorswed male connection

6. Classification According to the Control

Valves controlled by hand

Valves controlled by electric hydraulic or pneumatic power cylinder

Diaphragm valves etc.

The main parameters of valve or fitting are: 1) working pressure
2) inner diameter

From the technological (production) point of view the classification according to the use and according to raw material are the main criterion.

There are no data about the import of non-industrial and industrial valves and fittings because they are not a self-contained categories in the Foreign Trade Statistics in Iran.

Imports of Valves and Fittings

Import Tariff #		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
855-1 Metal taps	tons	2,136,4	2,453,3	3,284,7	3,306,9	2,244,0	2927,5
	1000 Rls	260,316	369,438	406,192	547,451	332,009	452,472
855-2 Metal cocks (liquid flow regulating)	1000 Rls	296,766	315,753	665,176	779,565	602,139	645,626
	tons	1,701,5	1,639,8	4,055,1	4,157,7	2,459,5	2750,2
855-4 Fluid control equipment not listed elsewhere	tons	1,050,0	1,072,8	1,436,4	1,407,1	976,5	1583,3
	1000 Rls	155,965	164,384	198,117	252,263	210,849	297,942
Total	tons	4,887,9	5,165,9	8,776,2	8,871,7	5,680,0	7,269,0
Total	1000 Rls	713,047	849,575	1,269,485	1,579,279	1,144,997	1,396,040

Source: Foreign Trade Statistics of Iran.

Non-Industrial Valves and Fittings

As already mentioned non-industrial valves and fittings are small valves, taps, faucets made of non-ferrous metals for households, social amenities etc.

According the use and shape, they are:

1. Valves, taps, fittings for cold water for example simple valves for kitchen, valves and fittings for water closets, pissoirs, sinks, etc.
2. Valves, taps, fittings for hot water or hot and cold water - for example mixing bateries for kitchen, bathrooms, lavatories (wash basins), bidets etc., sluice valves for radiators for central heating etc.
3. Valves, taps, fittings for gases, mainly for natural gas.

4. Fittings for sewerage - like sinks etc.

All above given valves, taps, fittings etc. are mostly made of brass, only small quantity is made of grey iron castings. Mostly are used sizes from ¼" up to 3/4", the maximum sizes 2".

There are three factories, producing the above given products on medium scale and plenty of small shops, producing them on small scale.

Iran Valve Co., Teheran

The factory was established in 1342 (1963/4) Production programme: simple water valves and sanitary fittings made of brass. Capacity of the plant: 440,000 pcs/year, in the second stage production will be enlarged up to 850,000 pcs/year.

Bronze Industrial Group Teheran

The factory was established in 1347 (1968/9) Production programme: water valves and sanitary fittings made of brass. Capacity of the plant: 2500 tons/year in one shift, the production will reach in 1351 (1972/3) approx. 1000 tons.

Sherkate Kulate Dorosti Teheran

This firm is producing mostly industrial valves and fittings, but the smallest products made of brass are intended for non-industrial use (valves inner dia 2").

Mesgar Co. Teheran

Production programme: globe and check valves for water, rated dia ½" and 3/4" made of hot stamped brass. The production started in 1350 (1971) and in 1351 (1972) reached the factory the full capacity i.e. 500 pcs/1 shift.
There is a possibility to extend the production by additional shift or by additional equipment.

Calculation of Demand of Non-Industrial Valves

For Household

It is estimated that the consumption of all kinds of valves, taps, mixing batteries incl. central heating and gas mains for one modern flat will be in the future as follows:

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Consumption of valves per one flat Kg	25	26	27	28

Based on this ratio the demand will be:

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Consumption of valves and fittings-tons	2,500	4,360	7,210	11,200
Replacement approx.10% -tons	250	440	720	1,120
Total	2,750	4,800	7,930	12,320

Public Construction

1. Housing & city building

The calculation of demand is based on this ratio of valves, taps etc per 1000 sq. m.

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Valves taps etc. per 1000 sq.m. - kg	72	75	78	80

The demand of valves, taps etc. for housing and city building will be :

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Consumption of valves and fittings-tons	438,2	719,1	1,351,9	2,167,0
Replacement approx. 10% -tons	43,8	71,9	135,1	216,0
Total -tons	482,0	791,0	1,487,0	2,377,0

2. Industry

The calculation of demand is based on the ratio of 10 kg valves, taps etc. per 1000 sq.m.

The demand of valves, taps etc. for industry (public construction) in tons:

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Consumption of valves and taps etc.-tons	34	66	128	203
Replacement approx. 10% -tons	4	7	13	20
Total -tons	38	73	141	223

Industrial Valves and Fittings

For estimation of demand of industrial valves and fittings, it is necessary to break up investments in different industries. This has been already done in "A Project for the Production of Chemical Machinery and Equipment in Iran with Annual Capacity of 9000 tons in the First Stage and 15000 tons in the Second Stage of Construction" prepared by Eng. J. Semsch, Eng. M. Mohseini and Eng. Sohanaki.

Total New Investment During the Fifth Five-Year Plan According to the Research Centre for Industrial and Trade Development of the Ministry of Economy with Estimated Value of Industrial Valves and Fittings According to the Author of This Study

	Total New Investment 10^6 Rls.	Valves and Fittings % of New Investm.	Valves and Fittings Value 10^6 Rls.
Food, beverage, tobacco manufacturing industries	51000	1,6 %	820
Textile, footwear and wearing apparel industries	59100	0,15 %	89
Manufacture of leather and leather products	13000	0,12 %	16
Manufacture of chemicals and chemical produots	110500	3,7 %	4040
Non-metalic minerals products industries	18400	0,3 %	55
Basic metal industries and metal products industries	169500	8,2 %	339
Manufacture of machinery, electrical and transport equipment	104400	0,1 %	104
Other industries	5500	0,2 %	11
Mining	98000	0,2 %	196
Total			5670

Total Demand of Industrial Valves and Fittings in the Fifth Five-Year Plan in Million Rials

	Value Million Rials
The above given industries	5670
Oil industry *	3000
Power Stations *	430
Town water mains and irrigation *	1900
	11000

* see A Feasibility Study for the Production of Industrial Valves and Fittings in Iran with Annual Capacity of 4050 tons/year.
The above given value is including small valves, given in non-industrial valves and fittings.

Forecast of Demand, Capacity, Production and Shortage of Industrial Valves and Fittings in Tons

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	8200	14600	21600	30600
Capacity	tons	-	-	7000	14000
Production	tons	-	-	7000	14000
Shortage	tons	8500	14600	14600	16600

Using 1356 (1977/8) as the base and the historical annual rate of increase of demand, figures for the years 1361 (1982/3) and 1366 (1987/8) were extrapolated by the author of this study.

It is advisible to start in the fifth five-year plan the construction of a new plant with the capacity of 7000 tons per annum of industrial valves and fittings and to extend it in the seventh five-year plan. The plant should be built with own foundry and forge shop.

Industry and Trade

The caloulation of demand is based on the same ratio of valves, taps, etc. per 1000 sq.m. i.e. 10 kg/1000 sq.m.

The demand of valves, taps etc. for industry and trade (private oonstruction) in tons

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Consumption of valves & taps etc.	22	42	74,4	118
Replacement approx. 10%	2	4	7,6	12
Total	24	46	82,0	130

Recapitulation of Demand of Non-Industrial Valves, Taps etc.

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Households	tons	2,750	4,800	7,930	12,320
Housing & city building (public oonstr.)	tons	482	791	1,487	2,377
Industry (publio oonstr.)	tons	38	73	141	223
Industry and trade (private oonstr.)	tons	24	46	82	130
Total		3,294	5,600	9,640	15,050

The existing theoretioal capaoity approx. 3200 tons/year in 1351 (1972/3) oould oover the whole demand of non industrial valves, taps, fittings eto. but it is estimated that the produotion will be approx. 1700 tons/year, e.i. approx. 1600 tons/year sould be imported. After expansion of Iran Valve Company Teheran the produotion could reaoh 3700 tons/year in 1356 (1977/8) i.e. there is a need of new capaoity approx. 1900 tons/year in the fifth five-year plan, 4000 tons/year in the sixth five-year plan and 5400 tons/year in the seventh five-year plan.

4.12 SHIP BUILDING AND REPAIR

The growing importance of the coastal and sea transportation and commercial fishing in Iran is raising the question of ship building.

A few years ago, there was no production of ships and boats except small ships made of wood for fishing; the other ships and boats were imported.

Import of Ships - According to the Foreign Trade Statistics

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
903-1	Seagoing vessels	pcs	1	-	1	1	-	5
		tons	200	-	445.5	230.0	-	15.8
903-2	Components of seagoing vessels	tons	3.7	1.7	16.3	24.5	14.7	6.5
904-1	Tugs	pcs	1	8	8	2	1	2
		tons	59.0	863.2	968.9	148.0	57.4	609.5
904-2	Components of tugs	tons	0.7	0.2	4.0	0.1	5.0	12.4
905A11	Engined boats for private use	pcs	29	36	26	37	48	8
		tons	14.9	11.8	10.9	18.2	24.4	30.8
905A12	Parts for privately used engined boats	tons	2.2	-	25.8	3.2	0.2	0.6
905A21	Other engined boats	pcs	12	11	18	15	4	1
		tons	139.9	43.8	80.2	38.0	66.7	0.5
905A22	Parts for other engined boats	tons	1.0	-	0.5	-	0.3	113.8
905B1	Sailing boats, not seagoing	pcs	2	5	11	3	1	1
		tons	0.2	15.8	2.2	10.3	0.5	0.1
905B2	Parts of sailing boats	tons	-	-	0.1	-	0.2	-
905C1	Other passenger boats, not seagoing	pcs	7	21	8	1	26	10
		tons	0.6	37.8	1.7	0.1	1.3	0.6
905C2	Components of other pass. boats	tons	-	0.5	6.0	-	37.7	3.8
906A1	Metal freight-carrying boats not seagoing	pcs	5	19	11	20	8	6
		tons	755.0	2349.9	2800.3	3239.0	869.7	264,6

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
906A2	Components of freight carr. boats	tons	2.4	3.8	117.6	0.2	32.6	136.2
906B1	Wooden freight carrying boats not seagoing	pcs	13	11	13	10	5	6
		tons	151.0	907.5	295.0	73.5	48.0	78.0
906B2	Components of wooden boats	tons	-	-	25.0	0.2	0.7	10.0
907-1	Specialized vessels	pcs	3	2	4	9	2	1
		tons	6030.0	305.4	318.6	70.2	12.3	12.8
907-2	Components of speoial vessels	tons	0.1	3.5	4.4	30.0	180.0	0.2
TOTAL		pcs	71	105	100	98	95	40
TOTAL		tons	7360.1	4548.7	5123.0	3885.5	1316.0	1296.2

Existing Ship Building Plants

There are 5 firms producing or repairing ships and boats on medium scale (see below) and unknown number of small workshops, producing ships and boats on small scale. Also both fishery companies in Iran-Northern Iranian Fisheries in Bandar Pahlavi and Southern Fishery Company in Bandar Abbas have their own ship building and ship repairing shops.

1. Keshti Sazi Iran Khoramshahr

The firm got licence for production of 17,000 tons/year of different kinds of ships and boats, expandable up to 27,000 tons/year. The production in 1349 (1970/1) was 60 pcs of fiber glass pleasure boats, 1 pc of barge, and 1 po sea bus for 60 passengers.

2. Sherkate Vasaele Dariaie Chaloos

The licence was issued for Chaloos, but the workshop is in Teheran. The production in 1349 (1970/1) was 40 pcs of wooden boats and 70 pcs of aluminium pleasure boats.

3. Sherkate Sahamie Khasse Sanaie Dariaie Iran Busher (Iran Marine Industrial Co., Busher.

This firm got licence for production of sea platforms - 4 pcs/year, bargee - 2 pcs/year and ships - 1 pc/year. The production in 1349 (1970/1) was: barge @ 600 tons - 2 pcs, dragger 55HP - 1 pc and 1 ship (capacity not given).

4. Basco Co. - South Iran

This is floating ship service station, operating in Persian Gulf.

5. Anatabadi Bandar Abbas

This firm got licence in 1350 (1971) for production of metal freight-carrying boats @ 60 tons - 10 pcs/year and @ 160 tons - 10 pcs/year. The production will start most probably in 1352 (1973/4).

In the last years, there were issued 4 licensee for the production of different kinds of ships and boats, but the firms have not started the production yet.

The issued licensees and existing capacities are sufficient to cover in the future most of the demand of not seagoing ships, boats etc. For their completion might be used materials as well as subdeliveries produced in the country (wood, plastics, steel shapes, aluminium profiles, diesel engines, cables, etc.).

It is not advisable to start the production of seagoing ships, boats etc. in next years. There are no good conditions for such a production, as there are no major materials available as well as subdeliveries in Iran (hot rolled steel sheets, diesel engines, etc.)
For completion of big seagoing ships and boats there are needed thousands of subdeliveries, which are 90% not available in the country.

4.13 TRANSMISSION TOWERS, MICRO-WAVE TOWERS, POLES ETC.

Till now there is only occasional production of transmission towers and poles made of steel for lighting etc. Polee made of steel tubes are made for example by Sepanta Co., Teheran of rejected pipes produced by the factory. According to the Ministry of Economy, Bureau of Statistics, the production of electric lamp metal poles in 1347 (1968/9) was 9173 pcs., total value of production 11.941.000 Rls.

Forecast of Demand of Transmission Towers, Micro-Wave Towers, Poles etc.

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Transmission towere(1)	tons	12,892	16,850	17,470	17,022
Electric Poles for railway(2)	tons	-	525	788	1,050
Micro-Wave Towers, Electric Lamp Metal Poles-approx.	tons	3,108	3,625	4,242	4,92
		16,000	21,000	22,500	22,000

(1) See Transmiseion lines (2) See Electrification of Railwaye.

Produotion of towers for high tension transmission lines was planned in Machine Building Plant in Arak, but in new production programme this item is canoelled and replaced by other items as the price ex factory was high compared with imported transmission towers.

The demand of high tension transmiseion towers is big enough for economical production. The production should be proposed in the frame of bigger complex like Machine Building Plant in Arak or other new unit, having the same machinery and equipment, mainly the hot dip galvanizing equipment or metallization melloeing.

Forecast of Demand, Production and Shortage of Tranemission Towers, Micro-Wave Towers, Poles eto.

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	16000	21000	22500	22000
Production	tons	2000	18000	21000	21000
Shortage	tons	14000	3000	1500	1000

New capacity should be built in the fifth five-year plan.

4.14 BLACK TOOLS

Black tools, i.e. spades, shovels, hoes, picks, axes, hatchets, hammers, rakes, pliers, pincers, spanners, levers etc. are partly imported, partly produced in Iran.

Imports of Black Tools

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
741-1	Spades, shovels, hoes	tons	700,9	327,5	760,6	427,6	489,4	365,9
741-2	Picks, mattocks	tons	192,8	367,7	380,7	271,7	301,4	189,0
741-3	Rakes, forks	tons	101,3	151,7	262,6	124,0	49,4	98,0
742	Axes, hatchets, cleavers	tons	1,6	24,1	38,1	22,8	42,4	18,8
743	Scythes, weeding hooks, straw cutters	tons	16,1	16,7	46,6	54,0	75,1	107,6
744A1	Sledge hammers	tons	99,4	128,7	39,0	247,6	287,7	146,7
744B	Hammers, adzes	tons	69,9	65,9	138,7	82,5	141,7	66,8
746-1	Pliers, pincers, wrenckes, chisels	tons	139,2	175,3	289,4	365,3	291,9	241,4
746-2	Spanners	tons	230,0	252,9	183,4	241,8	356,5	362,9
746-3	Cliffers	tons	6,0	9,1	5,4	5,2	10,4	29,5
747	Files, rasps	tons	61,6	87,2	80,0	106,7	98,6	65,1
751B	Levers	tons	67,4	60,8	118,1	0,6	4,0	-
Total		tons	1686,2	1667,6	2346,6	1949,8	2128,5	1691,7

Source: Foreign Trade Statistics of Iran.

Production of Black Tools in the Year 1347 (1968/9) in Iran

	1000 pcs	1000 Rials
Spades and picks	1324,9	51287
Sickles	4,3	157
Hammers, axes and adzes	597,6	20899
Total	1926,8	72343

Source: Iranian Industrial Statistics 1968, Bureau of Statistics of the Ministry of Economy.

Description of most important producers of black tools in Iran

Iran Abzar Co. Teheran

Iran Abzar Co. Teheran is the biggest producer of black tools in Iran. The production programme embraces forged as well as pressed black tools, carts and wheel-barrows, helves and handles for shovels, tyres for wheel barrows etc.

Forged black tools: mattocks (two sizes), hammers (three sizes), crowbars, levers, axes etc.

Pressed black tools: shovels (eight sizes), spades (six sizes), rakes etc.

The capacity of the factory is 2100 tons of black tools per year in one shift operation. The maximum weight of pressings is 1,5 kg, of die forgings 0,75 kg and of hammer forgings 20 kg.

The factory is well equipped with modern metal forming machines and machine tools. It consists of five shops:

- Pressing shop for the production of black tools made of metal sheets like shovels, spades, rakes etc.
- Forging shop for the production of forged black tools like mattocks, hammers, crowbars, axes, levers etc.
- Shop for the production of helves and handles for completion of shovels, hammers, axes etc.
- Shop for the production of carts and wheel barrows
- Shop for the production of tyres for wheel barrows and other components and parts.

Description of Machinery, Equipment and Processes in the Production of Black Tools in Iran Abzar Co.

Forging shop for the production of black tools is equipped with three pneumatic hammers the weight of ram being 125 kg each, one hammer with the ram weighing 700 kg, two eccentric presses their nominal pressure being 100 tons and 60 tons and one toggle lever press with the nominal pressure 500 tons. This forging line is equipped with one big oil-fired heating furnace and one smaller oil-fired reheating furnace.

Pressing shop for the production of black tools made of metal sheets has two continuous lines for cold and hot pressing of black tools, but only one is in operation.

Karkhaneh Sazi Hadidi Rezayeh

The production programme of this firm embraces tea-pots and other hollow ware and pressed black tools made of metal sheets like shovels, spades etc. The capacity as well as production of this firm is not known.

Forecast of Demand, Production and Shortage of Black Tools

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	5160	8400	13500	20500
Production	tons	2820	5100	8800	15000
Shortage (import)	tons	2340	3300	4700	5500

The above given forecast of demand of black tools has been made by the author of this study on the basis of growth rates applied to imports and production in the years 1345 (1966/7) until 1350 (1971/2).

It is estimated that the growth rates will be different for different kinds of black tools. Projected growth rates of demand of picks, mattocks, spades, shovels, axes etc. will be low as these hand tools will be in the future partly replaced by machines; the growth rates of demand of wrenches, pliers, pincers etc. will be high as these black tools will be used as special outfit of cars, buses, minibuses, trucks, motorcycles, machine tools etc.

It is advisable to extend the existing capacity (for example the capacity of Iran Abzar Co., Teheran could be extended by the second shift and new investment to 5200 tons per annum) and to build new plants, mainly for production of complicated black tools like pliers, pincers etc. Medium scale unit producing these black tools with best utilization of installed machinery and equipment has the capacity 1500-2000 tons per annum.

4.15 PNEUMATIC MACHINE TOOLS AND TOOLS

All pneumatic machine tools and tools like rock drills, pick hammers, wagon drills, paving breakers, crawler drills etc. are imported. Till now, there is no production of these machine tools and tools in Iran.

Import of Pneumatic Machine Tools and Tools

Tariff No.			(1966/7)	(1967/8)	(1968/9)	(1969/70)	(1970/1)	(1971/2)
848A1	Pneumatic machine tools	pcs	115	886	1316	2361	816	107
		tons	50,9	130,2	380,5	809,5	269,0	121,5
848A2	Pneumatic tools	tons	210,9	155,8	195,6	289,4	122,6	23,6
	Total	tons	261,8	286,0	575,1	1098,9	391,6	145,1

Source: Foreign Trade Statistics of Iran.

Buyers Groups	Rock drills	Pick hammers
Mining companies	29 %	11 %
Iranian National Steel Co.	24 %	31 %
Building contractors	30 %	11 %
Dealers, and others	17 %	47 %
Total	100 %	100 %

Forecast of Demand, Production and Shortage of Pneumatic Machine Tools

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand:					
Rock drills	pcs	620	980	1560	2340
Pick hammers	pcs	710	1380	2350	3700
Paving breakers	pcs	120	180	270	390
Others	pcs	10	20	40	70
Total demand	pcs	1460	2560	4220	6500
Capacity	pcs	-	-	4000	6000
Production	pcs	-	-	3200	5800
Shortage	pcs	1460	2560	1020	700

The above given forecast of demand of different pneumatic machine tools has been made by the author of this study on the basis of growth rates applied to imports in 1345 (1966/7) until 1350 (1971/2). Projected growth rates were derived by correlation with expected growth rates of mining activities, production of steel and construction of houses and other civil engineering activities.

It is advisable to start the production of pneumatic machine tools of different sizes on the medium scale in the sixth five-year plan and to extend it in the seventh five-year plan, or in the frame of small scale industry (only 2 up to 4 sizes) in the fifth five-year plan.

4.16 DUMPERS

Dumpers are special front tippers - trucks designed for transportation of soil, concrete mixture etc. for short distances; they are mostly used in civil engineering, construction of buildings etc.

There are four producers of dumpers in Iran at present.

Deltakar Co. Teheran

This factory is producing six different types of dumpers of own design.

Characteristics of Dumpers

Type	Engine	Length mm	Width mm	Height mm	Capacity kg.	
GM	Lister 7,5 HP	2600	1480	1070 1350 905	1000	Mechanical tilter
GMH	Lister 7,5 HP	2600	1480	1350 1130	1000	Hydraulic tilter
MD	Lister 15,5 HP	2850	1700	1580 1100	1800	Mechanical tilter
MH	Lister 15,5 HP	2850	1700	1850 1220	1800	Hydraulic tilter
MG	Lister 15,5 HP	2950	1685	1500 1200	1800	180° tilting (hydraulic)
MDT	Lister 23,5 HP	3120	1700	1540	2000	Mechanical tilter

There are new designs of dumpers with additional power shovel capacity 50 l or chassis of dumper is used for other purposes - hydraulic lifting equipment with working place for fitter (for example used for fitting electric lights etc.), crane with hydraulic lifting mechanismus etc. There are no data about the production of dumpers per year.

This factory is also producing concrete mixers, belt conveyors, vibrating screens etc.

Machine Koll, Technical Designing, Production Road and Construction Machineries, Teheran

This factory is producing one type of dumper of own design with following technical characteristics:

Capacity: 1000 l or 2000 kg
Engine: Lister, diesel, 3-cylinders, 23,5 HP, 1200-2000 RPM
Speeds: 4 - 5 km/hour; 8 km/hour; 12 km/hour; 20 km/hour;
1 reverse speed 4,8 km/hour
Dimensions: length 2,95 m; width 1,6 m; height 1,3 m
Weight: 1500 kg.

Production per year is unknown. This factory is also producing trailers, concrete mixers, reciprocating feeders, vibrating screens etc.

Sherkate Sanaye Machine

This workshop is producing dumpers, capacity 500 l. The firm is claiming that the production is approx. 50 pcs/year.

This firm is also producing concrete mixers.

Techno-Is Co. Teheran

The factory is producing different kinds of machinery and equipment, as dumpers, cement mixing machines, cranes, hydraulic shovels, machines for production of cement blocks, compactors and vibrators etc. (see respective chapters)

Dumpers produced in this factory are driven by stationary diesel engines and have capacity 750 up to 2000 kg.

Production of Dumpers at Techno-Is Co.

	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
Production of dumpers pcs	30	50	110	195	195

The factory is claiming that its capacity in the production of dumpers is 500 pcs/year.

Truck Mfg. Co., Teheran

One of items of production programme of this factory are dumpers. There are produced three sizes of dumpers with capacity 1 ton, 1,5 tons and 2 tons. Each size is produced in two variants: with mechanical or hydraulic tilter, i.e. there are produced 6 models.

Forecast of Demand, Production and Shortage of Dumpers

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	420	720	1150	1760
Production	pcs	360	640	1080	1700
Shortage	pcs	60	80	70	60

The above given forecast has been made by the author of this study on the basis of total production of dumpers in 1347 (1968/9) and forecasted growth rates of civil engineering industry.

4.17 MINE TIPPLER CARS

There are three factories producing or preparing the production of mine tippler cars (wagons) on medium and big scale:

Vaneh Company - Technical Designing and Production, Teheran

The factory is producing 6 sizes of mine cars:

Type	Capacity dm^3	Length cm	Width cm	Hight cm	Gauge cm	Dump	Steel sheet thickness mm	Weight Kg.
U	500	169	88	115	60	35°	3; 4; 5	260; 346; 372
U	650	169	88	121	60	30°	3; 4; 5	334; 362; 390
U	750	219	88	115	60	35°	3; 4; 5	390; 422; 454
U	1000	219	88	129	60	40°	3; 4; 5	508; 536; 568
V	1000	219	88	120	60	35°	5	564
V	750	219	88	110	60	35°	3; 5	415; 475

The capacity of the plant in production of mine cars is adjustable according to the demand, as the factory is producing also other items of machineries and equipment - for example belt conveyoers etc. The production in 1350 (1971/2) was approx. 100 pcs.

Machine Roll - Technical Designing Production Road and Construction Machineries - Teheran

This factory started the production of two sizes of mine tippler cars, but technical data, capacity as well as production per year are not known. The factory is producing also other kinds of products like trailers, feeders, etc.

Machine Building Plant in Arak

The factory started the production in 1350 (1971). In Revised Tentative Annual Programme (Product-mix) 1353 (1974/5) the production of mine tippler cars (for coal and/or ores) is given as 1000 tons per year. Mine tippler cars will be produced according the documentation supplied by the USSR.

As most of new mines will be open-pit mines using dumpers, the existing capacity will be sufficient for the fifth up to seventh five-year plan. Small quantity will be sold to civil engineering firms.

Forecast of Demand, Production and Shortage of Mine Tippler Cars

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand-for brick factories	pcs	120	360	570	630
-for other non-metalic minerals	pcs	40	120	190	210
-for other mines and civil engineering	pcs	440	620	840	1160
Total demand		600	1100	1600	2000
Production		540	1100	1600	2000
Shortage		60	-	-	-

The above given forecast of demand has been made by the author of this study and is based on projected growth of mining and construction industries see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part I, 1 Mining and Quarrying, 9 Non-metalic Mineral Products and 11, Construction Industries.

4.18 MINE LOCOMOTIVES

According to the drive system, there are diesel-mechanic, diesel-hydraulic, electric and pneumatic mine locomotives.

As new mines will be mostly open pit mines using belt conveyors and/or dumpers, the consumption of mine locomotives will be not big enough for economically feasible production.

4.19 WAGONS

There is no factory producing wagons in Iran at present. Repairshop of State Railways in Teheran and Arak are carrying out only repairs of wagons. The import statistics are giving only imports of components and parts, therefore they are of little help.

Forecast of demand of wagons see Master Demand Study for Mechanical and Capital Goods Products, Part I, Chapter II - Railway.

The Industrial Development and Renovation Organisation of Iran (IDRO) and the Industrial and Mining Development Bank of Iran (IMDBI) have jointly studied the feasibility of establishing a plant for the manufacture of railway freight wagons in Iran. The capacity of the proposed plant, based on the big targets of railway transport in the next years in connection with the erection of new factories would be 450 bogie type 4-axle wagons with necessary facilities for major repairs and overhaul of 1000 wagons per annum.

The plant will produce flat wagons, open wagons, covered wagons, hopper wagons, tank wagons, well wagons and special purpose wagons.

The location of the Plant has been chosen at Arak in the vicinity of the existing Arak Machine Building Plant. The foundry, forge and machine facilities of the Arak Machine Building Plant will be available for supplying components and parts of the wagons.

Wheel and axle sets, axle boxes and roller bearings, airbrake cylinders and valves, draft gear, slack adjuster and body panel pressings will be purchased mostly from abroad.

It is assumed that the plant will be built in the fifth five-year period and it will reach full production in the sixth five-year period and the second unit will be built at the end of the sixth five-year period and full capacity will be reached in the seventh five-year plan.

Forecast of Production of [illegible] According to the Author of This Study

	1356	1361 (1982/3)	1366 (1987/8)
Capacity of the plant [illegible]	-	1000	1000
Production [illegible]	-	450	1000*

* [illegible] of the production [illegible]

4.20-4.21 LIFTING, LOADING, UNLOADING MACHINERY AND EQUIPMENT

Lifting, loading, unloading machinery and equipment, given under tariff number 833B1 are mostly cranes, hoists, pulley blocks etc. They are partly produced in Iran, partly imported.

Import of Lifting, Loading and Unloading Machinery and Equipment

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
833B1	Import	pos	1758	2563	2917	2612	3826	2834
		tons	1891,1	4894,1	4116,3	2173,6	3573,6	3576,0

Source: Foreign Trade Statistics of Iran.

4.20 CRANES

There are different types of cranes, for example stationary cranes and travelling cranes, tower cranes, derric cranes, mast cranes, cable cranes, gantry cranes, jib cranes, bridge cranes, overhead travelling cranes, erecting cranes, steel works chargers, forging cranes, dock cranes etc.

Above given types of cranes are mostly imported, only simple gantry cranes and overhead travelling cranes are produced in Iran.

Producers of cranes in Iran:

Machine Building Plant in Arak

It will be the biggest producer of hoists and overhead travelling cranes. According to the revised tentative annual programme for year 1354 (1975/6) there will be produced hoists, capacity 1 ton up to 5 ton and overhead travelling cranes from capacity 5 tons up to 20 tons.

It is presupposed, that the production will reach 1800 tons of hoists and overhead travelling cranes in the year 1354 (1975/6).

It is advisable to extend not only the capacity of this plant, but also the assortment, i.e. to produce overhead travelling cranes over 20 tons capacity and other types of cranes like tower cranes, derric cranes, jib cranes and special cranes like steel works chargers, forging cranes etc. This could be done in the second stage of construction of this plant.

Cyrous Arjomand Works

This factory is producing overhead travelling cranes up to capacity approx. 20 tons. In the same department are produced fire fighting equipment, sanitation trucks and trailers. There were employed 70 workers in this department in the year 1349 (1970/1). Capacity of this department in the production of cranes is not fully utilized.

Luleh va Machine Sazi Iran Co., Teheran

This firm is producing occasionally overhead travelling cranes up to capacity approximately 20 tons. In the same factory are produced also steel structures, tanks, truck bodies etc. Production of all above mentioned machinery and equipment was 1500 tons in the year 1349 (1970/1).

Fathi and Son Manufacturing Co., Teheran

This firm is producing overhead travelling cranes up to capacity approximately 20 tons. In this factory are produced also steel structures, tanks, small machine tools and cold forming machines for pipes. There were employed 60 workers in the year 1349 (1970/1) and total production was 1500 tons.

Sherkate Sahami Vazneh, Teheran

This firm is producing overhead travelling cranes up to capacity 20 tons. Other items, produced by this firm are steel structures.

Firooza Engineering Co., Teheran Karadj Road

Production programme comprises more items, like hydraulic presses, gearboxes, machinery and equipment for sugar and petrochemical plants, special vulcanising equipment for rubber industry and gantry and overhead cranes. This factory is authorized to produce cranes up to capacity 150 tons; the biggest unit produced in this factory was gantry crane having capacity 60 tons.

Techno Is Teheran

This firm is producing more products, like dumpers etc.; it produces occasionally also overhead travelling cranes up to capacity 20 tons.

Capacity as well production are not known.

According to the "Iranian Industrial Statistics 1968" published by the Ministry of Economy, Bureau of Statistics, the production in the year 1347 (1968/9) was 30 cranes; the value of this cranes was 5380000 Rials (mostly small units).

Total New Investment During the Fifth Five-Year Plan According to the Research Centre for Industrial and Trade Development of the Ministry of Economy with Estimated Value of Cranes According to the Author of this Study

	Total New Investment 10^6 Rials	Cranes % of New Investment	Cranes Value 10^6 Rials
Textile, footwear and wearing apparel industries	59100	0,15	89
Manufacture of leather and leather products	13000	0,12	16
Manufacture of chemicals and chemical products	110500	0,28	309
Basic metal industries and metal products industries	169500	3,3	5595
Manufacture of machinery	39800	3,9	1552
Electrical equipment manufacturing industries	23600	3,5	826
Transport equipment industries	41000	3,4	1394
Other industries	5500	0,4	22
Mining	98000	0,7	687
Total			10490

From the total value of cranes in the fifth five-year plan was calculated total weight of cranes:

Total Weight of Cranes in the Years 1351 (1972/3) and 1356 (1977/8)

		1351 (1972/3)	1356 (1977/8)
Harbours, stores etc.	tons	250	580
Food, beverage, tobacco manufacturing industries*	tons	40	50
Non-metalic minerals industries*	tons	1020	1220
Replacement	tons	150	220
Other industries (see above)	tons	1640	2430
Total	tons	3000	4500

* see respective chapters of this study.

Forecast of Demand, Production and Shortage of Cranes

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons	3000	4500	6800	10800
Production	tons	250	3400	6200	10200
Shortage	tons	2750	1100	600	600

Using 1356 (1977/8) as the base year and the historical annual rate of increase of demand, figures for the years 1361 (1982/3) and 1366 (1987/8) were exterpolated, by the author of this study.

4.21 HOISTS

There are two groups of hoists: hand operated hoists, mostly with worm and worm gear and mechanical hoist - pulley blocks driven by electric motor.

Till now, neither hand operated hoists, nor pulley blocks with electric motor are produced in Iran (except simplest hoists, hand operated, made of grey iron castings).

Electric operated hoists, having capacity 1 ton up to 5 tons will be in the future produced in the Machine Building Plant in Arak (see cranes)

Forecast of Demand, Production and Shortage of Boats

		1351 (1976/7)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	80	1500	1500	6500
Production	pcs	-	600	400	4500
Shortage	pcs	2100	1700	2400	2000

The above given forecast has been made on the basis of imports in the years 1341 (1967/7) until 1350 (1975/6) - see tariff number 85381. Figures for the years 1351 (1976/5) until 1366 (1987/8) were exterpolated, by the author of this study.

3.1 TEXTILE MACHINERY

Import of Textile Machinery According to the Foreign Trade Statistics of Iran

Code No	Machinery	Year	Pos	Weight kgs	Value-1000 Rls.
835-8	Cotton gin machinery	1345(1966/7)	1	1555	208
		1346(1967/8)	25	7875	1697
		1347(1968/9)	7	156209	25715
		1348(1969/70)	30	213906	40742
		1349(1970/1)	24	342617	74998
		1350(1971/2)	-	-	-
844-1	Textile Material Processing Machines	1345(1966/7)	58	77725	15256
		1346(1967/8)	27	134467	21907
		1347(1968/9)	16	104322	18428
		1348(1969/70)	74	97149	63825
		1349(1970/1)	64	361430	97616
		1350(1971/2)	176	387512	81142
844-2	Spinning, Doubling Machines	1345(1966/7)	59	215707	36795
		1346(1967/8)	89	536556	101302
		1347(1968/9)	438	302482	40948
		1348(1969/70)	90	611217	121785
		1349(1970/1)	148	436793	98674
		1350(1971/2)	205	1073577	341807
844-3	Winding Machines	1345(1966/7)	63	54079	15082
		1346(1967/8)	136	195401	45837
		1347(1968/9)	126	227239	71730
		1348(1969/70)	151	185645	55239
		1349(1970/1)	92	213826	64897
		1350(1971/2)	115	448045	169844
844-4	Parts of Textile Machinery (Spinning, Frame Parts, Winding)	1345(1966/7)	-	1261275	225232
		1346(1967/8)	-	2398967	623760
		1347(1968/9)	-	976164	735207
		1348(1969/70)	-	1683367	393664
		1349(1970/1)	-	1103165	225947
		1350(1971/2)	-	1918600	632191
844-	Cloth weaving Looms	1345(1966/7)	-	53123	7128
		1346(1967/8)	-	21630	1824
		1347(1968/9)	-	8350	2203
		1348(1969/70)	-	122543	18649
		1349(1970/1)	-	145573	56276
		1350(1971/2)	-	528463	59732
844-2	Cloth weaving Looms	1345(1966/7)	113	281276	58999
		1346(1967/8)	155	371340	80614
		1347(1968/9)	210	415368	43633
		1348(1969/70)	118	339236	53455
		1349(1970/1)	1	14425	5771[illegible]
		1350(1971/2)	[illegible]	228175	49785

Code	Description	Year	Pcs	Weight kgs	Value-1000 Rls.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	465
		1346(1967/8)	11	[illegible]	4762
		1347(1968/9)	95	[illegible]2754	8630
		1348(1969/70)	59	12486	4532
		1349(1970/1)	100	1250	343
		1350(1971/2)	1	2780	[illegible]
[illegible]	[illegible]	1345(1966/7)	[illegible]595	498025	1291[illegible]
		1346(1967/8)	2778	132681	46082
		1347(1968/9)	1697	206004	[illegible]
		1348(1969/70)	3191	130779	[illegible]
		1349(1970/1)	3015	60464	[illegible]
		1350(1971/2)	[illegible]132	41505	[illegible]
[illegible]	Automatic weaving machines	1345(1966/7)	8	367	10[illegible]
		1346(1967/8)	350	744488	177[illegible]
		1347(1968/9)	667	367064	93971
		1348(1969/70)	137	72757	28135
		1349(1970/1)	7	22810	14275
		1350(1971/2)	69	101603	45353
[illegible]	[illegible]	1345(1966/7)	1	365	282
		1346(1967/8)	16	6134	4193
		1347(1968/9)	28	10500	4284
		1348(1969/70)	1	376	289
		1349(1970/1)	2	1092	981
		1350(1971/2)	79	41083	40555
[illegible]	[illegible]	1345(1966/7)	[illegible]	[illegible]86076	55613
		1346(1967/8)	24	[illegible]046	1624
		1347(1968/9)	61	83752	15629
		1348(1969/70)	111	6165	3247
		1349(1970/1)	330	20855	2899
		1350(1971/2)	-	-	-
[illegible]	Ancillary weaving machinery	1345(1966/7)	-	216929	35551
		1346(1967/8)	-	547025	128567
		1347(1968/9)	-	363382	113640
		1348(1969/70)	-	973478	180218
		1349(1970/1)	-	410579	108397
		1350(1971/2)	-	510741	148276
[illegible]	Parts of weaving machinery	1345(1966/7)	-	-	-
		1346(1967/8)	-	165216	34966
		1347(1968/9)	-	290977	60393
		1348(1969/70)	-	495539	84524
		1349(1970/1)	-	113298	17730
		1350(1971/2)	-	189287	39073

Code No	Machinery	Year	Pcs	Weight kgs	Value-1000 Rls.
846-2	Starching and Finishing Machinery	1345(1966/7)	70	184929	51165
		1346(1967/8)	177	615505	164752
		1347(1968/9)	109	253262	70058
		1348(1969/70)	252	292723	92747
		1349(1970/1)	196	782369	234486
		1350(1971/2)	86	456691	186154
846-3	Parts of Starching and Finishing Machinery	1345(1966/7)	-	371042	87930
		1346(1967/8)	-	319143	70924
		1347(1968/9)	-	147043	41758
		1348(1969/70)	-	533658	100234
		1349(1970/1)	-	209212	75431
		1350(1971/2)	-	331903	111901
857B2	Combing Ravelling and Carding Machines	1345(1966/7)	-	29937	8667
		1346(1967/8)	-	66489	14142
		1347(1968/9)	-	28693	8514
		1348(1969/70)	-	28281	6950
		1349(1970/1)	-	56695	17517
		1350(1971/2)	-	53328	19973
857B5	Parts for Spinning and Weaving Machines	1345(1966/7)	-	666645	172023
		1346(1967/8)	-	830065	191114
		1347(1968/9)	-	826639	226427
		1348(1969/70)	-	1046067	256538
		1349(1970/1)	-	956037	210396
		1350(1971/2)	-	1070314	368723
Total		1345(1966/7)	4022	4201965	899629
		1346(1967/8)	3788	7235494	1715459
		1347(1968/9)	3554	4794184	1640745
		1348(1969/70)	4061	6846372	1557638
		1349(1970/1)	4153	5452490	1374484
		1350(1971/2)	3990	8337249	2202471

Existing Manufacturing Facilities

There are quite a number of small workshops in Iran at present producing spare parts for textile machinery or some textile machines like looms, dyeing diggers etc. The biggest are:

1. Ali Wafai Company Esfahan

Production programme: looms, plain or with 4 shuttles, width 120 cm, 140 cm, 160 cm, 190 cm; 180-190 picks/minute

Capacity: This company is claiming to be able to make 200 looms/year

Number of employees: 8 in foundry and 32 in mechanical workshop.

[illegible] Textile Factory, Isfahan

[illegible] with [illegible] spindles, looms, dobbies
[illegible] spare parts

[illegible] company is claiming to be able in 10 years of operation to make 500 looms

[illegible] workers in foundry and mechanical shop

[illegible] foundry (grey iron castings), mechanical shop with lathes, milling machine, drilling machine etc.

[illegible] Engineering, Tehran

[illegible]: Jiggers and spare parts for textile machinery

[illegible]: max. 40 jiggers/year

[illegible] of employees: 40 workers

[illegible]: Lathes, drilling machines, milling machine etc.

[illegible] workshop, Tehran

[illegible]: printing jiggers made of stainless steel

[illegible]: [illegible] jiggers/year

[illegible] employees: [illegible] workers in foundry and 15 workers in mechanical shop

[illegible]: small [illegible] (grey iron castings), lathes, [illegible] machine, drilling machines, etc.

[illegible] Va Tarashkari [illegible], Isfahan

[illegible] programme: weaving [illegible], width 120 cm and 180 cm, circular [illegible], wood grinding machines, universal machines for carpets

[illegible]: 20-30 weaving machines/year and 10-15 wood working machines/year

[illegible] of employees: 15 workers and 1 foreman

Equipment: 3 lathes, 2 drilling machines, 1 milling machine, 1 shaping machine, 1 welding machine (transformator), 1 compressor, 1 hearth.

6. Hasan Wafai (Brother of Ali Wafai), Esfahan

Production programme: Looms width 120 cm-190 cm (now only 190 cm); other products and spare parts

Capacity: 30 looms/year plus other products

Number of employees: 2 workers in foundry, 36 workers in workshop, but only 8 are engaged in production of textile machines

Equipment: Foundry and workshop with universal machines.

7. Sanat-e-Karimzada, Esfahan

Production programme: Looms width 120 cm, 160 cm, with 4 shuttles, preparatory machines, hank winding machines

Capacity: It claims to be able to make 70 looms/year

Number of employees: 12 workers

Equipment: Small grey iron foundry, 1 lathe, 1 milling machine, 1 drilling machine.

8. Raza Syed, Esfahan

Production programme: Looms, width 140 cm, 4 shuttles

Capacity: It claims to be able to make 60 looms/year

Number of employees: 7 workers

9. Irawani Co., Teheran

Production programme: Woolen carding engines, sliver machines, woolen 50 spindles frames, spare parts for textile machines

Capacity: Not given

Number of employees: 5 plus 11 workers (there are 2 workshops)

10. **Shark-i-Motahet, Teheran**

Production programme: Spare parts for textile machines

Number of employees: 6 workers

Equipment: 2 lathes, 1 cutting machine

Forecast of Demand of Special Machinery and Equipment for Textile Industry

Machinery and Equipment	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Cotton Ginning			
Saw gins (incl. feeders and extractors)	200	260	[illegible]
Boll cleaners	70	90	[illegible]
Lint cleaners	160	210	[illegible]
Cotton Spinning, Weaving and Finishing			
Bale openers, breakers, pickers, sizing mach.	55	57	[illegible]
Cards	1020	1100	1300
Combing machines	82	86	102
Drawing frames	270	[illegible]	340
Speed frames	270	[illegible]	340
Ring frames	1660	1790	2150
Warpers with creel	82	[illegible]	[illegible]
Pirn winders	800	860	1040
Cone winders	110	115	[illegible]
Rope spreaders	82	86	[illegible]
Weaving looms	12000	13000	15600
Singeing and desizing machines	55	58	68
Kiers	41	43	50
Water mangles	41	43	50
Jiggers	110	125	155
Yarn dyeing machines	155	170	200
Printing machines	95	105	130
Drying ranges	110	125	155
Inspection machines	170	190	225
Impregnating mangles	41	43	50
Rolling machines	2800	3000	3600
Pad mangles	41	43	50

Machinery and Equipment		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Folding machines		77	80	96
Mercerising machines		18	20	28
Stenters and tenters		41	43	50
Foulards		155	170	205
Calenders		41	43	50
Doubling machines		110	125	155
Singeing machines		18	20	25
Raising machines		41	43	50
Tentering and egaliz. machines		77	80	96
Pneumatic feeding equipment (foxwell type)		570	620	760
Rope pilers		41	43	50
Rope scouring machines		240	250	295
Steaming boxes		41	43	50
Jute Spinning, Weaving and Finishing				
Bale openers and batch mixers		2	2	2
Roller softener		1	2	3
Cards (teaser,breaker,finisher)		16	21	24
Drawings (1st,2nd, finisher)		14	18	20
Spinnings (pot,sliver,slip draft)	nos / spindles	23 / 2600	28 / 3580	34 / 4080
Roving frames	nos / spindles	2 / 144	3 / 216	3 / 216
Twisters (flyer etc)	nos / spindles	2 / 160	3 / 240	4 / 320
Winders (cop and roll)	nos / spindles	14 / 840	18 / 1080	22 / 1320
Power reels	nos / spindles	1 / 48	2 / 96	3 / 144
Dressing machines		2	3	5
Looms (hessian, sacking)		160	200	240
Prebeamers		1	2	2
Spreaders		1	2	2
Cutting machines		1	2	3
Damping machines		1	2	3
Calenders		1	2	3

Machinery and Equipment	1952-56 (1973-78)	1957-61 (1978-83)	1962-66 (1983-88)
[illegible]	1		1
[illegible]	1	1	1
[illegible]	1	1	1
[illegible]	1	1	1
[illegible]	1	1	1
[illegible]			
Ring Mules	16	16	
[illegible]	4	4	4
[illegible]	2	2	4
Jeavons looms	200	200	200
[illegible]	1	1	2
Centrifugal machines	2	2	
[illegible]	1	1	2
[illegible]	1	1	2
[illegible]	1	1	2
[illegible]	30	30	35
[illegible]	1	1	2
[illegible]	1	1	2
[illegible]			
[illegible]	60	60	60
[illegible]	50	50	50
[illegible]	30	30	30
[illegible]	16	16	16
[illegible]	85	85	85
[illegible]	35	35	35
[illegible]	36	36	36
[illegible]	10	10	10
[illegible]	10	10	10
[illegible]	10	10	10
[illegible]	19	19	19
	1520	1520	1520

Machinery and Equipment		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Spindle twisters	nos spindles	24 5280	24 5280	24 5280
Winders	nos spindles	68 4080	68 4080	68 4080
Spinning machines	nos spindles	200 41280	200 41280	200 41280
Combing machines		14	14	14
Felt making machines		3	3	3
Dyeing machines (yarn)		23	23	23
Washing machines (yarn)		23	23	23
Weaving looms		870	870	870
Coiling machines		55	55	55
Printing machines (cloth)		6	6	6
Folding machines		36	36	36
Warping machines	nos [illegible]	32 6400	32 6400	32 6400
Inspection [illegible]		6	6	6
Cloth [illegible]		60	60	60
Spin dryers		7	7	7
Shrinkage [illegible]		14	14	14
Cloth [illegible]		60	60	60
Packing [illegible]		14	14	14
Kilograms				
[illegible]		580	590	610
Weft [illegible]		690	700	710
Weft [illegible]		45	50	55
Fully [illegible]		14	16	17
[illegible]		600	720	750
Oil [illegible]		21	24	25
Dye [illegible]		210	250	260
[illegible]		1000	1200	1250
Fuel [illegible]		4300	4720	6220
Wood for [illegible]		8000	8000	8000

The above given forecast of demand of special machinery and equipment for textile industry has been made by the author of this study on the base of forecasted growth rates of production of different textiles (see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part I, 3 Textiles Industry).

Forecast of Demand, Production and Shortage of Main Groups of Textile Machines

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Hand operated looms -					
Demand	pcs	800	700	500	300
Production	pcs	800	700	500	300
Shortage	pcs	-	-	-	-
Cotton weaving looms -					
Demand	pcs	1800	2500	2800	3 [illegible]0
Production	pcs	300	1200	2300	2500
Shortage	pcs	1500	1300	500	700
Drawing, speed and ring frames -					
Demand	pcs	380	440	480	560
Production	pcs	40	160	[illegible]	350
Shortage	pcs	340	280	[illegible]	210
Jiggers-					
Demand	pcs	20	25	30	35
Production	pcs	15	20	25	35
Shortage	pcs	5	5	5	-
Doubling machines -					
Demand	pcs	20	25	30	35
Production	pcs	-	-	20	25
Shortage	pcs	20	25	10	10
Hand and mechan. operated knitting machines-					
Demand	pcs	1050	1150	1400	1600
Production	pcs	-	400	800	1200
Shortage	pcs	1050	750	600	400

5. SPECIAL MACHINERY AND EQUIPMENT FOR PULP, PAPER AND CARDBOARD MAKING, PRINTING AND BOOKBINDING

The priority of special machinery and equipment for pulp, paper and cardboard making, printing and bookbinding is limited, only small quantity of these machines are produced in Iran.

Imports of Machinery and Equipment for Pulp, Paper and Cardboard Making Industries and Possibilities

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/71)	[illegible]
842-1	Wood and paper pulp, machinery	pcs	4	1	1	[illegible]	6	[illegible]
		tons	32,1	0,9	0,4	49,9	133,[illegible]	4,8
842-2	Paper and cardboard making machinery	pcs	3	4	1	[illegible]	13	[illegible]
		tons	9,9	174,0	0,5	49,3	133,[illegible]	4,[illegible]
842-3	Paper and cardboard cutting machinery	pcs	128	120	119	[illegible]	[illegible]	[illegible]
		tons	129,3	148,7	137,2	137,1	[illegible]	136,3
842-4	Bookbinding, stitching machines	pcs	25	134	151	49	69	67
		tons	5,0	13,6	18,7	7,6	7,1	14,5
842-5	Other paper and cardboard making mach.	tons	52,7	151,3	625,3	832,1	[illegible]	268,8
842-6	Parts of wood and paper pulp, paper and cardboard making and working machinery	tons	99,4	216,8	392,7	[illegible]	[illegible]	[illegible]
842-7	Paper cutting machines	pcs	2	8	5	[illegible]	[illegible]	[illegible]
		tons	0,5	5,4	7,0	0,5	0,[illegible]	3,4
842-8	Type setting machines	pcs	3	6	11	[illegible]	[illegible]	1
		tons	6,1	12,2	31,0	[illegible]	[illegible]	[illegible]
842-4	Stereotype making machines, stereotype printing presses	pcs	13	57	21	[illegible]	7	[illegible]
		tons	5,8	10,7	6,3	3,5	4,4	8,8
843-4	Printing presses	pcs	152	225	200	131	162	95
		tons	458,8	574,4	603,2	465,2	475,0	283,5
843-5	Graphic design printing presses	pcs	40	93	61	102	115	82
		tons	55,6	54,9	90,4	104,3	141,6	117,7
843-6	Parts of printing machines	tons	35,2	116,9	117,9	178,8	80,9	146,0
Total		tons	865,4	1479,8	2037,3	2894,7	1457,1	1196,6

Source: Foreign Trade Statistics of Iran.

There are no metal working factories in Iran, specialized in production [illegible] machinery and equipment for pulp, paper and cardboard making, [illegible] bookbinding. Some workshops located mostly in Teheran are from time to time producing [illegible] machines and equipment like paper and [illegible] presses, simple printing presses etc.

Author of this study [illegible] firms, which are producing special machinery and equipment for printing:

[illegible] Factory, Teh[illegible]

This firm is producing mainly wood working machines, metal forming machines and approximately [illegible] types [illegible] of simple printing machines - see Master Branch Study for Mechanical and Capital Goods Products Part II-2 Machine Tools, Metal Forming Machines, Wood-working Machines, page 83.

Peghtah Factory, Teheran

The main production [illegible] are hydraulic presses, drilling machines and machines for ceramic industry. The firm is producing from time to time simple printing presses [illegible] printing of tickets for buses etc.

[illegible] of [illegible] making, printing and bookbinding [illegible] in the year 1350 (1971/[illegible]) [illegible] the expert [illegible]

Forecast [illegible] Production [illegible] of Special Machinery and Equipment for [illegible] Cardboard [illegible] Bookbinding, incl. Spare Parts

		[illegible] (197[illegible])	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	tons		[illegible]	7200	11800
Production	tons	[illegible]	160	500	1400
[illegible]	tons		[illegible]	6700	10400

[illegible] of [illegible] by the author of this study and [illegible] growth [illegible] pulp, paper and cardboard, printing [illegible] - see Master [illegible] Mechanical and Capital Goods Industry [illegible] of Paper [illegible], Printing, Publishing and Allied Industries.

It is advisable to extend the production of simple special machinery and equipment for pulp, paper and cardboard making, printing and bookbinding including spare parts, like simple paper and cardboard cutting machines, bookbinding machines, simple printing presses etc.

Some factories are trying to produce complicated paper and cardboard making machines. They are following thirty years old design. It is not advisable to extend such a activity in the future.

Description of Machinery, Equipment and Process

Machine tools and equipment for the production of simple paper and cardboard cutting and bookbinding machines are the same like for the production of metal forming machines, i.e. production of simple paper and cardboard cutting and bookbinding machines could be combined with production of metal forming machines.

5.3 SPECIAL MACHINERY AND EQUIPMENT FOR FOOD INDUSTRY INCLUDING BEVERAGE INDUSTRY

Summary and Recommendations

1. The existing production of special machinery and equipment for food industry is concentrated on a few items:

1.1 Existing capacity and production of machinery and equipment for tea processing covers the needs of Iranian tea industry in tea rollers, tea roller cutters, vibrating screens, drying through wire sieves and fans, and therefore there will be no need for a new factory in the future (but the design and quality of products should be improved).

1.2 There are plenty of small workshops, producing machinery, equipment and spare parts for rice husking and for grain mills. In the future these workshops are not able to cover the demand of these machines not only quantitatively but mainly qualitatively.

1.3 Other small workshops, as well as medium size plants are specialized in the production of supporting (technological) steel structures, tanks, bins and various kinds of sheet metal products, but they are producing only the simplest items.

2. The biggest producer of machinery and equipment for food as well as other industries in the future will be Machine Building Plant in Arak. It is not possible to compare forecasted demand of special machinery and equipment for food industry with the existing capacity in Machine Building Plant in Arak because the capacity is designed also for other industries.

3. It is advisable to extend the Machine Building Plant in Arak in the fifth five-year plan. In this extension the existing capacity should be nearly doubled, approximately 50,000 tons/year and the plant should be specialized in the production of machinery and equipment for food industry and mining.

Recapitulation of Demand of Special Machinery Equipment for Food Industries in the Fifth, Sixth and Seventh Five-Year Plans.

			1352-56 (1973-77)	1357-61 (1978-82)	1362-66 (1983-88)
1.1	Supporting (technological) steel structures	tons	4,050	5,150	6,460
1.2	Plate work - tanks, bins, vessels	tons	7,250	8,550	10,070
1.3	Conveyors, elevators, etc.	tons	4,160	4,730	5,670
1.4	Heat exchangers, condensers, coolers, etc.	tons	3,120	3,860	4,130
1.5	Stirrers, agitators, crystallisers etc.	tons	6,790	8,480	9,840
	Total		26,270	30,750	36,160

Source: Author of this study

Demand of Special Machinery and Equipment for Food Industry in Different Years:

			1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1	Supporting (technological) steel structures	tons	980	1,[illegible]	1,060	1,520
1.2	Plate work-tanks, bins, vessels	tons	1,320	1,580	1,860	2,160
1.3	Conveyors, elevators, etc.	tons	770	890	1,020	1,240
1.4	Heat exchangers, condensers, coolers	tons	520	720	800	840
1.5	Stirrers, agitators	tons	1,180	1,540	1,860	2,080
	Total	tons	4,770	5,730	6,600	7,840

Source: Author of this study

Capacity of Machine Building Plant in Arak:

1.1	Technological steel structures	1200 tons/year
1.2	Tanks, bins, vessels,	6950 " "
1.3	Conveyors, elevators	1775 " "
1.4	Heat exchangers	1000 " "
	Total	10,925 tons/year

As already mentioned, Machine Building Plant in Arak, is designed also for other kinds of industries, therefore shortage etc. must be studied for all of them. The production programme of this plant is limited up to 40 mm thickness of steel sheets for production of pressure vessels. In the second stage of construction of Machine Building Plant the factory should produce pressure vessels etc. up to the thickness 80 or up to 100 mm in hot stage or 60 up to 65 mm in cold stage. It is not advisable to produce other special machinery and equipment like automatic and semi-automatic bottle cleaning, sterilizing, filling and capping machines, butter and cream molding and wrapping machines, pressing, cutting and extending rolls etc.

Special Machinery and Equipment for Food Industry and Beverage Industry

Import of Machinery and Equipment for Food Industry.

Tariff No.		1966/7 1345	1967/8 1346	1968/9 1347	1969/70 1348	1970/1 1349	1971/2 1350
832 B-1-1	Presses for vegetable oil extraction-pcs.	2	2	1	1	1	-
	-kgs.	760	10,861	102	2,300	3,470	-
832-5	Grain sorting machines - pcs.	10	20	3	71	37	10
	- kgs.	46,981	14,891	1,805	87,768	58,224	12,693
832-6	Fruit stoning machines -pcs.	-	2	1	-	1	13
	-Kgs.	-	1,594	468	-	400	2,134
835-7	Fruit & seed dryers, cleaners, graders -pcs.	5	43	45	160	530	236
	-kgs.	53,792	105,048	117,994	71,358	72,490	98,547
836-A2	Churns -pcs.	111	21	19	226	110	10
	-kgs.	6,050	7,441	2,258	11,721	15,283	423
836-A3	Dairy equipment other than churns -Kgs.	51,004	60,551	22,498	41,975	32,839	18,531
836-A4	Parts of dairy machines-Kgs.	7,057	26,831	16,097	8,330	51,937	10,235
837-1	Grain grinding flour milling machinery -Kgs.	755,013	605,969	430,458	452,170	441,329	446,604
	-pcs.	1,809	1,043	819	2,007	1,069	1,017
837-2	Grain cleaning & sieving machinery -pcs.	138	79	235	59	95	76
	-kgs.	128,576	117,384	157,349	37,300	52,581	58,568
837-3	Grain husking machinery-pcs.	214	180	1,678	131	64	51
	-Kgs.	58,863	45,833	80,647	65,884	37,178	68,315
837-4	Tea processing machinery-pcs.	21	8	2	2	1	-
	-Kgs.	91,329	80,932	8,514	2,700	600	-
837-5	Parts of tea processing machinery -kgs.	66,685	57,755	30,793	57,493	46,887	46,611
837-6	Parts of flour milling grain grinding cleaning, sieving, husking machinery -kgs.	388,138	522,234	190,638	590,202	229,488	307,614
838-A1	Filtering equipment for mineral animal -pcs.	15	56	126	1,992	46	76
	and vegetable oil -Kgs.	6,677	104,942	143,941	284,130	31,794	9,698
838-A2	Water filtering equipment-pcs.	140	398	374	396	305	336
	-Kgs.	121,900	568,814	274,297	121,901	163,786	201,386
838-A3	Other filtering equipment for fluids -pcs.	240	88	762	471	308	241
	-kgs.	139,051	315,175	303,282	97,887	273,082	440,821

Tariff No.			1966/7 1345	1967/8 1346	1968/9 1347	1969/70 1348	1970/1 1349	1971/2 1350
838-A4	Parts of filtering equipment	-Kgs.	668,235	1043,537	1877,956	1899,876	1328,301	2139,737
838-B9	Distilation equipment	-pcs.	65	73	113	7	37	2
		-Kgs.	34,393	5,592	3,511	5,582	309	181
838-B13	Evaporating apparatus	-pcs.	-	21	7	18	227	1
		-Kgs.	-	1,715	1,120	1,466	1,446	71
838-B15	Filter equipment not listed elsewhere	-pcs.	-	5	9	5,001	1	4
		-Kgs.	-	19,882	2,040	1,497	3,726	634
838-B17	Sterilizers	-pcs.	2,762	1,511	2,335	523	2,096	88
		-Kgs.	18,016	45,772	40,542	11,829	39,182	17,911
839-B1-1	Ice making plant	-pcs.	12	104	89	73	106	134
		-Kgs.	15,880	68,941	88,818	212,588	36,598	23,649
849-1-1	Canning machines	-pcs.	-	4	7	5	107	3
		-Kgs.	-	2,073	22,317	3,978	11,597	5,476
849 2-1	Bottle cleaning filling capping & labelling machines	-Kgs.	105,765	181,643	76,968	257,222	309,997	278,539
854 B2-2	Baking machines	-pcs.	3	10	-	12	-	-
		-Kgs.	24,930	1,250	-	804	-	-
854 B-2-4	Electric fruits squeezers exceeding	-pcs.	1	4	32	1	-	54
	1) Kgs. by weight	-Kgs.	2,200	269	32,000	70	-	1,161
854 B2-5	Electric meat mincing machines over 15Kgs.	-pcs.	-	22,031	20,055	20,322	41,464	54,564

Source: Foreign Trade Statistics of Iran.

5.30 SPECIAL MACHINERY AND EQUIPMENT FOR RICE HUSKING, CLEANING, AND FOR GRAIN MILLS

[illegible] Special Machinery and Equipment for Ri[illegible] cleaning and for Grain Mills according to the [illegible] Trade [illegible] of Iran

Tariff No.			134[illegible] (1966/67)	[illegible]	134[illegible] (196[illegible])	1348 (1969/70)	1349 (1970/71)	1350 (1971/72)
837-1	Grain grinding, [illegible] milling machinery	-pcs	1809	[illegible]043	819	2007	1065	1017
		-Kgs	735013	605966	430458	[illegible]2170	441225	446604
837-2	Grain cleaning and sieving machinery	-pcs	138	[illegible]	235	89	95	76
		-Kgs	128576	[illegible]	157349	[illegible]	52581	58568
837-3	Grain husking machinery	-pcs	216	[illegible]80	16[illegible]	[illegible]	64	51
		-Kgs	58863	45833	80847	69884	37178	68315
837-6	Parts of flour milling, grain grinding, sieving and husking machinery	-Kgs	388138	522234	190638	590202	229488	307614

Forecast of Demand of Special Machinery [illegible] cleaning and for Grain Mills in pieces

	1352-1356 (1973-1978)	[illegible]	1352-1366 (198[illegible]-1988)
Paddy cleaners	96		120
Paddy separators	180	[illegible]	240
Paddy huskers	260	[illegible]	330
Rice whitening machines	680	[illegible]	840
Rice refining machines	90	[illegible]	120
Rice graders	260	300	330
Cleaning separators	750	750	800
Permanent magnet separators	780	780	830
Two and four roller mill	1050	1050	1120
Grain [illegible]ers	350	350	370
Plan sifters	500	500	530
Water wheel dumpers	350	350	370
Trieur grading stations	100	100	110
Grain washers	100	100	110
Grain measurers	300	300	320
Spiral separators	100	100	110
Grain [illegible]urers	100	100	110

	1352-1356 (1973-1978)	1357-1361 (1978-1983)	1362-1366 (1983-1988)
Single and double detacheurs	250	250	270
Semolina purifiers	150	150	160
Grain finisher	100	100	110
Husking machines	300	300	320
Prismatic rotary sieves	900	900	960
Bucket elevators	2780	2860	3000
Vibrating screens	400	440	530
Worm conveyors	1450	1450	1450
Suction filters	150	150	160

Forecast of demand of special machinery and equipment for rice husking and cleaning and for grain mills has been made by the author of this study and is based on the projected growth of production of foodstuffs and precondition that in the future small flour mills will be replaced by bigger ones, with machines having bigger capacity, well machanized or even automatized - therefore the number of machinery and equipment is relatively low and also growth rate is low.

Existing manufacturing capacity

There are plenty of small workshops, mainly in the Caspian area, producing machinery, equipment and spare parts for rice husking and in some cases also for grain mills. Their production programme is mostly combined with production of metal ware, equipment and spare parts for other food industries for example for tea withering, rolling, fermenting and firing, bruisers for farmers etc.

There are no statistical data about the capacity, production programme, number of workers etc. as these workshops are too small, employing mostly 2-4 workers. One of the biggest producers is Azad Machine Factory Corporation in Rasht, producing also special machines for tea withering, rolling, fermenting and firing (See Tea Processing Machinery).

Existing plants are not able to cover the demand of special machinery and equipment for rice husking, cleaning and for grain mills not only quantitatively but mainly qualitatively. It is advisable either to modernise there plants and

their production prgramme, or to build a new, medium size plant for this production.

3.31 SPECIAL MACHINERY AND EQUIPMENT FOR SUGAR FACTORIES

Import of special machinery and equipment for sugar factories is compiled in "The Foreign Trade Statistics of Iran" under different numbers with machinery and equipment for other kinds of industry, like chemical industry, other food industry etc. It is impossible to assess from these figures any data concerning the requirements of specific machines.

Forecast of demand of special machinery and equipment for sugar factories (new as well as replacement) was calculated according to technological projects of sugar factories, capacity 1250 tons of sugar beet/24 hours and 2500 tons of sugar beet/24 hours.

Broad Classification of Machinery and Equipment for Sugar Factories from the Point of View of Mechanical Engineering Technology

1. Special Machinery and Equipment for Sugar Factories

1.1 Technological steel structures, like supporting steel structures, bridges for piping, staircases, platforms etc.

1.2 Platework - light and heavy - for example tanks and vessels, storage bins etc.

1.3 Steel structures with mechanism - for example conveyors, elevators, feeders etc.

1.4 Plate work combined with tubes - for example heat exchangers, condensers, coolers, preheaters etc.

1.5 Plate work with mechanism - for example tanks with stirrors, crystallisers, centrifuges, filters, dryers

1.6 Crusher , mills.

2. Other Machinery and Equipment

2.1 Transport equipment for liquid and gases - pumps, vacuum pumps, compressors, ventilators.

2.2 Other transport equipment for solids - like cranes, lifts etc.

2.3 Energetical equipment - steam boilers, turbines, steam engines, diesel engines, generators, etc.

2.4 Maintenance equipment - machine tools, tools, etc.

2.5 Electrical equipment - switches, conductors.

2.6 Measuring equipment, remote control etc.

2.7 Laboratory equipment

2.8 Weighing machines

2.9 Sundries

Forecast of Demand of Machinery & Equipment for Sugar Factories in tons

1. Special Machinery and Equipment for Sugar Factories

Group			1352-1356 (1973-1978)	1357-1361 (1978-1983)	1362-1366 (1983-1988)
1.1	Supporing steel structures*	tons	1,480	1,520	2,100
1.2	Plate work - tanks and vessels storage bins*	"	2,210	2,720	2,840
	- piping made of steel sheets	"	2,100	2,430	3,030
1.3	Steel structures with mechanism convoyors	"	1,580	1,940	2,240
	Feeders	"	70	80	100
1.4	Plate work combined with tubes	"	2,410	2,960	3,090
1.5	Plate work with mechanism - stirrers, agitators	"	3,590	4,410	5,090
	filters	"	860	1,050	1,220
	dryers	"	1,170	1,440	1,660
1.6	Crushers, mills	"	2,150	2,610	3,040
	1.1 - 1.6 Total		17,620	21,160	24,410

* incl. lime plants.

2. Other Machinery and Equipment

Group			1352-1356 (1973-1978)	1357-1361 (1978-1983)	1362-1366 (1983-1988)
2.1	Pumps	tons	1,090	1,090	1,270
	Compressors, vacuum pumps	"	430	530	620
	Ventilators	"	500	620	710
	Piping - steel pipes seamless or welded	"	3,100	3,430	4,360
	Fittings	"	790	850	980
2.2	Cranes, lifts, carts etc.	"	120	150	170
2.3	Energetical equipment - turbines, generators	"	920	1,130	1,310
	boiler house	"	1,750	2,220	2,330
2.4	Maintenance equipment - machine tools		170	220	260
2.5	Electrical equipment - switches, conductors etc.	"	3,500	4,310	4,960
2.6	Measuring equipment, remote control	"	260	325	380
2.7	Laboratory equipment	"	15	20	25
2.8	Weighing machines	"	280	345	400
2.9	Sundries	"	125	150	175
	Insulation	"	19,960	23,630	28,210
	2.1 - 2.9 Total	"	33,010	39,020	46,160

The above given forecast of demand has been made by the author of this study and is based on projected growth of production of sugar - see Master Demand for Mechanical and capital Goods Industry 1972-1987, Part 1.,2. Food, Beverage and Tobacco Industries, Code No. 207. The calculation of demand of machinery and equipment is based on the average unit 2500 tons/day of sugar beet and 4000 tons/day of sugar cane

Existing Manufacturing Facilities

Some sugar factories are producing in their own maintenance workshops not only components and parts for repairs, but they are also producing some new machinery and equipment. Some examples:

Sugar Factory in Ahwaz has substantially enlarged its maintenace workshop in 1349(1970/1) and is starting to produce some new machines.

Iranian Sugar Plant Co. is producing in its workshop evaporation units, vacuum pans and slicing equipment.
Some mechanical engineering plants are also producing machinery and equipment for sugar factories - for example:

Cyrus Arjomand Works Teheran

Engineering workshop, engaged mainly in the manufacure of steel structures, storage tanks, tower tanks as well as plate work combined with tubes. Existing capacity:- manufacture of steel structures 12000 tons/year; planned production 10,000 tons in 1350(1971/2); manufacture of storage tanks 7000-10000 tons/year, actual prodution 3000-4000 tons/year.

Machine Building Plant, Arak

The plant was originally designed for production of special machinery and equipment for sugar plants and cement plants approximately 705tons/year, storage tanks 1270 tons/year, welded steel structures 7420 tons/year, agricultural machinery incl. spare parts 8930 tons/year, steam boilers 3890 tons/year, conveyors 860 tons/year and overhead travelling cranes 1050 tons/year.

New manufacturing programme

1. Material handling -
   1.1 belt conveyors up to 800 mm width (1225 tons/year),
   1.2 screw type conveyors (100 tons/year)
   1.3 bucket elevators up to 456 bucket (400 tons/year)
   1.4 underground mine tippler cars (1000 tons/year) 2775 tons/year

2. Gear cutting and gear assemblies -
   2.1 crane crabs up to 45 tons (350 tons/year)
   2.2 hoist gears/assemblies up to 45 tons (350 tons/year)
   2.3 reduction gear boxes (150 tons/year) 850 "

3. Plate and tube vessels manufactures -
   3.1 storage tanks up to 80 cu m capacity and 10 atm. pressure (1250 tons/year)
   3.2 package boilers and auxiliaries up to 15 tons of steam/hour (1500 tons/year)

3.	Industrial boilers and auxiliaries (1000 tons/year	3750 tons/year
4.	Earthmoving equipment -	
	4.1 dozers 4.2 loaders 4.3 graders	4500 "
5.	Road-making equipment -	
	5.1 vibratory rollers	750 "
6.	Construction and crushing machines -	
	6.1 crushers and crusher screens	
	6.2 concrete mixers etc.	600 "
7.	Aluminium and stainless steel vessels fabrication for food/sugar and light chemical industry evaporative apparatus	700 "
8.	Fabrications, pressings, forgings and castings for use in agricultural machinery, railway wagon programs and HEALCO	2500 "
9.	Castings - manganese steel balls, heat resisting liners, general castings	3800 "
10.	Forgings	500 "
11.	Plate and tube vessels manufactures -	
	11.1 pressure vessels, medium and heavy (5000 tons/year)	
	11.2 heat exchangers (1000 tons/year)	6000 "
12.	Medium and heavy steel structures -	
	12.1 road bridges (800 tons/year)	
	12.2 building structurals (2000 tons/year)	
	12.3 technological structures (1200 tons/year)	4000 "
13.	Steel and iron castings general	2000 "
14.	Miscellaneous forgings and hot flangings	1000 "
15.	Miscellaneous pressings and flangings for sale against occasional orders	500 "

The new production programme is covering partly or fully demand of machinery and equipment for sugar factories (see above)

Group of Machinery and Equipment (see Forecast of Demand)		Item of New Production Programme
1.1	Supporting steel structures	12.3
1.2	Plate work - tanks and vessels, storage bins	3.1, 7, 11.1
1.3	Steel structures with mechanism (conveyors)	1.1, 1.2, 1.3
1.4	Plate work combined with tubes	11.2
1.5	Plate work with mechanism	-
1.6	Crushers, mills	-
2.1	Pumps, compressors, vacuum pumps, ventilators	-
2.2	Cranes, lifts, carts etc.	2.1, 2.2
2.3	Energetical equipment-boiler house	3.3
2.4 - 2.9	Maintenance equipment etc.	-

The original production programme had covered also group 1.5 of machinery and equipment, but in new programme this group was left out. From the technologicol point of view, i.e. installed machinary and equipment it is possibe to produce these machines in the plant and to some extent even group 1.6-crushers and mills, if necessary.

The utilization of total plant's capacity in items 1.1, 1.2, 1.3, 2.1, 2.2, 3.1, 3.3, 7, 11.1, 11.2 etc. could be judged in connection with needs for other industries, mainly chemical industry (see Chemical Machinery and Equipment).

Other factories, producing machinery and equipment suitable for sugar plants:

Chakosh Co. Teheran

Production of steel structures, tanks and containers.

Zigaus Company Teheran

Manufacturing of tanks and tower tanks.

Luleh va Machine Sazi Iran Co. Teheran

Production of steel structures, tanks, cranes etc.

Fathi & Sons Manufacturing Co. Teheran

Production of steel structures and cranes.

Azari Company Teheran

Production of tanks and tower tanks.

5.32 SPECIAL MACHINERY AND EQUIPMENT FOR DAIRY INDUSTRY

Import of Special Machinery and Equipment for Dairy Industry According to the Foreign Statistics of Iran

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
836A2	Churns* - pcs.	111	21	19	226	110	10
	- Kgs.	6,050	7,441	2,258	11,721	15,583	423
836A3	Dairy Equip. other than churns. -Kgs.	51,044	60,551	22,498	41,975	32,839	18,031
863A4	Parts of dairy machinery -Kgs.	7,057	26,831	16,097	8,330	51,937	10,235

* Incl. churns for agricultural farms.

1. Forecast of Demand of Special Machinery and Equipment for Dairy Industry in tons or pcs.

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-86)
1.1	Supporting steel structures - tons	30	45	70
1.2	Plak work-vats & tanks -tons	60	90	120
	-stainless steel pipes-tons	90	130	180
1.3	Steel structures with mechanism-conveyors-tons	5	7	10
1.4	Plak work combined with tubes-cooling coils, water heaters, evaporators-tons	100	145	200
1.5	Plate work with mechanism - stirrers etc. tons	90	130	180
1.6	Churns pcs/tons	22/45	30/60	45/90
	Separators - tons	15	20	30
	Automatic & semi-autom. bottle cleaning, sterilizing, filling and capping machines-pcs.	106	144	210
	Automat. butter molding & wrapping machines-pcs.	12	17	25
	Automat. cream molding & wrapping mach. -pcs.	15	20	30
	Automat. milk molding & wrapping mach. -pcs.	15	20	30
	Can washers - pcs.	18	25	35
	Ice bars freezers - pcs.	20	30	40
2. Forecast of Needs of Other Machinery & Equipment				
2.1	Pumps and deep well pump - tons	6	9	12
	Pumps for milk & cream - tons	9	13	18
	Pumps for hot water - tons	2.3	3.0	4.5
	Compressors - air -tons	8	12	17
	- ammonia - tons	27	40	55
	Ventilators - tons	4	6	9
2.2	Lifts - pcs.	5	10	15

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
2.3.	Steam boilers upto 10 tons/hour of steam - tons	60	90	120
2.4.	Maintenance equipment -machine tools-tons	20	30	45
2.8.	Weighing machines - tons	22	30	40
2.9.	Cans 401. 501.* - pcs.	12,000	20,000	30,000

* incl. agricultural farms.

There is no production of special machinery and equipment for dairy industry in Iran at present. In the future some items like supporting steel structures, vats and tanks, conveyors, cooling coils, water heaters, evaporators, strirrers etc. could be produced in the country - see recapitulation of the machinery and equipment for food industry.

Forecast of demand of special machinery and equipment for dairy industry has been made by the author of this study; it is based on projected growth of production of dairy products - see Master Demand Study 1972-1987, Part I., 2. Food, Beverage and Tobacco Industries.

5.34 SPECIAL MACHINERY AND EQUIPMENT FOR FRUIT DRYING AND PACKING

Import of Machinery and Equipment

Tariff No.		1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
835-1	Fruit stoning machinss -pos	2	1	-	1	13
	-Kgs.	1,594	468	-	400	6,214
835-7	Fruit and Seed dryers, oleaners, graders-pos	43	45	160	530	736
	-Kgs.	105,048	117,994	71,358	72,490	90,547

Only the first traiff no. is self-contained category; ths second one is oompiling machinery for fruit and seeds, i.e. machinery not only for fruit drying and packing plants, but also for agricultural farms, flour mills, rice husking, etc.

1. Forecast of Demand of Special Machinery and Equipment for Fruit Drying and Packing - in pcs.

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Fruit washing machines - pcs.		70	75	98
Pinching, fruit stoning machines - pcs.		50	55	70
Suction sorters	- pcs.	60	65	85
Paoking machines	- pcs.	10	11	14
Fruit dryers	- pos.	10	15	20

2. Forecast of Demand of other Machinery and Equipment - in tons.

Vibrating screens	- tons	8.0	8.6	11.0
Belt conveyors	- tons	3.0	3.3	4.2
Water pumps	-tons	6.0	6.3	7.5
Weighing machines	- tons	24.0	27.-	30.-
[illegible]	- tons	5.0	5.3	7.0
Boilers, up to 1 tons of steam/hour	- tons	30.0	54.0	60.0
TOTAL	- tons	76.0	104.4	119.7

Forecast of demand of special machinery and equipment for fruit drying and packing has been made by the author of this study and is based on projected growth of production of dried fruits - see Master Demand Study for Mechanical and Capital Goods Industry 1972-1987, Part 1.,2. Food, Beverage and Tobacco

Industries, Code No. 2031.

Some simple special machines like fruit washing machines, fruit dryers are produced in the country. Above given quantity of machinery and equipment is only modern machinery not yet produced in Iran. As the demand of these machines is low it is not advisable to produce them in the country, except fruit dryers.

Other machinery and equipment (group 3) could be in the future covered by Iranian products.

5.35 SPECIAL MACHINERY AND EQUIPMENT FOR CANNED FRUITS AND VEGETABLES, FRUIT AND VEGETABLE JUICES

There are no statistical data about production as well as import of special machinery and equipment for canned fruits and vegetables, fruit and vegetable juices.

1. Forecast of Demand of Special Machinery and Equipment in tons or pcs.

	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
1.1. Supporting steel structures - tons	30	45	60
1.2. Plate work tanks, bins, hoppers, sinks, kettles, retorts with crates - tons	35	50	70
1.3. Steel structures with mechanism-conveyors etc. - tons	17	25	34
1.4. Plate work combined with tubes (heat exchangers, scalders, deareators, pasteurizeurs - tons	15	22	30
1.5. Plate work with mechanism-stirrers etc. -tons	5	7	10
1.6. Can producing machinery - reformers, flangers, Bottom seamers, testers' - pcs.	47	82	110
Can washers, closers, tabellers, fillers, coolers - pcs.	26	40	53
Bottle washing, filling, soaking, crown corking machines - pcs.	15	24	30
Fruits and vegetables washers - tons	8	12	16
graders, abrasive pealers - pcs.	12	18	24
Blanchers - pcs.	3	5	6
Juice fillers - pcs.	3	5	6
Juice extractors - presses - pcs.	3	4	6
Centrifugal separators - pcs.	3	5	6

2. Other Machinery and Equipment in tons

2.1. Pumps - tons	3	4,5	6
Vacuum pumps - tons	1	1.5	2
Compressors - tons	1.2	3.3	4.5
2.2. Hoists - tons	0.8	1.2	1.6
2.3. Steam boilers - tons	16	24	32
2.4. Machine tools - tons	6	9	12
2.8. Weighing machines - tons	24	36	50
Total	52.0	79.5	108.1

[illegible]

[illegible]

vegetable juices - see Master Demand Study for [illegible] and [illegible] Goods Industry 1972-1987, Part [illegible] 2. Food, Beverage [illegible] Tobacco Industries.

[illegible]

machinery and equipment for [illegible] juices. In the future there [illegible] possibility to produce simple equi[illegible] [illegible]

5.16. SPECIAL MACHINERY AND EQUIPMENT FOR PRODUCTION OF CAKES, COOKIES, PASTRIES, BISCUITS, MACARONI AND NOODELS

There are no data about imports as well as production of special machinery and equipment for production of cakes, cookies, pastries, biscuits, macaroni and noodels.

1. Forecast of demand of special machinery and equipment for production of cakes, cookies, pastries, biscuits and noodels.

	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
1.1. Supporting steel structures - tons	50	65	80
1.2. Plate work - vats, bins and tanks - tons	50	65	80
1.3. Steel structures with mechanism-conveyors-tons	2	3	4
1.6. Whirl round knearders, dough mix.machines-pcs	50	80	120
Table feaders - pcs.	10	16	24
Pressing, cutting and extending rolls-pcs.	13	20	30
Cream mixers - pcs.	40	52	65
Laminators - pcs.	10	14	18
Cutting machines - pcs.	24	32	40
Moulding machines - pcs.	20	26	32
Steam tunnels, belt ovens, chamber ovens-pcs.	34	48	60
Stacking machines - pcs.	3	4	5
Oil spray machine, salt [illegible] - pcs.	6	8	10
Packing machines - pcs.	10	16	24

2. Forecast of Other Machinery and Equipment for Cakes, Cookies, etc.

2.1 Pumps - tons	2	2.5	3
Blowers - tons	3	5	7
2.3. Steam boilers -tons	5	8	12
2.8. Weighing machines - tons	6	9	14

Forecast of demand of special machinery and equipment for production of cakes, cookies, pastries, biscuits and noodels has been made by the author of this study and is based on projected growth of production of cakes, cookies, pastries, biscuits and noodels - see Master Demand Study for Mechanical and Capital Goods Industry 1972-1987, Part 1., 2. Food, Beverage and Tobacco Industries.

5.37 TEA PROCESSING MACHINERY

Import of Tea Processing Machinery and Equipment according to the Foreign Trade Statistics of Iran

Tariff No. 837-4 Import of Tea Processing Machinery

Year	Pcs.	Weight Kg.	Value in Rials
1343(1964/5)	[illegible]	[illegible]	9,527,015
1344(1965/6)	4	[illegible]	2,239,923
1345(1966/7)	21	[illegible]	6 [illegible]21,496
1346(1967/8)	8	[illegible]	[illegible],[illegible]12,508
1347(1968/9)	2	[illegible]	1,581,095
1348(1969/70)	2	[illegible]	1,936,085
1349(1970/1)	1	[illegible]	523,142
1350(1971/2)	-	-	-

Tariff No. 837-5 Import of Parts of Tea Processing Machinery

Year	Weight Kg.	Value Rials.
1343(1964/5)	36,898	[illegible]428,238
1344(1965/6)	119,918	[illegible]415,329
1345(1966/7)	182	33,493
1346(1967/8)	57,7[illegible]	[illegible] 111,512
1347(1968/9)	30,7[illegible]	[illegible],781,095
1348(1969/70)	57,493	[illegible] [illegible]91
1349(1970/1)	46,887	[illegible] [illegible]16,[illegible]19
1350(1971/2)	46,631	[illegible],942,712

Production of Tea Processing Machinery in Iran

Year	Pieces	Value Rials.
1341(1962/3)	22	3,176,000
1342(1963/4)	25	3,650,000
1343(1964/5)	96	[illegible]0 409,000
1344(1965/6)	975*	50,517,000
1345(1966/7)	192	14,520,000
1346(1967/8)	84	15,675,000

* Including fans

Source: Bureau of Statistics of the Ministry of Economy.

Details about Production of Tea Processing Machinery in 1345 and 1346

		1345(1966/7)	1346(1967/8)
Tea sieving machiners	pcs.	123	16
Tea rubbing machines	pcs.	14	15
Other kinds of tea process. machines	pcs.	55	49

Forecast of Demand of Tea Processing Machinery and Equipment

		1352-6 (1973-8)	1357-61 (1978-83)	1362-6 (1983-88)
Tea rollers	pcs.	410	400	440
Tea roller cutters (tea grinders)	pcs.	55	50	60
Vibrating screens (green leaf sifter)	pcs.	330	300	360
Drying troughs with sieves	pcs.	570	490	570
Converyer dryers	pcs.	110	100	120

In the above given forcast of demand made by the author of this study are included machinesfor extention of capacity of existing plants for tea withering, rolling and fermcuting as well as for replacement of old ones see Master Demand Study for Mechanical and Capital Goods Industry, Part 1. 2. Food Beverage and Tobacco Industries, code No. 2098.

Existing Manufacturing Facilities

There are some workshops in Iran, producing tea processing machinery and equipment, The biggest are:

Azad Machine Factory Corporation - Mr. Sarkisian - Rasht

The biggest workshop in Iran, producing tea processing machinery and equipment (not visited). Machines produced up to 1344 (1965/6): tea rollers 34 units, green leaf sifters 30 units, tea leaves drying machines 4 units, air heaters 5 units. The factory is also producing tea - grinders, tea-rollers dia 36" and humidifying machines.

Martin Co. Tehran

This firm started six years ago the production of fans for tea factories and tea rollers dia. 36" and 46". It has built only 20 pieces of tea

rollers and approximately the same quantity of fans but it stopped this [illegible] due the lack of orders.

[illegible]

This workshop is producing only tea rollers. In year 1344 (1965/66) there [illegible] different factories.

[illegible]

[illegible] producing only spare parts for tea industry and repair [illegible] machinery and equipment (not visited)

The biggest suppliers of imported machinery and equipment [illegible] Davidson Co., Krupp Co. and others.

[illegible] of Iranian [illegible] roller cutters, [illegible] screens, drying troughs with sieves [illegible], and therefore [illegible] will be no need of new factory in future. [illegible] with furnaces could be either imported (for example from [illegible] project) or produced in Azad Machine [illegible] these dryers.

[illegible] of Tea [illegible] Machi[illegible]

		[illegible] ([illegible])	[illegible] (197[illegible])	[illegible]	[illegible]
[illegible]	pcs.	78	[illegible]	[illegible]	[illegible]
[illegible]	pcs.	76	[illegible]	[illegible]	[illegible]
Tea roll[illegible] cutters – demand	pcs.	10	12	10	15
– production	[illegible]	10	12	10	13
[illegible] screens – demand	[illegible]	[illegible]	68	60	75
– production	pcs.	[illegible]	68	60	75
Drying troughs with sieves – [illegible]	pcs	110	120	90	120
– production	pcs.	110	120	90	120
[illegible]rs – demand	[illegible]	[illegible]	24	[illegible]	25
– production	[illegible]	[illegible]	12	15	20

[illegible]

[illegible] ANIMAL FEED INDUSTRY

There are no data about import of special machinery and equipment for animal feed industry. Till now, there was no production of these items in Iran so the account was low.

1. Forecast of Demand of Special Machinery and Equipment for Animal Feed Industry.

	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
1.1 Supporting steel structures - tons	120	165	330
1.2. Plate work-bins, cooling columns - tons	185	270	540
1.3. Steel structures with mechanism-conveyor etc. tons	120	175	410
1.5. Sorting shakers - tons	23	33	67
Bag filling lines - tons	14	20	30
Mixing machines - pcs./tons	14/37	20/52	30/78
Granulating presses - pcs./tons	14/21	20/30	30/45
Forage cake breakers, beating mills-pcs/tons	14/18	20/25	30/38
Sealing devices, change over-flaps - tons	6	9	18
Total - tons	544	779	1,576

2. Forecast of Demand of other Machinery and Equipment for Animal Feed Industry

	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
2.1. Fans - tons	7.4	11	21
Pumps - tons	7	10	15
2.3. Steam boilers - tons	14	20	40
2.8. Weighing machines - tons	36	52	78

It is advisable to produce some items like supporting structures, bins, cooling columns, conveyors, feeders etc. in Iran, in the future - see recapitulation of machinery and equipment for food industry.

5.39 SPECIAL MACHINERY & EQUIPMENT FOR BREWERIES

The import of special machinery and equipment for breweries is compiled in The Foreign Trade Statistics of Iran with machinery and equipment for other food industry, chemical industry etc.

Forecast of demand of special machinery and equipment for breweries was calcultated by the author of this study, acoording to the technological project of brewery, capacity 40,000 hl/year and is based on projected growth of production of beer - see Master Demand Study for Mechanical and Capital Goods Industry 1972-87, Part 1., 2. Food, Beverage and Tobacco Industries.

Broad Classification of Machinery and Equipment for Breweries from the point of view of mechanical engineering technology - the same as for sugar factoreis.

Forecast of Demand of Machinery and Equipment for Breweries in tons.

1. Special Machinery and Equipment for Breweries

Group		1352-56 (1973-78)	1357-61 (1978/83)	1362-66 (1983/88)
1.1.	Supporting steel structures	110	130	170
1.2.	Plate work-bins, tanks, vessels-made of steel	85	96	127
	" " " made of stainless steel	80	91	116
	made of aluminium	23	27	34
	made of copper	22	26	33
1.3.	Steel structure with mechanism-conveyor	18	20	25
1.4.	Plate work combined with tubes-coolers,	49	62	73
	condensers, evaporators	28	32	41
1.5.	Plate work with mechanism-mixers and			
	stirrers	15	18	24
	-filters	10	11	16
1.6.	Bottle washing, pasteurising and filling machines	74	87	114
1.7.	[illegible], malt cleaning [illegible] machines	50	57	73
	1.1 - 1.7 Total	565	657	843

2. Other Machinery and Equipment

		[illegible] (1973/78)	
.1	Pumps	20	
	Compressors	26	
	Piping-steel, stainless steel, copper	3[illegible]	
	Fittings	16	
2.2	Lifts, pulley blocks	16	
2.3	Energetical equipment - boilers	70	
.4	Maintenance equipment-machine tools	8	
.5	Electrical equipment	63	
.6	Measuring equipment, remote control	5	
.8	Weighing machines	3	
	Insulation	127	111
2.1 - 2.9	Total	386	[illegible]

Existing Manufacturing Facilities

There is no factory in Iran producing special machinery for breweries. Existing plants producing steel structures [illegible] special machinery and equipment for sugar factories) [illegible] some components and parts and even some machines [illegible], but it [illegible] to produce only specific [illegible] equipment, [illegible] of which is [illegible]

Detailed recapitulation of Demand of Special Machinery and Equipment for Food Industries in tons

	1952-56 (1973-78)	1957-61 (1978-83)	1962-66 (1983-88)
1.1. Supporting steel structures - tons			
Sugar factories	1,480	1,520	2,100
Dairy industry	30	45	70
Cakes, cookies, biscuits etc.	50	65	80
Rice husking, cleaning, grain mills	2,250	2,270	2,500
Animal feed industry	120	165	330
Tea processing	60	50	70
Canned fruits and vegetables	30	45	60
Breweries	110	130	170
Industries not covered (ca. 20 %)	820	860	1,080
Total	4,950	5,150	6,460
1.2. Steel - tanks, bins, vessels - tons			
Sugar factories	4,310	5,150	5,870
Dairy industry	150	220	300
Cakes, cookies, biscuits, etc.	50	65	80
Rice husking, cleaning, grain mills	1,020	1,030	1,110
Animal feed industry	185	270	540
Tea processing	60	55	70
Canned fruits & vegetables	35	50	70
Fruit drying & packing	20	30	40
Breweries	210	240	310
Industries not covered (approximately 20 %)	1,210	1,420	1,680
Total	7,250	8,530	10,070
1.3. Steel structures with pneumatic-conveyors elevators, etc. - tons			
Sugar factories	1,650	2,020	2,340
Dairy industry	5	7	10
Cakes, cookies, pastries, biscuits	2	3	4
Rice husking, cleaning, grain mills	1,650	1,690	1,900
Animal feed industry	120	175	410
Tea processing	3	5	6
Canned fruits and vegetables	17	25	35

	1352-56 (1973/78)	1357-61 (1978/83)
Breweries	18	20
Industries not covered-approximately 20%	695	[illegible]
Total	4,160	4,7[illegible]

1.4. Plate work combined with tubes-heat exchangers condensers, coolers, preheaters, etc. - tons

Sugar factories	2,410	2,9[illegible]
Dairy industry	100	1[illegible]5
Canned fruits and vegetables	15	[illegible]
Breweries	77	[illegible]4
Industries not covered-approximately 20%	518	639
Total	3,120	3,860

1.5. Plate work with mechanism-stirrers, crystallisers, agitators, etc. - tons

Sugar factories	5,620	6,9[illegible]
Dairy industry	90	1[illegible]0
Canned fruits and vegetables	5	7
Breweries	25	[illegible]
Industries not covered approximately 20%	1,050	1,414
Total	6,790	8,480

Forecast of Demand Production and Shortage of Special Machinery and Equipment for Food Industry in tons According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1. Supporting steel structures:	Demand	980	1,000	1,060	1,520
	Production	380	680	840	1,320
	Shortage	600	320	220	200
1.2. Plate work-tanks, bins vessels:	Demand	1,320	1,580	1,860	2,160
	Production	390	1,100	1,400	1,880
	Shortage	930	480	460	280
1.3. Steel structures with mechanism:					
	Demand	770	890	1,020	1,240
	Production	140	450	740	1,000
	Shortage	630	430	280	240
1.4. Plate work & combined with tubes:					
	Demand	520	720	800	840
	Production	80	350	600	720
	Shortage	440	370	200	120
1.5. Plate work with mechanism:	Demand	1,180	1,540	1,860	2,080
	Production	140	800	1,240	1,640
	Shortage	1,040	740	620	440

5.4 SPECIAL MACHINERY AND EQUIPMENT FOR TANNERIES

Import of Machinery and Equipment For Tanneries

Source: Foreign Trade Statistics of Iran

841-1 Hide and Skin Processing Machinery

Year	Pieces	Weight/Kg.	Value in Rials
1344(1965/6)	40	24004	2,619,[illegible]
1345(1966/7)	71	8470	1,665,274
1346(1967/8)	69	58563	9,740,[illegible]
1347(1968/9)	114	64998	10,167,[illegible]
1348(1969/70)	50	77201	15,154,[illegible]
1349(1970/1)	50	156758	23,460,[illegible]
1350(1971/2)	25	38681	10,331,176

841-2 Hide and Skin Working Machinery

Year	Pieces	Weight/Kg.	Value in Rials
1344(1965/6)	79	13960	1,947,173
1345(1966/7)	39	28150	861,91[illegible]
1346(1967/8)	30	6113	5,732,07[illegible]
1347(1968/9)	61	5109	1,924,157
1348(1969/70)	38	26180	4,279,45[illegible]
1349(1970/1)	58	54417	15,112,42[illegible]
1350(1971/2)	15	95184	27,134,077

841-3 Parts of Hide and Skin Processing and Working Machinery

Year	Pieces	Weight/Kg.	Value in Rials
1344(1965/6)		14255	1,921,630
1345(1966/7)		6476	1,717,590
1346(1967/8)		34142	6,204,026
1347(1968/9)		14688	2,413,823
1348(1969/70)		517943	40,222,926
1349(1970/1)		360563	43,556,310
1350(1971/2)		219741	43,280,278

Existing Manufacturing Facilities

There are no metal working factories in Iran specialized in production of special machinery and equipment for tanneries. Some local workshops in Tabriz and Teheran are occasionally producing not complicated machines and equipment like drums, paddles, shaving machines width 300 mm, buffing machines width 250mm and 1400mm, hydraulic presses (small size, low pressure), dryers with conveyor*.

These firms have not been visited. Dr. Ludviger mentioned in his report that the firm Abaz-Zadeh in Tabriz is producing machinery and equipment for tanneries.

The big needs of special machinery and equipment for tanneries give the possibility to a systematical production of these items. It will be possible to produce these machines in Iran in future:

	1352-6 (1973/8)	1357-61 (1978/83)	1362-5 (1983/8)
Drums of all kinds	120	140	180
Paddles of all kinds	80	90	100
Shaving machines-all sizes	18	27	40
Buffing machines small sizes	14	16	19
Brushing machines	7	9	10
Hydraulic presses	10	13	15
Planimeters	20	20	20
Spraying units for upper leather	3	4	5
Toggling units for upper leather	4	5	7
Drying units	5	5	10

Besides the above mentioned special machinery and equipment it would be possible to produce all kinds of tools - like flaying knives, fleshing knives, beamding knives, dipping knives, setting out tools and all kinds of tools in the finishing department and all kinds of internal transport like carts, shelves etc.

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* See Dr. Ludviger's Report on the Problems of the Existing Tanneries in Iran and Recommendations for Improvement.

Forecast of Demand of Special Machinery and Equipment for Tanneries

		1352-56 (1973/78)	1357-61 (1978/83)	1362-66 (1983/88)
Drums of all kinds	pcs	120	140	180
Paddles of all kinds	pcs	80	90	100
Fleshing machines	pcs	10	15	20
Shaving machines (all Sizes)	pcs	10	15	20
Metal toggling units (dryers)	pcs	4	5	7
Spraying machines-all types	pcs	3	4	5
Rolling machines (sole leather rollers)	pcs	7	8	9
Stacking machines	pcs	16	26	16
Buffing machines, small sizes	pcs	14	16	19
Buffing machines, Fulminosa	pcs	14	14	19
Drum setting machines	pcs	2	4	6
Sammying machines	pcs	6	8	9
Hydraulic presses	pcs	10	13	15
Seasoning machines (tamponing machines)	pcs	3	4	5
Measuring machines*	pcs	9	12	14
Brushing machines	pcs	7	9	10
Sboudding machines	pcs	5	7	8
Hand setting out machines (correctors)	pcs	16	18	21
Vacuum dryers	pcs	3	5	10
Planimeters	pcs	20	20	20
Setting our machines	pcs	8	10	11
Air dust removal machines	pcs	1	2	3
Pasting units	pcs	1	1	1
Setting our machines Mignon	pcs	2	4	6

* Incl. measuring machines for manufacture of leather shoes
Splitting machines are included in special machinery for production of leather shoes.

The above given forecast of demand of special machinery and equipment for tanneries has been made by the author of this study on the basis of projected growth of production of tanneries-see Master Demand Study for Mechanical and Capital Goods Products, Part 1., 4. Leather and Foodwear Industries, code No. 2911-2[illegible].

Forecast of Production of Special Machinery and Equipment for Tanneries

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Drums of all kinds	pcs	18	26	30	40
Paral[illegible] of all kinds	pcs	15	17	19	22
Shav[illegible] machines-small sizes	pcs	3	4	6	10
Buffing machines-small sizes	pcs	2	3	3	4
Brushing machines	pcs	1	2	2	2
Hydraulic presses	pcs	1	2	3	4
Planimeters	pcs	3	4	4	4
Spraying units for upper leather	pcs	-	1	1	1
Toggling units for upper leather	pcs	-	1	1	2
Drying units	pcs	1	1	1	2

Forecast of production of special machinery and equipment for tanneries has been made by the author of this study on the basis of existing capacity and growth rates applied to the production in the year 1347 (1968/9)

9.5 SPECIAL MACHINERY AND EQUIPMENT FOR MANUFACTURE OF LEATHER SHOES

Import of special machinery and equipment for leather shoe factories is [illegible] in "The Special Trade Classification of Iran" under different numbers. It is impossible to derive from these figures any data concerning the requirements of specific machines. Only import of shoemakers' sewing machines is given under tariff no. 847A3.

847A3 - Shoemakers' Sewing Machines

Year	Pieces	Weight/Kg
1344 (1965/6)	57	5005
1345 (1966/7)	375	13146
1346 (1967/8)	343	20031
1347 (1968/9)	388	40878
1348 (1969/70)	435	19565
1349 (1970/1)	344	12485
1350 (1971/2)	177	8172

Forecast of Demand of Special Machinery and Equipment for Leather Shoes Factories According to the Author of This Study

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Upper cutting machines(*)(***)	pcs	580	970	1420
Bottom part cutting machines	pcs	140	240	340
Splitting machines (**)	pcs	95	170	240
Numbering machines (***)	pcs	60	100	140
Marking machines (***)	pcs	120	200	280
Skiving machines (*)	pcs	340	580	790
Edge trimming machines	pcs	45	80	115
Buffing machines	pcs	45	80	155
Drying cabines	pcs	230	400	570
Folding machines (*)	pcs	140	240	340
Perforating machines	pcs	45	80	115
Lasting machines	pcs	45	80	115

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Eyeleting machines	pcs	90	160	230
Forming machines for upper parts	pcs	140	240	340
Lasting machines	pcs	140	240	340
Pounding machines	pcs	45	80	115
Scouring machines	pcs	90	160	230
Roughing-up machines	pcs	90	160	230
Delasting machines	pcs	45	80	115
Spraying boxes	pcs	90	160	230
Molling and Damping cabine	pcs	45	80	115
Presses for soles and insoles	pcs	45	80	115
Sole attaching presses	pcs	45	80	115
Cement applying machines(***)	pcs	445	730	1020
Sole stitching machines	pcs	90	160	230

* Incl. machines for production of other leather articles-travel articles etc.

** Incl. machines for tanneries

*** Incl. machines for rubber shoes

The above mentioned machines and equipment are arranged in groups, i.e. one item represents not only different sizes but also different machines for similar purpose.

Existing Manufacturing Capacity

Until now there is no factory producing machinery and equipment for production of leather shoes.

Production of special machinery and equipment for manufacture of leather shoes is not inviable; only few types of not complicated machines (for example machines for bottom part cutting machines etc.) could be produced in future in combination with other programs like production of machine tools, machinery and equipment for milling industry etc.

[illegible] MACHINERY AND EQUIPMENT FOR MANUFACTURE OF RUBBER PRODUCTS

Import of special machines and equipment for manufacture of rubber products is [illegible] "CSU Foreign Trade Statistics of Iran" under different [illegible]. It is impossible to assess from these figures any data concerning the requirements of specific machines.

Forecast of Demand of Special Machinery and Equipment for Manufacture of Rubber Products (without electr. industry)

		1352-56 (1972-78)	1357-61 (1978-83)	1362-66 (1983-88)
Bale cutting machines	pcs	15	20	28
Banbury mixers	pcs	12	21	28
Roll mills	pcs	100	130	190
Mixers	pcs	30	40	60
Calenders with 3,4,5,6 rolls	pcs	170	230	310
Wind-up equipment to calenders	pcs	35	45	60
Extruders	pcs	70	95	130
Rubber multi-stage presses	pcs	70	90	125
Rubber splitting machines	pcs	15	18	25
Milling machines for overflow	pcs	17	21	28
Shears for overflow	pcs	36	45	60
Rubber surfacing machines-all types	pcs	50	60	80
Tire building machines	pcs	110	160	260
Tire curing presses	pcs	190	280	450
Post-cure inflation machines	pcs	170	250	400
Bead building machines	pcs	50	80	130
[illegible] machines	pcs	12	16	25
Flipper machines	pcs	20	30	50
Filler machines	pcs	12	18	28
Dip units(for bead wires)	pcs	10	15	25
Dip units-continuous for [illegible]s, proph. etc.	pcs	5	10	20
Inner tube presses	pcs	25	40	60

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Band wrapping machines	pcs	8	12	20
Rubber trimming machines	pcs	8	12	20
Buff runners	pcs	25	40	60
Buffing machines	pcs	20	30	50
Slitting machines	pcs	10	15	25
Wind-up rolls	pcs	25	40	60
Timer machines	pcs	5	8	10
Festooners	pcs	4	6	10
Winding machines for rubber hoses	pcs	5	10	15
Pocket making machines	pcs	40	60	100
Skiving machines	pcs	10	15	20
Soleing and heeling machines	pcs	90	110	150
Patching device without heating	pcs	400	500	600
Patching device with heating	pcs	400	600	800
Tyre testing machines	pcs	1	2	2
Rubber bending machines	pcs	1	1	1
Rubber tensile testing machines	pcs	2	3	3
Tube joining machines	pcs	12	18	25

Existing Manufacturing Capacity

Until now there is no factory producing machinery and equipment for production of machinery and equipment for rubber industry.

The above given data show that in future it will be possible to produce some kinds of these machines - for example roll mills, calenders, mixers, extruders (in combination with extruders for plastics), rubber vulcanizing presses, tire curing presses etc. in big mechanical engineering factory.

[illegible] of Special Machinery and Equipment for [illegible] Industry

		[illegible]	1356 (1977/8)	1361 (1982/3)	1362 (1987/8)
[illegible]	pcs	3	4	5	7
[illegible]	[illegible]	3	4	5	7
[illegible]	[illegible]	[illegible]	[illegible]	90	120
[illegible]	pcs	7	9	10	13
Extruders	pcs	16	19	24	30
Rubber multi-stage [illegible]	[illegible]	[illegible]	17	20	27
Rubber splitting machines	[illegible]	-	3	4	5
[illegible] milling machines for [illegible]	pcs	6	7	8	11
Rubber surfacing machines - all types	pcs	9	12	14	18
Tire building machines	pcs	16	28	38	60
Tire curing presses	pcs	30	48	65	108
Post-cure inflation machines	pcs	26	44	58	100
[illegible]		8	12	20	30
[illegible] filler machines	pcs	7	10	12	22
[illegible]	pcs	4	6	9	14
[illegible] machines		7	11	17	26
[illegible]		4	6	9	15
[illegible] machines		14	[illegible]	24	32
[illegible] with or without [illegible]	pcs	150	210	230	300

It is advisable to build in the fifth five-year plan a new plant for [illegible] of special machinery and equipment for manufacture of fubber [illegible] and plastics, mainly roll mills, mixers, calenders, extruders, [illegible] multi-stage process, tire building machines and tire curing presses, [illegible] capacity approximately [illegible] tons/year. This plant should start [illegible] production in the sixth five-year plan and to achive the full capacity [illegible] the seventh five-year plan. This plant should be equipped with own [illegible] for production of grey iron as well as steel cashings. Other [illegible], not produced in plant, will be imported.

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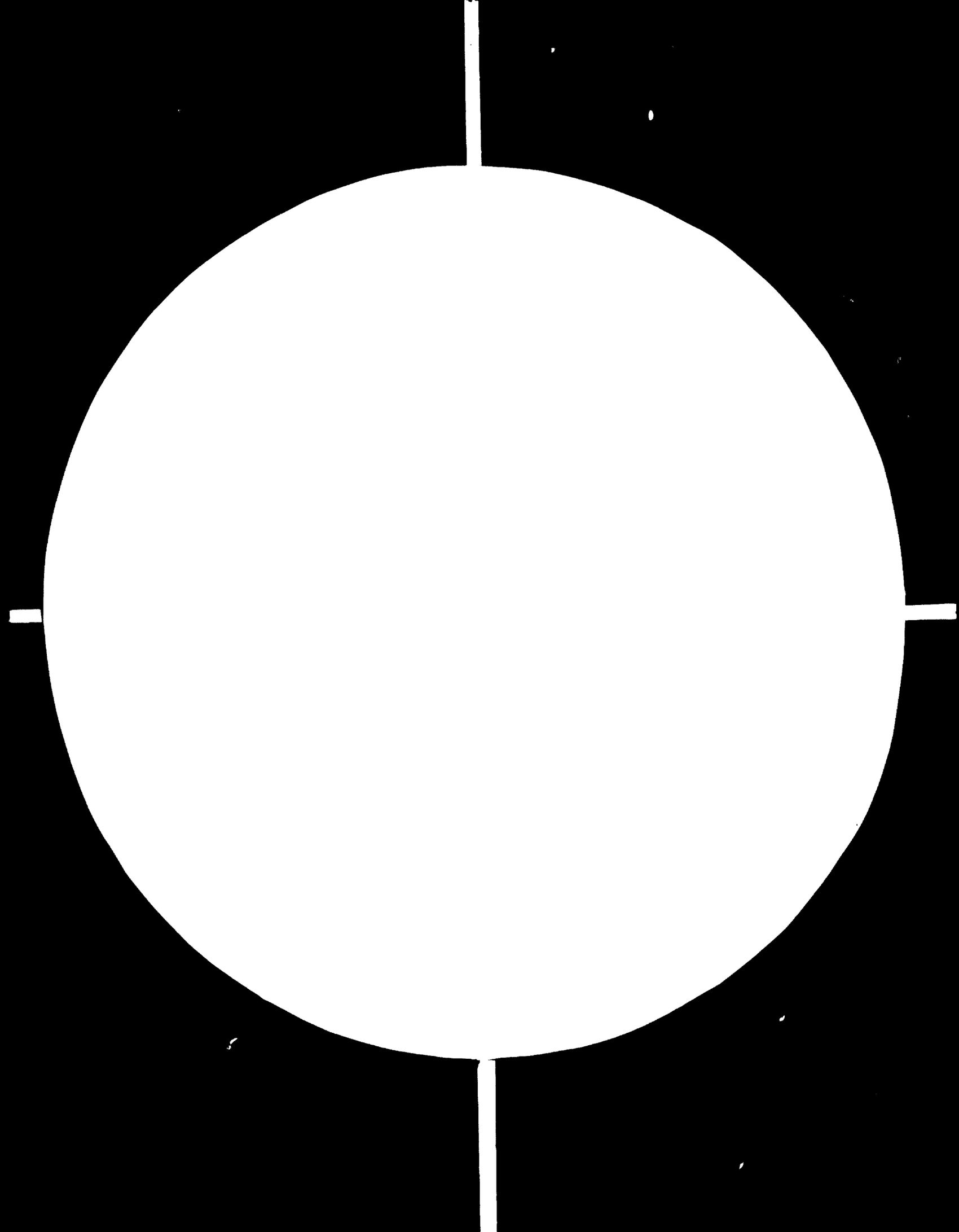

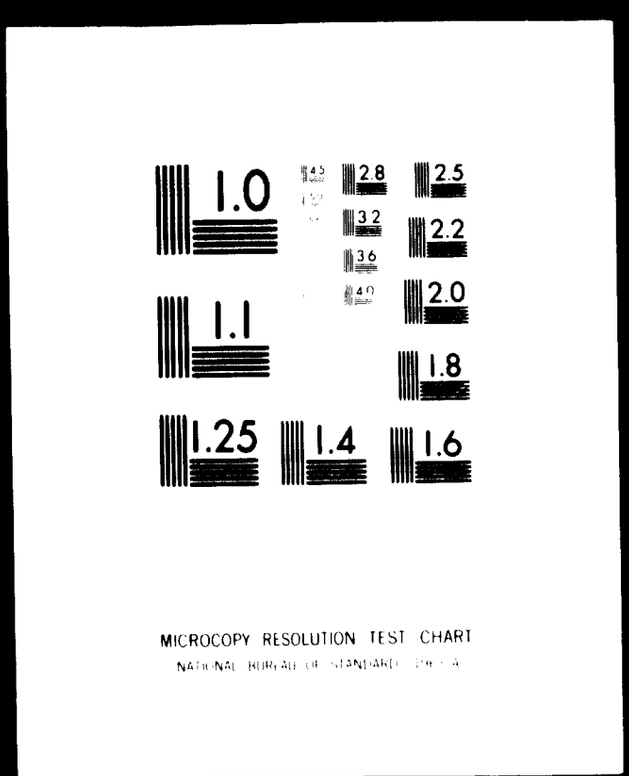

5.70 SPECIAL MACHINERY AND EQUIPMENT FOR NON-METALIC MINERAL PRODUCTS

5.71 SPECIAL MACHINERY & EQUIPMENT FOR CEMENT FACTORIES

There are no data about import of special machinery and equipment for Cement plants (there is no self-contained category in "The Foreign Trade Statistics of Iran").

The calculation of demand of machinery and equipment in the fifth, sixth and seventh five-year plans has been made by the author of this study on the basis of projected growth of production of cement - see Master demand Study for Mechanical and Capital Goods Products, Part 1., 9. Non- Metalic Mineral Products. It is based on project 1 x 2000 tons/day.

Forecast of Demand of Machinery and Equipment for Cement Plants.
1. Special Machinery and Equipment.

	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
1.1. Supporing steel structures - tons	6,900	7,240	10,350
1.2. Plate work-tanks and bins - tons	3,980	4,170	5,960
- cyclons -tons	240	250	350
- piping - tons	3,040	3,190	4,560
1.3. Steel structures with mechanism-			
- elevators - tons	6,560	6,890	9,840
- belt conveyers - tons	3,050	3,200	4,580
- worm conveyers - tons	1,030	1,080	1,540
- feeders - tons	590	620	880
1.5. Plate work with mechanism-kilns-tons	19,980	20,980	29,900
- mills - tons	26,400	27,720	39,600
- driers - tons	1,450	1,520	2,170
- sorters, separators-tons	2,850	2,990	4,270
1.6. Filters - tons	2,940	3,090	4,410
Crushers - tons	1,790	1,870	2,680
Rotary packing machines - tons	440	460	660
Homogenizing and aerating equipment-tons	810	850	1,220

2. Other Machinery and Equipment

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
2.1.	Pumps - tons	1,960	2,060	2,940
	Compressors - tons	454	480	680
	Ventilators - tons	1,740	1,820	2,600
2.2.	Cranes, lifts - tons	4,140	4,340	6,210
2.3.	Boiler house - tons	930	980	1,400
2.4.	Maintenance equipment-machine tools-tons	1,100	1,165	1,650
2.5.	Electrical equipment - tons	4,740	4,980	7,110
2.6.	Measuring equipment, remote control-tons	22	23	33
2.8.	Weighing equipment - tons	456	480	690
2.9.	Excavators - tons	1,660	1,740	2,490
	Drill rigs - tons	520	550	780

Forecast of Demand, Production and Shortage of Special Machinery and Equipment for Cement Factories in tons

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1. Supporting steel structures:				
Demand	1300	1400	1500	2200
Production	180	800	1500	2200
Shortage	1120	600	-	-
1.2. Plate work-tanks, bins, vessels:				
Demand	1350	1500	1580	[illegible]
Production	160	900	1580	[illegible]
Shortage	1190	600	-	-
1.3. Steel structures with mechanism:				
Demand	2180	2300	2420	3500
Production	-	1500	2420	3500
Shortage	2180	800	-	-
1.4. Plate work with mechanism:				
Demand	9800	10300	11200	16400
Production	-	2000	[illegible]	[illegible]
Shortage	9800	8300	[illegible]	[illegible]
1.5. Other machinery and equipment:				
Demand	1170	1200	[illegible]	2000
Production	-	[illegible]	[illegible]	[illegible]
[illegible]	1170	1000	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Cast or forged balls and cylpebs are used for grinding olinker with gypsum to finished cement. The ratio is appr. 60% of balls and 40% of cylpebs. The caloulation of the demand of balls and cylpebs is based on the ratio of consumption of balls aba cylpebs (in Kg) to production of 1 ton of cement. For Iranian cement factories this ratio was adopted as follows:

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Ratio - Balls and cylpebs in Kg: 1 ton of produced cement.	1.2	1.1.	1.0	0.9

Based on the above given ratio, the demand of balls and cylpebs in cement factories will be:

	1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Cast balls and cylpebs - tons	2,160	4,460	7,100	11,070
Forged balls - tons	2,160	4,460	7,100	11,070
Total balls and cylpebs - tons	4,320	8,920	14,200	22,140

All balls and cylpebs are now imported. It is advisable to produce these balls and cylpebs in the future in Iran (See Foundries and Forge Plants).

There is a big consumption of spare parts in cement industry, mainly of special castings with high content of Mn or of fire resistant castings. The consumption in Iranian factories is now very high (approx. 1 up to 1,1 Kg per 1 ton of produced cement), but it is presupposed that in the future it will be lower.

The Demand of Special Castings

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8
Special castings	- tons	3,800	6,930	11,360	17,220

All these special castings are now imported. It is advisable to produce these special castings in the future in Iran (See Foundries and Forge Plants).

5.72 SPECIAL MACHINERY AND EQUIPMENT FOR LIME PLANTS

The calculation of demand of special machinery and equipment for lime plants in the fifth, sixth and seventh five-year plans has been made by the author of this study on the basis of projected growth of production of lime see Master Demand Study for Mechanical and Capital Goods Products 1972-1987, Part 1., 9. Non-Metalic Mineral Products, Code 3391.

Forecast of Demand of Machinery and Equipment for Lime Plants

			1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
1.	Special Machinery and Equipment				
1.1	Supporting steel structures	tons	1650	2200	2750
1.2	Plate work - tanks and bins	tons	4530	6040	7550
	- piping	tons	260	350	435
1.3	Steel structures with mechanism-				
	- belt and worm coveyors	tons	2320	3090	3860
	- feeders and hoppers	tons	805	1070	1340
1.5	Plate work with mechanism-mills	tons	760	1010	1270
	-Kilns	tons	12170	16220	20280
	-hydrating equipment	tons	480	635	800
	-sorters, cyclones, separators	tons	125	165	205
1.6	Filters	tons	530	700	875
	Jaw, conic and hammer crushers	tons	810	1080	1350
	Packing machines	tons	72	95	130
2.	Other Machinery and Equipment				
2.1	Pumps	tons	60	80	100
	Compressors	tons	240	320	400
	Ventilators	tons	430	580	720
2.2	Cranes, lifts	tons	600	800	1000
2.4	Maintenance equipment	tons	750	1000	1250
2.5	Electrical equipment	tons	1540	2050	2610
2.6	Measuring equipment, [illegible]	tons	230	305	380
[illegible]	[illegible] equipment	tons	180	240	300
[illegible]	[illegible] generators	tons	60	80	100

The calculation of demand of machinery and equipment is based on project of lime plant with capacity 500 tons of lime per day

Forecast of Demand of Special Machinery and Equipment for lime Plants

			1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1	Supporting steel structures	tons	160	440	440	550
1.2	Plate work- tanks, bins, piping	tons	180	1280	1280	1600
1.3	Steel structures with mechanism	tons	310	830	830	1040
1.5	Plate work with mechanism	tons	1350	2910	2910	4510
1.6	Other machinery and equipment	tons	130	370	370	470
	Total	tons	2430	5830	5830	8170

It is advisable to produce special machinery and equipment for lime plants partly with special machinery and equipment for brick factories, partly with special machinery and equipment for cement factories. Spare parts are not included in the above given forcast of demand of special machinery and equipment for lime plants.

5.73 SPECIAL MACHINERY AND EQUIPMENT FOR PLASTER OF PARIS FACTORIES

The forecast of demand of machinery and equipment for plaster of Paris factories has been made by the author of this study on the basis of projected growth of production of plaster of Paris - see Master Demand Study for Mechanical and Capital Goods Industry, Part 1., 9. Non-Metalic Mineral Products, Code No. 3392.

Forecast of Demand of Machinery and Equipment for Plaster of Paris Factories

			1352-56 (1973/78)	1357-61 (1978/83)	[illegible]
1.	Special Machinery and Equipment				
1.1	Supporting steel structures	-tons	119	148	90
1.2	Plate work - tanks and bins	-tons	455	569	350
	- piping	-tons	200	250	155
	- cyclons	-tons	48	60	38
1.3	Steel structures with mechanical belt conveyors	-tons	192	240	150
	- feeders	-tons	125	155	95
	- worm conveyors	-tons	148	185	115
1.4	Plate work with mechanical-				
	- separators	-tons	69	86	53
	- mills	-tons	560	700	430
	- dryers	-tons	800	1000	620
	[illegible]	-tons	205	255	155
	[illegible]	-tons	194	248	150
	[illegible]	-tons	23	28	17
2.	[illegible]				
	[illegible]	-tons	32	40	24
	[illegible]	-tons	37	46	28
	Ventilators	-tons	114	142	85
	Fittings	-tons	64	80	48
2.2	Cranes	-tons	60	75	45
2.4	Maintenance equipment	-tons	96	120	72
2.5	Electrical equipment	-tons	420	525	315

The calculation of demand of machinery and equipment id based on project 2 x 500 tons/day.

Forecast of Demand, of Special Machinery and Equipment for Plaster of Paris Factories

			1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1	Supporting steel structures	-tons	-	30	30	20
1.2	Plate work-tanks, bins, vessels	-tons	-	160	175	110
1.3	Steel structures with mechanism	-tons	-	120	135	85
1.5	Plate work with mechanism	-tons	-	360	370	230
1.6	Other machinery and equipment	-tons	-	110	120	75
	Total	-tons	-	780	830	520

It is presupposed that special machinery and equipment for plaster of Paris factories will be produced with special machinery and equipment for cement factories i.e. either in the Machine Building Plant in Arak, or in a new plant.

5.74 SPECIAL MACHINERY AND EQUIPMENT FOR PRODUCTION OF SANITARY CERAMIC WARE

The forecast of demand of machinery and equipment for production of sanitary ceramic ware has been made by the author of this study on the basis of projected growth of production of sanitary ceramic ware - see Master Demand Study for Mechanical and Capital Goods Industry, Part 1., 9. Non - Metalic Mineral Products, Code No. 333.

Forecast of Demand of Machinery and Equipment for Production of Sanitary Ceramic Ware

			1352-56 (1973/78)	1357-61 (1978/83)	1362-66 (1983/88)
1.	Special Machinery and Equipment				
1.1	Supporting steel structures	tons	6.8	13.6	27.2
1.2	Plate work - tank and bins	tons	3.2	6.4	12.8
1.3	Steel structure with mechanism - feeders loaders	tons	24.0	48.0	96.0
	- belt conveyors, elevators	tons	22.0	44.0	88.0
	- dryers	tons	18.3	36.6	73.2
	- tunnel kilns	tons	206.0	412.0	824.0
1.4.5	Plate work with mechanismus-drum mills	tons	88.0	176.0	352.0
	- dust separating equipment	tons	30.2	60.4	120.8
1.6	Crushers and mills	tons	49.3	98.6	197.2
	Mixers (propeller, double shaft etc.)	tons	21.3	42.6	85.2
	Vibrating screens, magnet separators	tons	0.9	1.8	3.6
	Grinding machines, retouching wheels	tons	42.0	84.0	168.0
2.	Other Machinery and Equipment				
2.1	Special pumps for ceramic industry	tons	5.7	11.4	22.8
	Water pumps	tons	2.5	5.0	10.0
	Compressors	tons	37.0	74.0	148.0
2.3	Boiler house and gas reduction station	tons	25.0	50.0	100.0
2.4	Maintenance equipment-machine tools	tons	64.0	128.0	256.0
2.5	Electrical equipment	tons	40.0	80.0	160.0
2.8	Weighing equipment	tons	2.6	5.2	10.4
2.9	Dieselgenerator	tons	7.6	15.2	30.4

The calculation of demand of machinery and equipment is based on projeot 2400 tons/year.

For [illegible] Machinery and equipment for Production of Sanitary Ceramic Ware

			1971 (1972/3)	1976 (1977/8)	1981 (1982/3)	1986 (1987/8)
1.1	Supporting steel structures	tons	-	3	3	6
1.2	Plate work - tanks etc.	tons	-	1	1	3
1.3	Steel structures with mechanism	tons	-	78	132	260
1.5	Plate work with mechanism	tons	-	34	57	115
1.6	Other machinery and equipment	tons	-	32	54	110
2.1	Special pumps for ceramic industry	tons	-	2	3	6
	Total	tons	-	760	250	500

It is advisable to produce special machinery and equipment for production of sanitary ceramic ware partly with special machinery and equipment for brick factories, partly with special machinery and equipment for cement factories. Spare parts are not included in the above given forecast of demand of special machinery and equipment for production of sanitary ceramic ware .

5.75 SPECIAL MACHINERY AND EQUIPMENT FOR PRODUCTION OF PORCELAIN INSULATORS AND UTILITY TABLE WARE

The calculation of demand of special machinery and equipment for production of porcelain insulators and utility table ware has been made by the author of this study on the basis of projected growth of production of porcelain insulators and utility table were - see Master Demand Study for Mechanical and Capital Goods Industry, Part 1., 9. Non-Metalic Mineral Products, Code No. 3814.

Forecast of Demand of Machinery and Equipment for Production of Porcelain Insulators and Utility Table Ware

		1352-56 (1973/78)	1357-61 (1978/83)	1362-6 (1983/8
1. Special Machinery and Equipment				
1.1 Supporing steel structures	tons	9.0	7.5	6.0
1.2 Plate work-tanks, bunkers	tons	5.0	5.0	4.0
-pallets	tons	4.5	3.8	3.0
1.3 Steel structures with mechanism				
-belt conveyors	tons	54.0	45.0	36.0
-feeders, loaders	tons	26.6	21.5	19.3
1.5 Plate work with mechanism				
-tunnel kilns	tons	530.0	442.0	354.0
-dryers	tons	260.0	217.0	173.0
-Calcination furnace	tons	26.3	21.8	17.4
-electr. decorating kilns	tons	342.0	285.0	228.0
-drum mills	tons	138.0	115.0	92.0
1.6 Crushers and edge runner mills	tons	29.7	24.8	19.4
Mixers, worm vacuum presses	tons	43.2	35.8	28.8
filter presses	tons	64.0	54.2	42 6
Magnet, separators, vibrate screens	tons	2.0	1.6	1.2
Potter's whssls, semi-automatic and automatic machines, copying maohines etc.	tons	46.0	38.2	31.0
Glasing and decorating lines incl. spraying booths, washing machines etc	tons	168.0	140.0	112.0
Grinding machines	tons	91.0	76.0	61.0
2. Other Machinery and Equipment				
2.1 Special pumps for ceramic industry	tons	7.6	6.3	5.2

		[illegible]	[illegible]-61 ([illegible])	[illegible]-66 ([illegible])
	[illegible]	[illegible]	4.0	5.[illegible]
	[illegible]	[illegible]	58.2	46.7
Compressors	tons	4.5	3.8	3.0
[illegible]	[illegible]	36.0	30.0	24.0
[illegible]	[illegible]	[illegible]	[illegible]	31.0
[illegible]	[illegible]	[illegible]	177.0	142.0
[illegible]	[illegible]	[illegible]	[illegible]	10.0
[illegible]	[illegible]	[illegible]	7.5	5.6
[illegible]	[illegible]	7.2	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	18.7

[illegible] ment is based on [illegible] roject
[illegible] ware, capacity [illegible] tons/
[illegible] tons, or only [illegible] tons/

[illegible] t for production of

		[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	1.2
		[illegible]	[illegible]	1.4
[illegible] structures with [illegible]	[illegible]	52.2	[illegible]	11.1
[illegible]	[illegible]	[illegible]	[illegible]	175.0
[illegible]	[illegible]	[illegible]	[illegible]	60.2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	3.0	[illegible]	1.1
		750.0	[illegible]	250.0

[illegible] vicultural to [illegible] and equipment for production
[illegible] insulators [illegible] cept special semi-automatic
[illegible] forming [illegible] machinery and equipment
[illegible] of chairs, partitions [illegible] y and equipment for cement
[illegible] (calcination furnaces, [illegible] etc.)
[illegible] are parts are not [illegible] [illegible] forecast of demand of
[illegible] machinery and [illegible].

5.76 SPECIAL MACHINERY AND EQUIPMENT FOR PRODUCTION OF REFRACTORY WARE

The forecast of demand of special machinery and equipment for production of refractory ware has been calculated by the author of this study on the basis of projected growth of production of refractory ware-see master Demand Study for Mechanical and Capital Goods Industry, Part 1., 9. Non-Metalic Mineral Productn, Code No. 3314.

Forecast of Demand of Machinery and Equipment for Production of Refractory Ware

		1352-56 (1973/78)	1357-61 (1978/83)	1362-66 (1983/88)
1. Special Machinery and Equipment				
1.1 Supporting steel structures	tons	192.0	256.0	320.0
1.2 Plate work-tanks, bunkers, vessels	tons	92.0	122.3	153.0
-piping	tons	103.0	137.3	172.0
1.3 Steel structures with mechanism-feeders	tons	37.3	50.0	62.0
-belt and worm conveyors	tons	63.6	84.8	109.0
1.5 Plate work with mechanism-tunnel kilns with cars	tons	724.0	923.0	1206.0
-dryers	tons	139.0	186.0	232.0
-Calcination furnaces	tons	52.5	70.0	88.0
-drum mills and separators	tons	143.1	190.0	238.0
1.6 Crushers	tons	64.5	86.0	107.0
Edge runner mills	tons	70.0	93.0	116.0
Mixers, desintegrators	tons	231.0	308.0	385.0
Filters, vibrating screens	tons	116.0	141.0	192.0
2. Other Machinery and Equipment				
2.1 Pumps	tons	12.0	16.0	20.0
Ventilators	tons	28.0	37.0	47.0
Compressors	tons	6.6	8.8	11.0
2.3 Boiler house	tons	44.0	58.0	73.0
2.4 Hydraulic and mechan. presses for ceramic	tons	183.0	244.0	305.0
Machine tools	tons	74.0	98.0	123.0
Other maintenance equipment	tons	32.0	43.0	53.0
2.5 Electrical equipment	tons	535.0	580.0	725.0
2.7 Laboratory equipment	tons	24.0	32.0	40.0
2.8 Weighing machines	tons	15.0	20.0	25.0
2.9 Diesel generators	tons	19.2	25.0	32.0
Tilting trucks	tons	10.5	14.0	17.0

The calculation of demand of machinery and equipment is based on project 24,000 tons of refractory ware per annum.

Forecast of Demand of Special Machinery and Equipment for Production of Refractory Ware

			1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1	Supporting steel structures	tons	-	58.0	60.0	70.0
1.2	Plate work-tanks, bins, piping	tons	-	59.0	64.0	75.0
1.3	Steel structures with mechanism	tons	-	30.0	33.0	38.0
1.5	Plate work with mechanism	tons	-	320.0	335.0	384.0
1.6	Other machinery and equipment	tons	-	119.0	140.0	175.0
2.4	Special presses for refractory ware		-	54.0	58.0	68.0
	Total	tons	-	640.0	690.0	810.0

It is advisable to produce special machinery and equipment for production of refractory ware partly with special machinery and equipment for brick factories, partly with special machinery and equipment for cement factories (calcination furnaces, dryers etc.)

Spare parts are not included in the above given forecast of demand.

5.77 SPECIAL MACHINERY AND EQUIPMENT FOR BRICK FACTORIES

There are no data about import of special machinery and equipment for bric factories, except the following one tariff numbers:

Tariff No.		1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
840-2	Earth moulding machinery	pcs	22	35	23	336	37	16
		tons	105.8	57.1	86.2	321.8	96.1	77.4

Other tariff numbers in the Foreign Trade Statistics of Iran are not self-contained categories.

On the basis of the forecast of demand on machine made bricks given in the Master Demand Study for Mechanical and Capital Goods Products 1972-1987 Part 1., 9. Non-Metalic Mineral Products, Code No. 3311, the calculation of demand of special machinery and equipment for brick factories in the fifth, sixth and seveth five-year plans has been made by the author of this study.

Forecast of Demand of Machinery and Equipment for Brick Factories

			1352-56 (1973/78)	1357-61 (1978/83)	1362/66 (1983/88)
1.	Special Machinery and Equipment				
1.1	Supporting steel structures	tons	2410	4820	6025
1.3	Steel structures with mechanism -conveyors	pcs	582	1164	1455
		tons	1840	3680	4600
	-feeders	pcs	532	1064	1330
		tons	3260	6520	8150
1.5	Plate work with mechanism -drying ovens	pcs	108	216	270
		tons	4456	8912	11140
	-round aur tunnel kilns	pcs	108	216	270
		tons	12184	24368	30460
1.6	Pug mills	pcs	100	200	250
		tons	1416	2832	3540
	Hammer crushers with rolls	pcs	58	116	145
		tons	248	496	620
	Roll mills with rolls grinders	pcs	266	532	665
		tons	1942	3884	4855
	Double shaft mixers and filter mixers	pcs	144	288	360
		tons	780	1440	1800

		1352-56 (1973/78)	1357-61 (1978/83)	1362-66 (1983/88)
Worm presses and vacuum worm presses	pcs	144	288	360
	tons	1188	2376	2970
Automatic brick cutters	pcs	144	288	360
	tons	100	200	250
Semi-automatic and fully automatic brick lines	pcs	288	576	720
	tons	1336	2672	3340
Loaders, column storage racks, drying trucks travelling units	pcs	698	1396	1745
	tons	1480	2960	3700
Total		32580	65160	81450
2. Other machinery end Equipment				
2.1 Pumps		45	90	110
Ventilators		650	1300	1620
2.4 Maintenance equipment-mechine tools		1050	2100	2600
2.5 Electrical equipment -	tons	10750	21,500	27000
2.8 Weighing equipment	tons	970	1940	2430
2.9 Excavators	pcs	118	236	295
	tons	1304	2608	3260
mine tippler cars	pcs	1200	2400	3000
	tons	462	924	1155

It is presupposed that from the beginning of the seveth five-year plant onward each year these will be built 11 mechanized brick factories beving capacity 8,000,000 bricks/year each, 25 mechanized brick factories, heving capacity 15,000,000 bricks/year each and 18 mechanized brick factories, having capacity 3,000,000 brick/year each.

Forecast of Demand of Special Machinery and Equipment for Brick Factories

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
1.1 Supporting steel structures	tons	240	725	1080	1200
1.3 Steel structures with mechanism - conveyors	tons	185	550	820	920
- feeders	tons	325	980	1470	1630

			1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
[illegible]	Plate work with mechanisms-drying ovens	tons	445	1340	2030	2230
	-round and tunnel kilns	tons	1220	3660	5500	6100
[illegible]	Pan mills	tons	140	425	640	710
	Hammer crushers with rolls	tons	25	75	120	130
	Roll mills with rolls grinders	tons	195	590	880	970
	Double shaft mixers and filter mixers	tons	70	220	330	360
	Worm presses and vacuum worm presses	tons	120	360	535	600
	Automatic brick cutters	tons	10	30	45	50
	Semi-automatic and fully automatic brick lines	tons	135	300	510	670
	Loaders, column storage racks, drying trucks, travelling units	tons	150	445	670	740
	Total	tons	3260	9700	14730	16310

It is advisable to build the plant for production of machinery and equipment for brick factories as a new, self-contained unit with own foundry.

[illegible] Programme and Capacity of [illegible] Plant

	tons/year	[illegible] tons/year
[illegible] supporting steel structures	-	1205
[illegible] pit excavators	59	652
[illegible] belt conveyors	291	920
[illegible] gravity feeders	266	1630
[illegible] incl. air handling units	54	2228
[illegible] incl. air [illegible] ing units and walking turing	31	686
[illegible] incl. air handling [illegible] and furnace cars	23	406
[illegible]	50	708
[illegible] with rolls	29	124
[illegible]	133	931
[illegible]	133	40
[illegible] mixers and filt[illegible]	72	360

	pcs/year	tons/year
Worm presses and vacuum worm presses	72	594
Automatic brick cutters	72	50
Semi-automatic brick lines (rear, front and sleep conveyors and column loaders	36	162
Fully-automatic brick lines (strip path, rear and front conveyors, one-or two-column sleep conveyor, one-or two-column loaders)	36	504
Loaders	72	180
Column storage racks	61	278
Drying trucks	108	146
Travelling units	108	1[illegible]6
Sub total		16940
Spare parts		[illegible]
Production of the same machinery and equipment for manufacture of refrectory products, pottery, china etc.		1140
Total capacity of the plant		24000

The plant should be universal as much as possible in order to [illegible] the demand of machinery and equipment for small as well as biggest [illegible] [illegible] in [illegible] and also to cover partly the demand of machinery [illegible] [illegible] for other [illegible] as for example manufacture of china and earthenware, pottery, refractory products, terracotta etc.

[illegible] the construction of the plant in the fifth [illegible] operation in the sixth five-year plant. [illegible] and shortage of special machinery [illegible]

		[illegible]	1356 (1977/8)	[illegible]	1366 (1987/8)
[illegible]	tons	[illegible]	12500	[illegible]	[illegible]000
[illegible]ty	tons	-	24000	[illegible]	24000
[illegible]tion	[illegible]	-	11500	[illegible]	[illegible]000
[illegible]	[illegible]	[illegible]	1000	-	-

[illegible] for [illegible]

[illegible] product [illegible]

[illegible]ption of Machinery, Equipment and Process

The manufacture of machinery and equipment for brick factories will be [illegible] into the following sections:

Foundry for production of grey iron castings, steel and malleable [illegible] and non-ferrous metal castings, preparation shop of material, mechanical shop for steel structures, mechanical shop for heavy and medium components and parts, mechanical shop for small components and parts and mounting shop.

SPECIAL MACHINERY AND EQUIPMENT FOR STONE CUTTING AND GRINDING

Special machinery and equipment for stone cutting and grinding is partly produced in Iran, partly imported. The import statistics of Iran are of no help as this machines are compiled under different tariff numbers with other machines.

Statistical data about production of special machinery and equipment for stone cutting and grinding are compiled under two code numbers and are not giving the whole picture:

		1345 (1966/7)	1346 (1967/8)
Stone cutting and grinding machineries	pcs	9	6
	1000 Rials	560	69.0
Emery machines*	pcs	250	50
	1000 Rials	1075	200

* For different kinds of raw materials to be polished or ground.

Source: Bureau of Statistics of the Ministry of Economy.

Forecast of Demand of Special Machinery and Equipment for Stone Cutting and Grinding According to the Author of This Study

		1352-1356 (1973-1978)	1357-1361 (1978-1983)	1362-1366 (1983-1988)
Stone cutting saws 1-110 blades	pcs	150	170	210
Stone cutting circular saws	pcs	10	13	15
Stone polishing machines	pcs	330	420	500
[illegible] machines	pcs	10	13	17
[illegible] cutting & polishing	pcs	10	13	17

[illegible] grinding machines [illegible] for stone grinding see Electric [illegible] achines.

Forecast of demand is based on projected growth of stone cutting and grinding industry - see Master Demand Study for Mechanical and Capital Goods Products, Part 2: Non-Metallic Mineral Products, Code Nr. 3399.

[illegible] Manufacturing Capacity

There are some small workshops in Iran producing stone cutting frame saws, circular saws and stone polishing machines. Most probably the [illegible] of these machines is:

[illegible] Co. Teheran

This firm is producing stone cutting frame saws as well as circular [illegible] stone polishing machines. Number of workers 20. Previously this firm has produced also machines for tea industry, but it stopped this production [illegible] lack of orders.

Other products: ball mills for ceramic industry etc.

Existing capacity does not cover the needs of Iranian stone cutting and grinding industry. Machinery and equipment produced now in Iran is of old design, mostly 25-30 years back the temporary state of technology in the most advanced countries. It is advisable to change the design of produced machines and either to enlarge the existing workshops or to build medium size factory for production of these machines, combined with production of machines for ceramic industry, mainly for mosaic etc.

Forecast of Demand, Production and Shortage of Special Machinery and Equipment

For Stone Cutting and Grinding

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Stone cutting machines					
[illegible]	pcs	26	35	40	46
[illegible]	pcs	17	30	35	42
Shortage	pcs	9	5	5	4
Stone polishing machines					
[illegible]	pcs	50	75	90	110
[illegible]	pcs	[illegible]	[illegible]	75	90
[illegible]	pcs	10	15	15	20

MACHINERY AND EQUIPMENT FOR CIVIL ENGINEERING

High demands laid upon civil engineering in last decade in Iran resulted in its qualitative change. A building company, working without mechanical help of any kind and using the manuel work only, belongs to the past. A new type of a large-scale corporations has been established, specialized exclusively in one type of activity only for example construction of roads etc. To ensure the erection and its execution in a most economical way, these establishments have to be outfitted with a perfect machine park. This concerns not only the rentability, as for example saving the labour, but also to take charge over the building technology. Some types of machines are absolutely necessary for a succesful accomplishment of the work.

The engineering industry has produced a wide assortment of special machines with high operation efficiency to be used in civil engineering. First of all, the machines, have to improve the technology and final product-the building work of any kind, and their second task being the elimination of the labour.

There are two groups of machinery and equipment used in civil engineering:

1. Universal machinery and equipment used in different other industries, for example transport means (trucks, conveyors, pulley blocks, carts etc.), compressors, pumps, welding machines, machine tools etc.
2. Special machinery and equipment used only (or predominantly) in civil engineering, for example machinery and equipment for mixing technique, road rollers, vibrators, equipment for the construction of the concrete or bituminous roadways etc.

Universal machines are dealt in respective chapters, this chapter is dealing special machinery and equipment used in civil engineering.

[illegible] FOR THE CONSTRUCTION THE CONCRETE ROADWAYS

[illegible] for the construction the concrete roadways is represented by:

- [illegible] mixers included in the section Mixing Technique
- [illegible] spreaders
- Finishers for concrete [illegible] and also the levelling finishers
- Gap cutters
- [illegible] fillers
- Varnish sprayers

[illegible] for the construction of concrete carpet [illegible] generally of concrete spreaders, finishers, machines for finishing operations such as gap cutters, gap fillers and varnish sprayers. These machines are [illegible] not only for constructing the concrete roadways of certain [illegible] but also for constructing the airport runways, floors of store spaces etc.

The demand of these machines in Iran is and will remain low, (approx. [illegible] in 1356) therefore their production is not suggested and the [illegible] will be covered by import. Only in the case the ratio of [illegible] of concrete to asphalt roadways will substantially change in the future, it would be possible to produce these machines in the seventies [illegible] as an additional programme in one of existing [illegible] of machinery and equipment for civil engineering.

[illegible]

Tariff No.		[illegible] ([illegible])	1346 (1967/[illegible])	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
84386 [illegible]	pcs	[illegible]	[illegible]	110	220	[illegible]	274
	[illegible]	[illegible]	[illegible]	[illegible]	1633,0	[illegible]	[illegible]

Source: Foreign Trade Statistics of Iran.

5.82 EQUIPMENT FOR CONSTRUCTION OF THE BITUMINEOUS ROADWAYS

The equipment for the construction the bitumineous roadways consist of:

- Complex manufacture of precoated crushed material (asphalt plants)
- Transport equipment for precoated crushed material
- Spreaders of precoated crushed material
- Bitumen sprayers.

The complex manufacture of the precoated crushed material consists of a set of machines and equipment used in heating up the asphalt and the crushed material, which is evenly precoated with asphalt in the rotary drum. The transport of the precoated crushed material is executed in standard trucks. The spreader of the precoated crushed material is a single-purposed equipment by means of which the precoated crushed material from the feeding hopper is evenly spread on the roadway. The bitumen sprayer is used in heating-up the asphalt which is transported in hot state in a cistern with a spraying system.

It is estimated that in 1349 (1970/1) there were in operation 170 pcs of asphalt plants (complex manufacture of precoated crushed material) 90 pcs. of spreaders of precoated crushed material and 300 pcs. of bitumen sprayers.

Forecast of Demand of Equipment for Construction the Bitumineous Roadways

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Asphalt plants	pcs	23	30	40	50
Spreaders of precoated crushed materials	pcs	11	15	20	25
Bitumen sprayers	pcs	35	45	60	75

The above given forecast of demand has been made by the author of this study on the basis of growth rates applied to imports in the years 1345 (1966/7) until 1350 (1971/2). Projected growth rates were derived by correlation with expected levels of growth rates of construction of bitumineous roadways and by reference to mechanisation of civil engineering.

II.1.205

[illegible] the first [illegible] Tehran started in 1349 (1970/1) [illegible] [illegible] India, it [illegible] [illegible] [illegible] low for [illegible]

5.83 LIFTING DEVICES FOR CIVIL ENGINEERING

Civil engineering industry is using very often lifting devices of different kinds for hoisting heavy loads, containers, carts with raw material etc., up to the top of the building under construction.

The hand or mechanically operated lifting winch is till now mostly used lifting device in civil engineering in Iran. It is used for lifting raw materials (bricks, mortar, sand etc.) incl. carts to the working place. The disadvantage of this lifting device is that it is transporting all loads only vertically i.e. there is a need of other transport means for horizontal transportation, there is a double transhipment etc.

Hand operated lifting winches are occasionally produced in small shops. Mechanically operated lifting winches are produced by one f:

Vazneh Co. Technical Designing and Production Teheran

The firm is producing two types of lifting winches:

1. Mobile lifting winches located on undercarriage with four wheels with tyres. On the undercarriage is vertical double column steel structure on which is hoisted lifting platform suitable for hand carts with concrete etc. This lifting device is used for small loads and for not high lifting.

2. Stabile lifting winches with vertical one column steel structure on which is hoisted lifting platform. This device is designed for bigger loads and high lifting.

The capacity as well as production is not known.

Cranes, mainly tower and mast cranes, but also gantry cranes are mostly used in the construction of prefabricated houses, steel structures etc. Their advantage is that they may transport heavy loads not only vertically, but also horizontally. Cranes for civil engineering are delt in the chapter "Cranes".

5.84 ROAD ROLLERS

There are different types and designs of road rollers:

1. Static Road Rollers

1.1 The self propelled static road rollers tandem type, rolls made of steel sheets or steel castings, propelled by diesel engine, capacity 10 up to 25 tons. Till now they represented the basic machinery with regard to the road and compacting technique.

1.2 The self propelled static road rollers tandem type, rubber tyred rolls, propelled by diesel engine, capacity approx. 6 up to 15 tons. Rubber tyred rollers consolide virgin or newly deposited earth for the construction of roads, airfields, dams and embankments, specially where the material has the tendency to flow under pressure.

2. Vibrating Road Rollers

2. The self propelled vibrating road rollers, capacity approx. 2 up to 10 tons, propelled by diesel engine. They are designed for compacting loose and uncohesive earths like the ballast, gravel sand, cinder etc. on level surface and slopes of fills and for wide variety of other materials. Modern, efficient designs have 6 up to 10 times higher compaction efficiency than static road rollers, therefore in the future they will be more often used.

2.2 The suspension vibrating road rollers, capacity 3 up to 12 tons. The vibrator is propelled by diesel engine. The vibrating road roller is suspended on tractor etc.

2.3 The guided vibrating road rollers, capacity approx. 0,6 up to 1,5 tons. The vibrating road roller is propelled by diesel engine, the operator is walking and guiding it. These small rollers are used for repairs of road top layers, compacting of bituminous or concrete carpet, compacting of pavement edges, curbs etc.

The Import of Road Rollers According to the Foreign Trade Statistics of Iran

Tariff No.			1345 (1966/7)	1346 (1967/8)	1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/2)
826-1	Road rollers	pcs	306	149	128	151	-	-
		tons	2602,1	1229,7	794,7	907,4	1111,4	658.)
	Average size of 1 road roller	tons	8,5	8,3	6,2	6,0	-	-
826-2	Parts of road rollers	tons	250,1	17,6	488,5	95,8	29,5	276,6

It is estimated that the total number of road rollers in operation at the beginning of 1349 (1970/1) was approx. 1350 pcs.

The forecast of Demand of Road Rollers According to the Author of this Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Road Rollers	pcs	240	370	540	780

The production is under preparation in two factories:

The Iran Pipe and Machine Manufacturing Co. Teheran

At the exhibition, "The Districts Development" in 1350 (1971) this firm installed one suspension vibrating road roller, capacity 3,5 tons. The factory intends to produce two types of these rollers. The capacity as well as present production (if any) are not known.

Machine Building Plant Arak

The factory is preparing production of vibratory rollers. It is presupposed that in the first stage there will be produced only one type of vibratory rollers having capacity 5 tons and the yearly production will be approx. 60 pcs. In the second stage there will be produced also other sizes vibratory rollers and the production will reach approx. 500 tons/year.

Both plants will cover only small part of the future demand, therefore there will be need of new capacity in existing factories in new factory.

New capacity should cover wide range of different kinds of road rollers; only special types should be imported in the future.

The Forecast of Production of Road Rollers

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Road Rollers	pcs	20	300	450	700

Difference between demand and production are special road rollers which are not recommended to be produced in Iran.

5.05 MACHINERY AND EQUIPMENT FOR MIXING TECHNIQUE

The term "mixing technique" includes the mixers of all types, from small simple ones, included especially for maintenance and small scale operations right up to the completely mechanized units for mixing the concrete or mortar mixtures, transport containers and tanks for concrete or mortar mixtures and preparatory materials. Special mixers are used for mixing the dry mixtures, ceramics and glass batches. The completely mechanized stationary units for mixing the concrete mixtures on large building sites are set up in a line in which are placed generally the tanks of loosely laid concrete with automatic desimeter of concrete, water and individual fractions, fraction distributor, drag line and compressor.

From the all types of mixers, that is

- the overflow mixers for concrete and mortar
- the stationary mixers with forced mixing
- the continuous mixers
- the complete mechanized units for concrete mixing
- the truck mixers
- the tanks and batching plants

are produced in Iran only the overflow mixers for concrete and mortar and tanks and batching plants and one type continuous mixer.

Overflow Mixers for Concrete and Mortar

Sherkate Sanaye Machine Teheran

This factory is producing small overflow mixers for concrete and mortar, capacity 125 l, 250 l and 400 l driven by electric motors as well as diesel engines. The production in 1345 (1966/7) was 110 pcs.

Truck Rah Co. Ltd. Teheran

The factory recently started the production of two sizes of overflow mixers for concrete, capacity 290 l and 300 l with skip driven by diesel motor or electric motor. The capacity as well as production is not known.

Sanaar Co. Teheran-Barboard

The production programme of this factory comprises the production of one type of overflow mixers, capacity 300 l. This type is produced in two variations: with skip car and with hydraulic tilting system. The capacity as well as production of these mixers is not known.

Techno-Is Co. Teheran

This firm is also producing overflow mixers for concrete and mortar. Technical data as well as capacity and production are not known.

Machine Building Plant in Arak

In the "Revised Tentative Annual Program (Production Mix) 1353" elaborated in 1350 (1971) it was presuppoeed that there will be production of concrete mixers in this plant. Production for the year 1353 (1974/5) was given 300 tons of overflow as well as continuous concrete mixers.

In the new production programme, elaborated in 1352 (1973) this item is cancelled. It is advisable to produce concrete, mortar and other overflow as well as continuous mixers in the second stage of construction of this plant.

Continuous Mixers

Sherkate Sahami Machine Roll Teheran

This factory is producing small size continuous mixers. Technical data, capacity as well as production are not known.

Forecast of Demand, Production and Shortage of Concrete and Mortar Mixers

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Demand	pcs	540	920	1460	2100
Production	pcs	460	820	1350	2000
Shortage	pcs	80	100	110	100

The above given forecast has been made by the author of this study. It is based on forecasted growth rates of construction activities in civil engineering - see Market Demand Study for Mechanical and Capital Goods Products 1972-1987, [illegible] Engineering Industry.

[illegible] PRODUCTION OF CONCRETE BLOCKS

Hollow concrete blocks are used instead of bricks for construction of dwelling houses, stores, fences etc. Concrete mixed in mixing machine is poured into moulds [illegible] on a table of the machine. Most of [illegible] production of concrete blocks are equipped with [illegible] table. Upper part of mould is pressed into the lower part of the mould and forms the block.

Machines for production of concrete blocks are either hand operated, or mechanic (pneumatic, hydraulic), semi-automatic, or automatic, combined with feeder, belt conveyor etc.

There is one producer of mechanic machines for production of concrete blocks in Iran at presents

[illegible]-ls Co. Teheran

This factory started the production of one model of machine for concrete blocks in 1348 (1969/70).

Production of Machines for Concrete Blocks

		1347 (1968/9)	1348 (1969/70)	1349 (1970/1)	1350 (1971/)
[illegible]	pcs	-	30	60	70

[illegible] of Demand, Production and Shortage of Machines for Production of Concrete Blocks (all types) According to the Author of This Study

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
[illegible]	pcs	100	150	200	250
[illegible]	pcs	70	120	160	200
[illegible]	pcs	25	30	40	50

Shortage (imported machines) [illegible]ly semi-automatic and automatic machines, not produced in Iran. Low growth rate of the demand is due the fact, that there will be used bigger machines in the future.

.0 OTHER SPECIAL MACHINERY AND EQUIPMENT

.01 DRY CLEANING MACHINES AND STEAM IRONING MACHINES

Dry cleaning machines and steam ironing machines are partly imported, partly produced in Iran.

Import of Dry Cleaning Machines and Steam Ironing Machines

Tariff No.			(1966/7)	1967/8	(1968/9)	(1969/70)	(1970/1)	(1971/2)
838B2	Dry cleaning machines	pcs	-	850	181	389	290	182
		tons	-	224,4	190,9	236,3	306,4	174,5
846-1	Steam ironing machines	pcs	15	25	64	46	17	32
		tons	4,9	11,8	64,5	32,5	20,0	29,0

Source: Foreign Trade Statistics of Iran.

Production of Steam Ironing Machines and Dry Cleaning Machines

		1343 (1964/5)	1344 (1965/6)	1345 (1966/7)	1346 (1967/8)	1347 (1968/9)
Steam ironing machines	pcs	542	290	50	25	48
Dry cleaning machines	pcs	n.a.	n.a.	n.a.	n.a.	15

Source: Iranian Industrial Statistics, Bureau of Statistics of the Ministry of Economy.

The demand of dry cleaning machines as well as steam ironing machines is decreasing steadily as most of dry cleaning shops are already well equipped with modern machinery and equipment. Steam ironing machines will be replaced in the future by electric ironing machines and semi-automatic dry cleaning machines will be replaced by big automatic dry cleaning machines.

It is advisable to start the production of modern electric ironing machines and automatic dry cleaning machines in collaboration with foreign firms.

[illegible], Production and Shortage of Dry cleaning Machines and [illegible] machines

		1351 (1972/3)	1356 (1977/8)	1361 (1982/3)	1366 (1987/8)
Dry cleaning machines:					
Demand	pcs	280	420	540	700
Production	pcs	20	80	280	500
Shortage	pcs	260	340	260	200
Industrial Ironing Machines:					
Demand	pcs	160	260	400	600
Production	pcs	70	180	330	[illegible]
Shortage	pcs	90	80	70	[illegible]

Using 1345 (1966/7) until 1347 (1968/9) as the base years, figures for the years 1351 (1972/3) until 1366 (1987/8) were exterpolated, by the author of this study.

5.92 MATCH PRODUCING MACHINERY

Forecast of Demand of Special Machinery and Equipment

		1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Cleaning and sieving machines or splint selecting and feeding machines	pcs.	9	11	11
Continuous heating, paraffing and drying m/c	pcs.	1	2	2
Frame filling machines	pcs.	10	10	10
Splint filling machines	pcs.	5	5	5
Frame emptying machines	pcs.	10	10	10
Splint collecting machines	pcs.	5	5	5
Heating and paraffining apparatus	pcs.	10	10	10
Dipping apparatus	pcs.	10	10	10
Inner box making machines	pcs.	25	35	40
Outer box making machines incl. labelling m/c	pcs.	20	28	30
Side phosphor coating machines	pcs.	5	8	8
Box closing machines	pcs.	4	6	6
Box filling machines	pcs.	4	6	6
Band-rolling machines	pcs.	4	6	6
Friction machines	pcs.	1	2	2

Other special machines, like veneer peeling machines, drying rooms, packing machines, mixing machines etc. - see special wood working machines, chemical machinery and equipment etc.

The above given forecast of demand of special machinery and equipment has been calculated by the author of this study on the base of growth of production of matches - see Master Demand Study for Capital Goods Industry, Part I, Chemical Industry Code No. 3195.

Import of Special Machines for Match Factories

Special machines for match factories are compiled in "The Foreign Trade Statistics of Iran" under different tariff numbers. It is impossible to assess from these figures any data concerning the requirements of specific machines.

[illegible] Manufacturing Facilities

[illegible] special machining factories in Iran producing special machines for match factories. Some local workshops are occasionally producing small, not complicated machines, but it doesn't represent their main, steady activity - for example firm Fayedur Negar - Teheran.

The demand of special machinery for match factories will be in the next years very limited and therefore there will be no need of new capacity in this field of production.

5.93 SPECIAL MACHINERY FOR TOBACCO INDUSTRY

Import of special machines and equipment for tobacco industry is compiled in "The Foreign Trade Statistics of Iran" under different numbers. It is impossible to ascertain from these figures any data concerning the requirements of specific machines.

Forecast of Demand of Special Machinery and Equipment for Tobacco Industry

	1352-56 (1973-78)	1357-61 (1978-83)	1362-66 (1983-88)
Cigarette making machines*	30	35	41
Filter-tip attachements*	15	17	20
Cigarette packing machines	15	17	21
Cigarette-box cover, wrapping machines	5	6	8
Tobacco shredding machines	7	9	11
Leaf separators	10	11	14
Tobacco baling machines	2	3	4
Tobacco Packing machines	5	6	7
Vacuum moistuing chambers moisturing equipment	4	5	7
Tobacco mixers	1	2	2
Tobacco sieves	1	2	3

* Sometimes both machines are combined together.

The above given forecast has been made by the author of this study and is based on projected growth of tobacco factories and production of tobacco products - see Master Demand Study for Mechanical and Capital Goods Products Industry Part I, 2 Food, Beverage and Tobacco Industries, Code No. 220.

Existing Manufacturing Capacity

Until now there is no factory producing special machinery and equipment for tobacco industry. The production of special machinery and equipment for tobacco industry is not advisable, as these machines are too complicated and the demand is very low.

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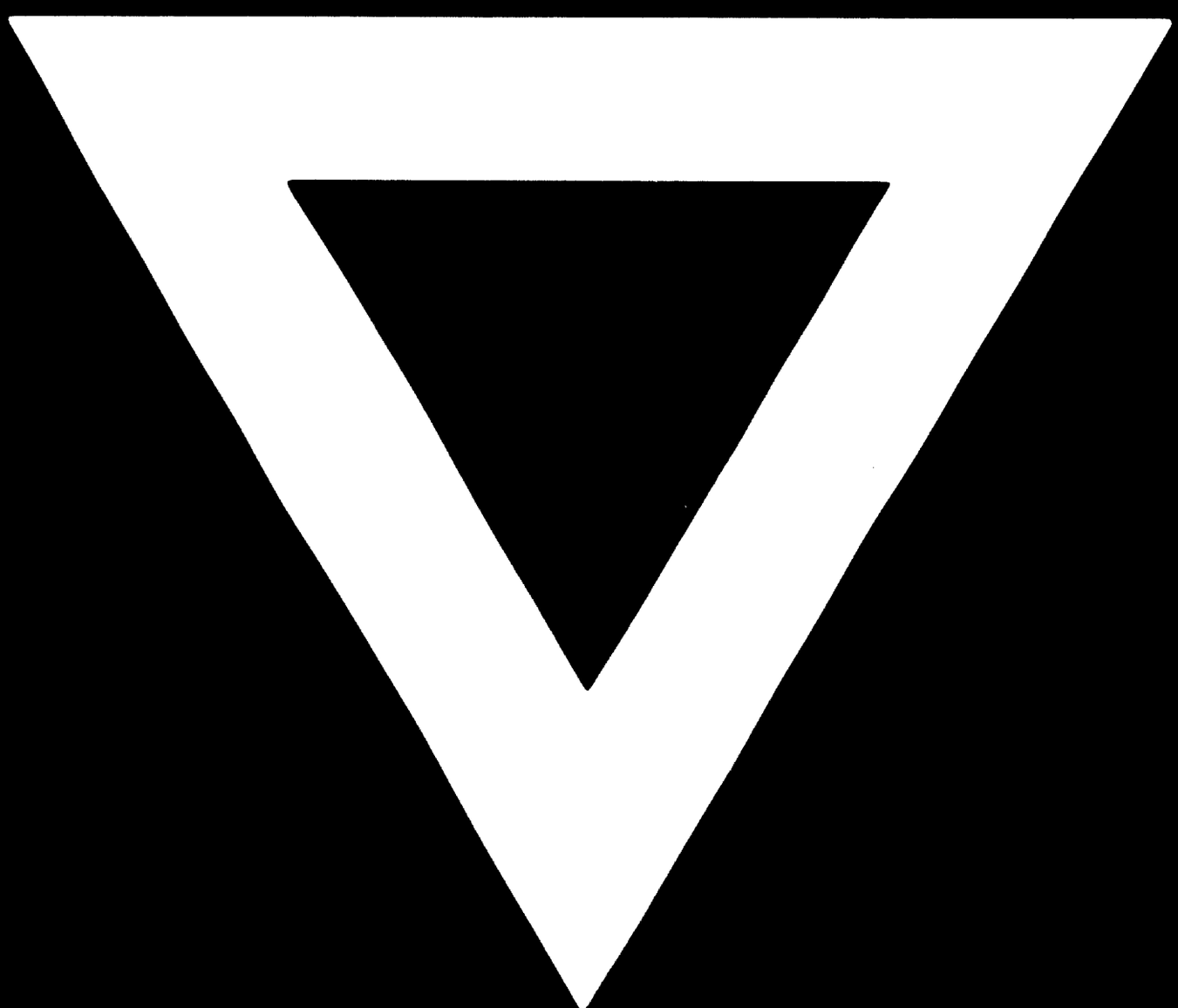

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