



**PAGEV**

**TURKISH PLASTICS PROCESSING MACHINERY  
INDUSTRY FOLLOW-UP REPORT**

**2017**

**PREFACE**

The plastic industry is one of the most important actors of the Turkish economy. Today, the contribution of the plastics industry to the country's economy is gradually increasing with the total production exceeding 9 million tons, and 35 billion dollars worth of turnover, the approaching direct exports of 5 billion dollars and the annual growth of 12% for the last 10 years.

Our industry, with its production capacity, has reached the second place in Europe and the sixth place in the world. As PAGEV, we continue to lead the industry successfully in the framework of the "Unifying Power" mission of the Turkish Plastics Industry.

We also know that having the right and reliable data and information is the most important part of the solution when we sign the indispensability of Plastics in our lives and sign our work to tackle our industrial problems with concrete steps based on scientific evidence. In this direction we constantly investigate, collect new data, compile and report them. We present our reports that we believe are important for the development of our industry and our booklets containing important information to the plastics industry representatives, stakeholders and public institutions.

As PAGEV, we prepared a report set that will contribute to the industry in a serious way in the face of our long and dedicated researches. With our reports, we made booklets with the comments of our expert reporters about the point where the Turkish Plastics Industry is in the right and reliable light, common problems and what should be the search for concrete solutions. We believe that our reports and information set will benefit all of our stakeholders, especially our members, and will guide the plastics world. At the same time, we are pleased that our public institutions have reached the most up-to-date and accurate information about the plastics industry.

On the other hand, with our sector reports in English, we think that our colleagues will be able to share the potential of our country's plastics industry with the most up-to-date business partners in the global marketplace.

Hereby, presenting our current reports and information files relating with our industry, we would like to thank all of our colleagues who have contributed to this day's achievement of our industry, who has taken a position as a locomotive mission in the development of our country.

**Best regards,**

**Yavuz EROĞLU**  
**PAGEV President**



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**EXECUTIVE SUMMARY**

Turkey is a country which imports about 60-80% of plastic processing machines and parts and accessories and is a net importer in these products and can not provide sufficient added value with low export prices compared to developed western societies. As the plastics industry is growing rapidly, the production of plastic processing machines does not develop parallel to this pace, and the sector can not develop against imports made from cheap machine-maker countries, especially from China. The lack of a state strategy for the plastic processing machinery industry and the inadequate protection of the domestic producers cause the production of plastic processing machines in Turkey not to improve sufficiently.

In the last 5 years covering the years 2013 - 2017, the plastics industry has invested an average of 850 million dollars in machinery and equipment per year. In this period, presses and other machines shared 36% of total investments, injection 22%, extrusion 18%, thermoforming 5%, blow molding 2% and parts and components 17% .

In 2017, 518 million dollars of production, 583 million dollars of imports, 169 million dollars of exports and 932 million dollars of domestic sales (machinery investment of the plastics industry) has been realized.

In this period, industry gave 414 million dollars of foreign trade deficit and 63% of the investment has been met by imports and export coverage of imports realised as 29%

Annual average growth rates for the last 5 years covering the years 2013-2017 in plastics processing machinery are 11.2% for production, 2.6% for imports, 6.1% for exports, 6.2% for domestic sales and 1.3% for foreign trade.

In order for the Turkish plastic processing machinery sector to produce and export more value-added machines, the main strategies are as described in the Machinery Sector Export Strategy Document; General Purpose; "Improvement of Machinery Industry and Ensure the Manufacture of High-Tech Products".



## 1. NUMBER OF COMPANIES

598 company produce plastic processing machines and their parts and component in Turkey. 78% of them is in İstanbul, 6% of is in İzmir.

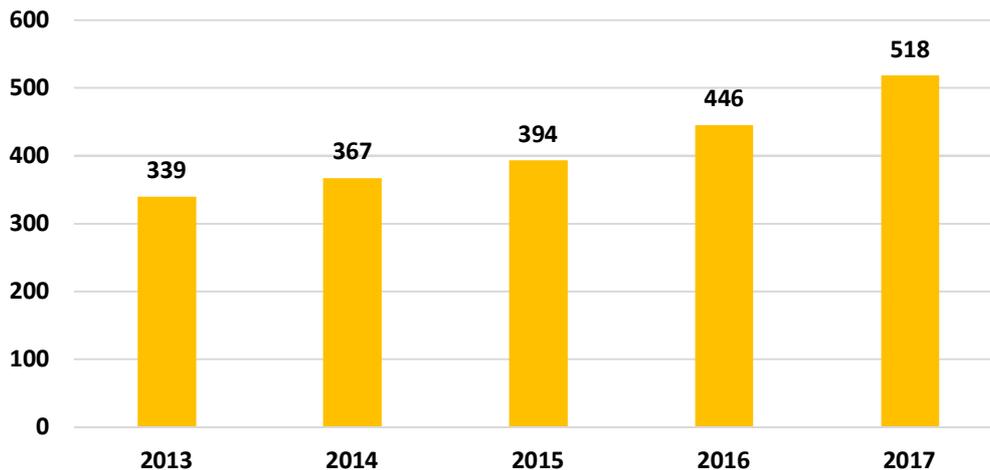
Provinces	Number	% Share
İstanbul	464	78
İzmir	34	6
Ankara	17	3
Bursa	17	3
Kocaeli	11	2
Konya	10	2
Adana	8	1
Gaziantep	8	1
Manisa	5	1
Others	24	4
Total	598	100

**Table 1: Plastic Processing Machines Producers By The Main Provinces**

Source: PAGEV

## 2. PRODUCTION

Production of plastic processing machines has increased by an average rate of 11,2% a year between 2013 and 2017. Production realized as 518 million dollars in 2017 increasing by 16% with respect to 2016.



**Graphic 1: Plastics Processing Machines Production (USD Million)**

Source: TurkStat & ITC Trade Statistics

It is seen that production of all machines other than extrusion machines in 2017 .

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Machinery Group	2013	2016	2017	Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	19,9	23	25	10	5.8
Extrusion Machines	62,5	71	69	-3	2.4
Blow Molding Machines	0,4	1,0	4,9	371	87.0
Thermoform Machines	36,1	47	60	28	13.6
Presses and Other Machines	152,5	154	188	22	5.3
Parts and Components	67,9	151	172	14	26.2
Total	339,3	446	518	16	11.2

Table 2: Plastics Processing Machines Production (Million \$)

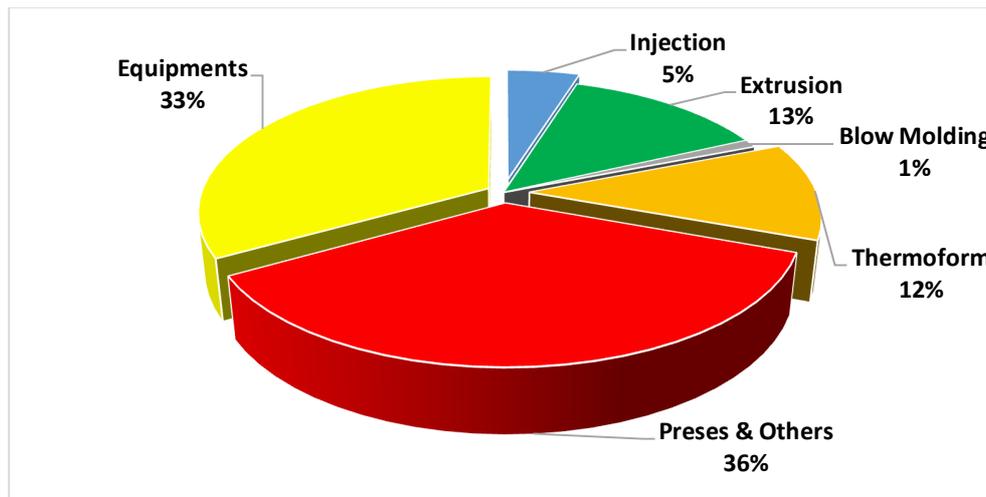
Source: TurkStat & ITC Trade Statistics

In this period, , injection machines accounted for 5% extrusion machines 13%, blow molding machines 1%, thermoforming machines 13%, presses and other machines 36 % and parts and components 33% of total plastic processing machines production.

Machinery Group	2016	2017
Injection Machines	5	5
Extrusion Machines	16	13
Blow Molding Machines	0	1
Thermoform Machines	11	12
Presses and Other Machines	34	36
Parts and Components	34	33
Total	100	100

Table 3: Share of Machines in Total Production (%)

Source: TurkStat & ITC Trade Statistics



Graphic 2: Share of Machines in Total Production (2017)

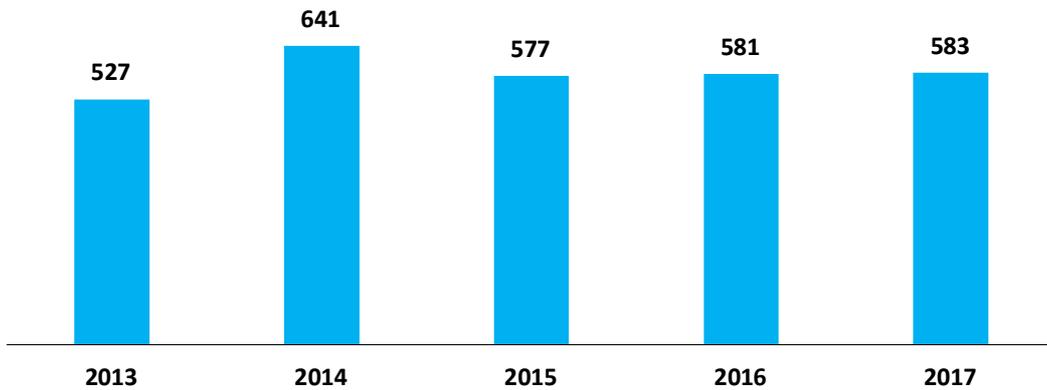
Source: TurkStat & ITC Trade Statistics



### 3. FOREIGN TRADE

#### 3.1. IMPORTS

Imports of plastic processing machines has increased by an average rate of 2,2% a year between 2013 and 2017. Imports of plastic processing machines realized as 583 million dollars in 2017 staying almost at the same level of 2016.



**Graphic 3: Plastics Processing Machines Imports (Million \$)**

Source: TurkStat & ITC Trade Statistics

It is seen that imports of all machines other than extrusion and presses increased in 2017 compared to 2016.

Machinery Group	2013	2016	2017	Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	161	172	186	8	3.7
Extrusion Machines	96	115	99	-14	0.7
Blow Molding Machines	21	23	23	2	2.1
Thermoform Machines	24	15	22	47	-2.5
Presses and Other Machines	181	216	209	-3	3.6
Parts and Components	43	40	44	9	0.7
<b>Total</b>	<b>527</b>	<b>581</b>	<b>583</b>	<b>0</b>	<b>2.6</b>

**Table 4: Plastics Processing Machines Imports (USD Million)**

Source: TurkStat & ITC Trade Statistics

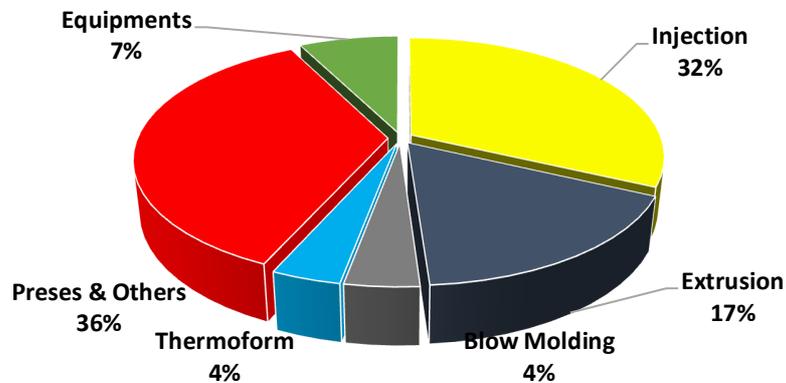
In this period, injection machines accounted for 32% extrusion machines 17%, blow molding machines 4%, thermoforming machines 4%, presses and other machines 36 % and parts and components 8% of total plastic processing machines imports.



Machinery Group	2016	2017
Injection Machines	30	32
Extrusion Machines	20	17
Blow Molding Machines	4	4
Thermoform Machines	3	4
Presses and Other Machines	37	36
Parts and Components	7	8
Total	100	100

Table 5: Breakdown of Imports by Machine Types (\$- %)

Source: TurkStat & ITC Trade Statistics

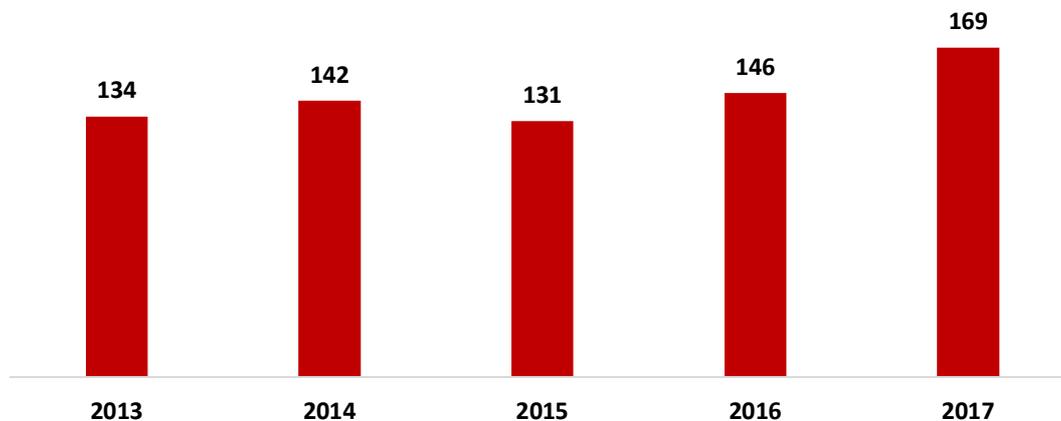


Graphic 4: Breakdown of Imports by Machine Types (USD - %) (2017)

Source: TurkStat & ITC Trade Statistics

### 3.2. EXPORTS

Exports of plastic processing machines has increased by an average rate of 6,1% a year between 2013 and 2017. Exports of plastics processing machines realized as 169 million dollars in 2017 increasing by 16% compared to 2016.



Graphic 5: Plastics Processing Machines Exports (Million \$)

Source: TurkStat & ITC Trade Statistics



In this period exports of all machines other than blow molding increased.

Machinery Group	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	10	11	12	10	5.8
Extrusion Machines	31	35	34	-3	2.4
Blow Molding Machines	0	0	2	371	87.0
Thermoform Machines	14	19	24	28	13.6
Presses and Other Machines	61	57	73	28	4.7
Parts and Components	17	23	23	2	8.2
<b>Total</b>	<b>134</b>	<b>146</b>	<b>169</b>	<b>16</b>	<b>6.1</b>

**Table 6: Plastics Processing Machines Exports (Million \$)**

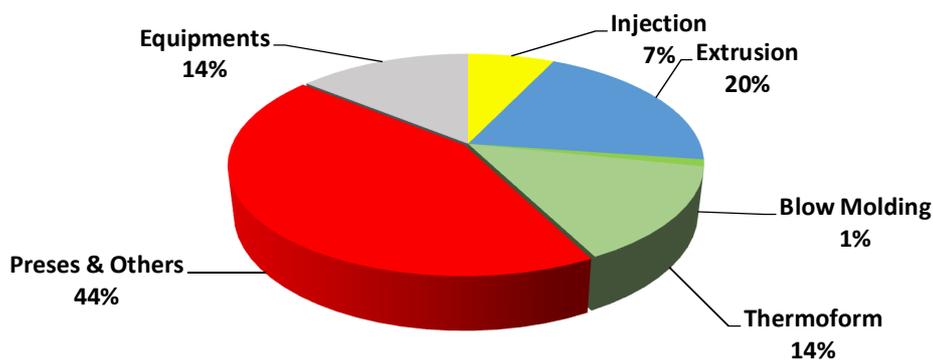
Source: TurkStat & ITC Trade Statistics

In this period, injection machines accounted for 7% extrusion machines 20%, blow molding machines 1%, thermoforming machines 14%, presses and other machines 43 % and parts and components 14% of total plastic processing machines exports.

Machinery Group	2016	2017
Injection Machines	8	7
Extrusion Machines	24	20
Blow Molding Machines	0	1
Thermoform Machines	13	14
Presses and Other Machines	39	43
Parts and Components	16	14
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 7: Share of Machines in Total Machine Exports (\$ - %)**

Source: TurkStat & ITC Trade Statistics



**Graphic 6: Share of Machines in Total Machine Exports (\$ - %) (2017)**

Source: TurkStat & ITC Trade Statistics



### 3.3. FOREIGN TRADE BY COUNTRIES

In 2017, plastics processing machines and parts and components imports from the 10 main countries constituted the 91% of the total imports. China, Germany, Italy are the first 3 countries from which Turkey imports plastics processing machines most. These countries shared 63% of imports on value base.

On the other hand, exports to the 10 main countries received a share of 43% on value base in 2017. The first 3 countries to which Turkey has conducted plastics processing machines exports in this period are Russian Fed. Iran and Algeria. These countries shared 19% of exports on value base.

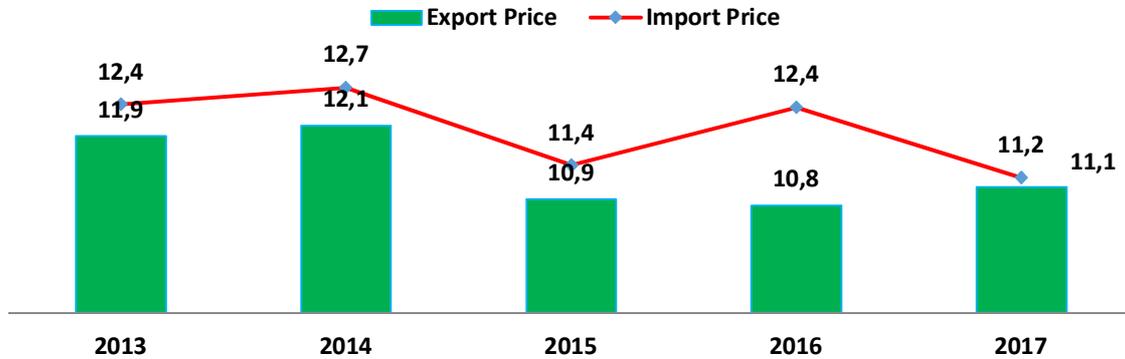
Imports			Exports		
Countries	Million \$	% - Share	Countries	Million \$	% - Share
Chian	157,2	27	Russian Fed	11,9	7.0
Germany	122,6	21	Iran	11,1	6.5
Italy	89,5	15	Algeria	9,6	5.7
Austria	52,9	9	Germany	7,8	4.6
Japan	38,6	7	Bulgaria	6,2	3.6
Taiwan	25,9	4	Romania	6,1	3.6
Switzerland	16,3	3	Çorlu Avr. Free Trade Zone.	5,1	3.0
USA	10,0	2	Iraq	4,8	2.8
S.Korea	9,9	2	Uzbekhistan	4,8	2.8
Tailand	8,1	1	S.Africa Rep.	4,7	2.8
<b>10 Countries Total</b>	<b>530,9</b>	<b>91</b>	<b>10 Countries Total</b>	<b>72,0</b>	<b>42.5</b>
<b>Others</b>	<b>52,3</b>	<b>9</b>	<b>Others</b>	<b>97,3</b>	<b>57.5</b>
<b>Total</b>	<b>583,2</b>	<b>100</b>	<b>Total</b>	<b>169,3</b>	<b>100.0</b>

**Table 8: Plastics Processing Machines Foreign Trade by Countries (2017)**

Source: TurkStat & ITC Trade Statistics

### 3.4. IMPORT AND EXPORT PRICES

In 2017, average unit import prices of plastics processing machines and parts and components realized as 11,2 \$/kg, decreasing by 9% with respect to 2016.



**Graphic 7: Average Import and Export Prices Of Plastics Processing Machines (\$/kg)**

Source: TurkStat & ITC Trade Statistics

In this period, average import prices for extrusion, blow molding and thermoform machines increased and the others declined compared to 2016.

Machinery Group	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	6,6	6,6	6,3	-5	-1.1
Extrusion Machines	22,9	20,2	20,8	3	-2.3
Blow Molding Machines	26,6	21,0	22,6	7	-4.0
Thermoform Machines	20,4	15,7	20,3	29	-0.1
Presses and Other Machines	16,5	17,7	14,7	-17	-2.9
Parts and Components	55,2	38,6	33,7	-13	-11.6
<b>Total</b>	<b>12,4</b>	<b>12,4</b>	<b>11,2</b>	<b>-9</b>	<b>-2.5</b>

**Table 9: Average Import Prices By Plastics Processing Machines (\$/kg)**

Source: TurkStat & ITC Trade Statistics

In 2017, average unit export prices of plastics processing machines and parts and components realized as 11,1 \$/kg, increasing by 3% with respect to 2016.

In this period, average export prices declined for machines other than injection, blow molding and presses compared to 2016.

Machinery Group	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	4,64	4,55	4,9	7	1.3
Extrusion Machines	16,26	14,03	13,1	-7	-5.3
Blow Molding Machines	9,19	4,04	8,5	110	-2.0
Thermoform Machines	20,90	19,02	18,5	-3	-3.0
Presses and Other Machines	11,89	8,92	10,3	16	-3.5
Parts and Components	12,78	22,19	15,7	-29	5.2
<b>Total</b>	<b>11,91</b>	<b>10,77</b>	<b>11,1</b>	<b>3</b>	<b>-1.8</b>

**Table 10: Average Export Prices By Plastics Processing Machines (\$/kg)**

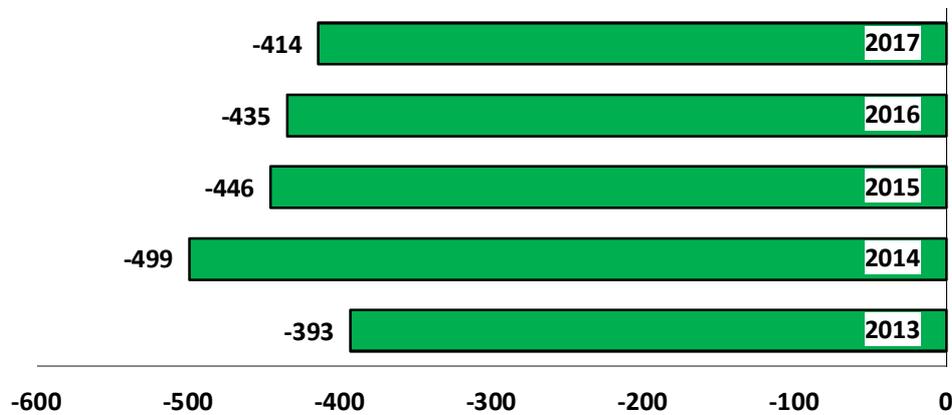
Source: TurkStat & ITC Trade Statistics



In this period, the average unit export and import prices for plastics processing machines are almost equalized.

### 3.5. FOREIGN TRADE DEFICIT

Turkey has always had foreign trade deficit in plastics processing machines. Its foreign trade deficit, reached it's maximum level with 589 million dollars in 2011, In 2017 foreign trade deficit realized as 414 million dollars decreasing by 5% compare to 2016.



**Graphic 8: Foreign Trade Deficit in Plastics Processing Machines (Million \$)**

Source: TurkStat & ITC Trade Statistics

Foreign trade deficit decreased for all machines other than injection machines, presses and other machines in 2017 compared to 2016.

Machinery Group	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	-151	-161	-174	8	3.6
Extrusion Machines	-65	-79	-65	-19	-0.1
Blow Molding Machines	-21	-22	-21	-5	0.1
Thermoform Machines	-10	4	2	-42	-
Presses and Other Machines	-120	-158	-136	-14	3.0
Parts and Components	-26	-17	-21	19	-5.3
<b>Total</b>	<b>-393</b>	<b>-435</b>	<b>-414</b>	<b>-5</b>	<b>1.3</b>

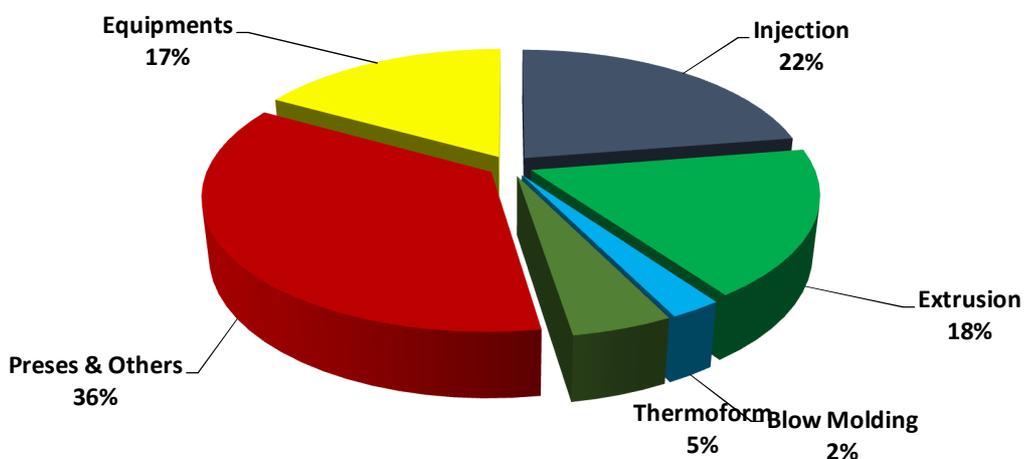
**Table 11: Foreign Trade Deficit in Plastics Processing Machines (Million \$)**

Kaynak: TÜİK ve ITC Trade Statistics



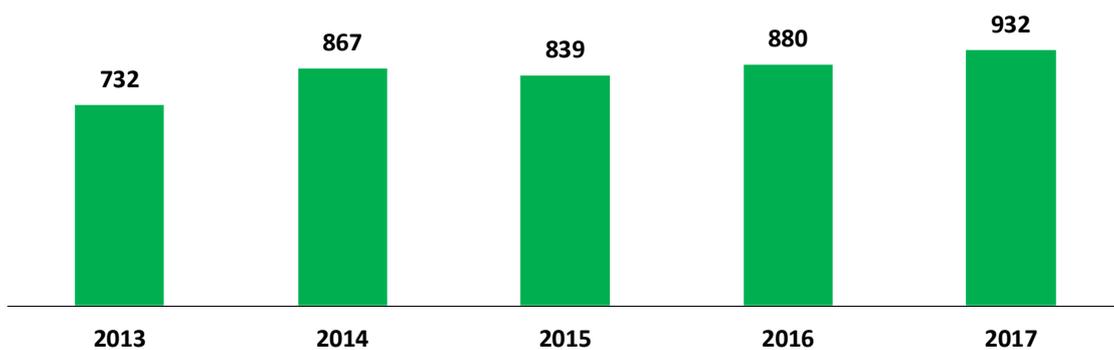
**4. DOMESTIC SALES (MACHINERY INVESTMENTS OF PLASTICS INDUSTRY)**

The plastics industry, in parallel with the increase in its processing capacity, makes investment in machine and equipment with an increasing trend every year. Machinery and equipment investment of plastics industry after reaching it’s maximum level of 885 million dollars in 2011, decreases in following years. But it showed an increasing tendency after 2016 and realized as 932 million dollars in 2017 increasing by 6% compared to 2016.



**Graphic 9: Breakdown of Machinery Investments of Plastics Industry for the Last 5 Years**

Source: TurkStat & ITC Trade Statistics



**Graphic 10: Domestic Sales of Plastics Processing Machines (USD Million)**

Source: TurkStat & ITC Trade Statistics

It is seen that, investment of all machines other than extrusions increased in 2017 compared to 2016.



Machinery Group	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017
Injection Machines	171	184	199	8	3.8
Extrusion Machines	127	150	133	-11	1.1
Blow Molding Machines	22	23	26	12	4.9
Thermoform Machines	46	43	58	35	6.0
Presses and Other Machines	273	312	323	4	4.3
Parts and Components	94	168	193	15	19.8
<b>Total</b>	<b>732</b>	<b>880</b>	<b>932</b>	<b>6</b>	<b>6.2</b>

**Table 12: Domestic Sales of Plastics Processing Machines (USD Million)**

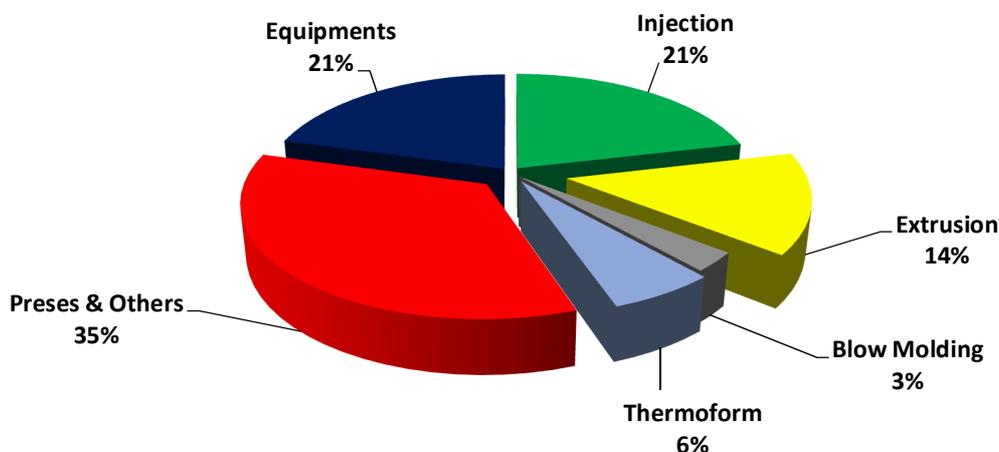
Source: TurkStat & ITC Trade Statistics

The share of injection realized as 21%, extruders 14%, blow molding 3%, thermoform 6, presses and other machines 35% and parts and components 21% in the total machinery investment of the plastics industry in 2017.

Machinery Group	2016	2017
Injection Machines	21	21
Extrusion Machines	17	14
Blow Molding Machines	3	3
Thermoform Machines	5	6
Presses and Other Machines	35	35
Parts and Components	19	21
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 13: Breakdown of Machinery Investments by Machine Types in 2017**

Source: TurkStat & ITC Trade Statistics

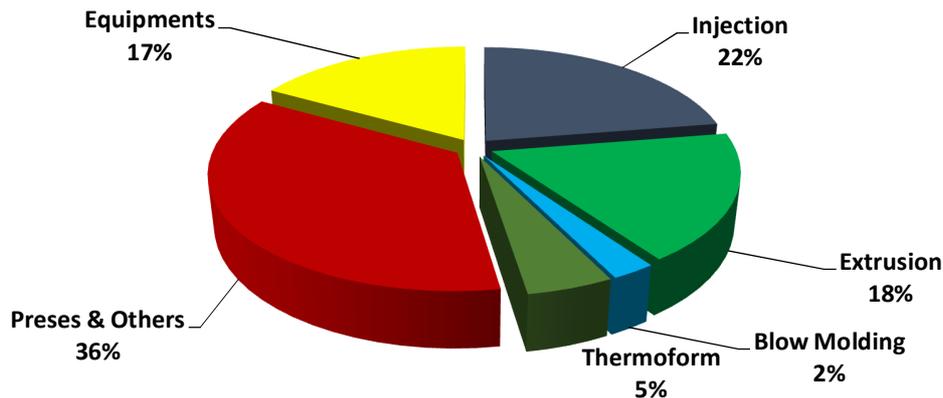


**Graphic 11: Breakdown of Machinery Investments by Machine Types ( 2017)** Source: TurkStat & ITC Trade Statistics

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In the last 5 years covering the years 2013 - 2017, the plastics industry has invested an average of 850 million dollars in machinery and equipment per year. In this period, presses and other machines shared 36% of total investments, injection 22%, extrusion 18%, thermoforming 5%, blow molding 2% and parts and components 17% .



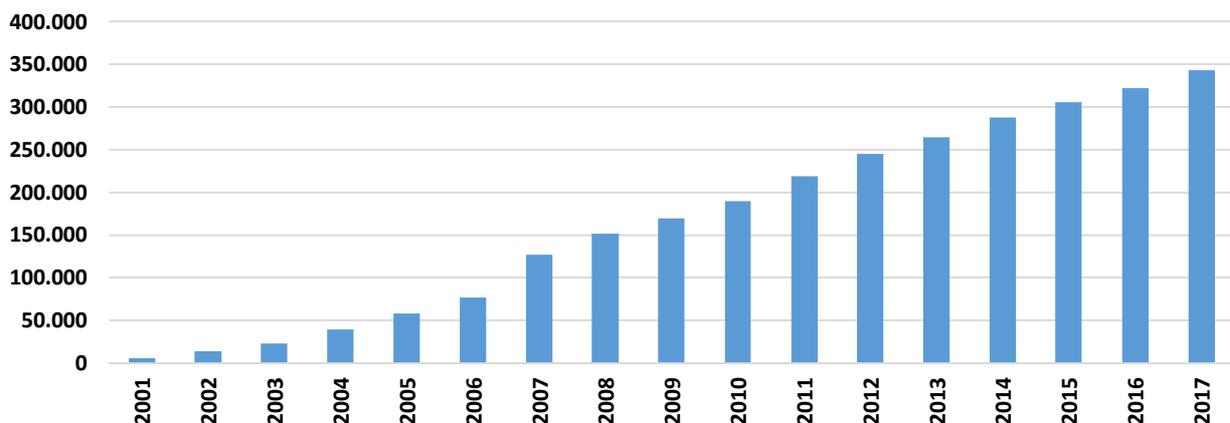
**Graphic 12: Breakdown of Machinery Investments by Machine Types For The Last 5 Years.**

Source: TurkStat & ITC Trade Statistics

### 5. MACHINERY PARK

The process capacity of Turkish plastics industry, which had 2.5 million tons of processing capacity and 5.688 machine parks in 2001, reached to 9,6 million tons by the end of 2017. The machinery park of the industry realized as about 343 thousand units by the end 2017.

Between 2001 and 2017, the plastics industry's processing capacity increased by an average of 7,9% as the machinery park invcreased 29,2% annually.



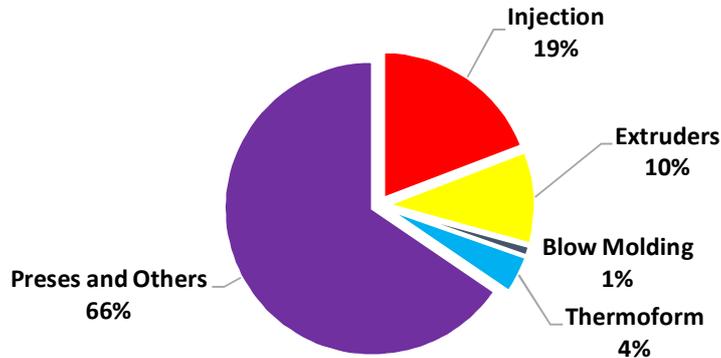
**Graphic 13: Plastics Industry Process Capacity and Mahcinery Park**

Source: TurkStat & ITC Trade Statistics

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As of 2017, 19% of the Turkish plastics processing machinery park consists of injection, 10% extrusion, 1% blow molding, 4% thermoform and 66% presses and other machines.



**Graphic 14: Machinery Park of Plastics Industry By Machine Types**

Source: TurkStat & ITC Trade Statistics

As of 2017, 30% of the total processing machinery park of the Turkish plastics industry is sold by domestic producers while 70% of it has been imported.

Machinery Group	Units			% Share	
	Machinery Group	Machinery Group	Machinery Group	Machinery Group	Machinery Group
Injection Machines	4,481	60,752	65,233	7	93
Extrusion Machines	4,473	30,268	34,741	13	87
Blow Molding Machines	410	3,344	3,754	11	89
Thermoform Machines	5,168	8,908	14,076	37	63
Presses and Other Machines	87,239	134,114	221,353	39	61
Parts and Components	101,770	237,386	339,156	30	70

**Table 14: Machinery Park of Plastics Industry**

Source: TurkStat & ITC Trade Statistics

Share of imported machines in total machine park realised as; 93% in injection machines, 87% in extrusion machines, 89% in blowing machines, 63% in thermoforming machines and 61% in others.

In other words, the share of domestic produced machineries within the total park is; 7% in injection machines, 13% in extrusion machines, 11% in blow molding machines, 37% in thermoforming machines and 39% in presses and other machines.

10 countries share 96,5% of total imported machines park. China shared 43,7% of Injection, 63,3% of extrusion, Italy shared 30,5% of blow molding and Germany shared 21% in the imported machines park.



Injection		Extrusion		Blow Molding		Thermoform	
Countries	% Share	Countries	% Share	Countries	% Share	Countries	% Share
China	43.7	China	63.3	Italy	30.5	Germany	21.0
Germany	18.1	Germany	13.8	Germany	21.5	China	18.8
Italy	9.6	Italy	7.3	China	9.4	Italy	14.9
Taiwan	8.9	Taiwan	4.3	France	8.4	Taiwan	10.0
Austria	6.2	Austria	3.9	Japan	7.2	France	5.7
Switzerland	2.8	S.Korea	1.6	Taiwan	4.5	Israel	5.1
France	2.7	India	1.1	UK	4.0	Switzerland	4.5
Japan	2.4	Japan	0.8	Switzerland	3.5	USA	4.2
S.Korea	1.2	USA	0.8	Austria	3.0	S.Korea	3.4
India	0.9	UK	0.7	Belgium	2.8	Austria	2.8
<b>10 Countries</b>	<b>96.5</b>	<b>10 Countries</b>	<b>97.5</b>	<b>10 Countries</b>	<b>94.9</b>	<b>10 Countries</b>	<b>90.4</b>
<b>Others</b>	<b>3.5</b>	<b>Others</b>	<b>2.5</b>	<b>Others</b>	<b>5.1</b>	<b>Others</b>	<b>9.6</b>

**Table 15: Imported Machinery Park By Countries**

Source: TurkStat & ITC Trade Statistics

10 countries shared 97,5% in imported extrusion machinery park while, 63,3% of the park is made up of China, 13,8 % of Germany, 7,3% of Italy, 4,3% of Taiwan and 3,9% of Austrian machinery.

10 countries shared 94,9% in imported blow molding machinery park while, 30,5% of the park is made up of Italy, 21,5 % of Germany, 9,4% of China, 8,4% of Italy and 7,2% of Japanese machinery.

10 countries shared 90,4% in imported thermoform machinery park while, 21% of the park is made up of Germany, 18,8 % of China, 14,9% of Italy, 10% of Taiwan and 5,7% of France machinery.

## 6. SUPPLY AND DEMAND AND 2018 EXPECTATIONS

### 6.1. TOTAL INDUSTRY

In 2017, 518 million dollars of production, 583 million dollars of imports, 169 million dollars of exports and 932 million dollars of domestic sales (machinery investment of the plastics industry) has been realized.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	339	446	518	16	11,2	576
<b>Imports</b>	527	581	583	0	2,6	598
<b>Exports</b>	134	146	169	16	6,1	180
<b>Domestic Sales</b>	732	880	932	6	6,2	995
<b>Foreign Trade Deficit</b>	-393	-435	-414	-5	1,3	-419
<b>Imports/Domestic Sales (%)</b>	72	66	63			60
<b>Exports/Imports (%)</b>	25	25	29			30

**Table 16: Plastics Processing Machines Supply & Demand Balance (Million \$)**

Source: TurkStat & ITC Trade Statistics



In this period, industry gave 414 million dollars of foreign trade deficit and 63% of the investment has been met by imports and export coverage of imports realised as 29%

Annual average growth rates for the last 5 years covering the years 2013-2017 in plastics processing machinery are 11.2% for production, 2.6% for imports, 6.1% for exports, 6.2% for domestic sales and 1.3% for foreign trade.

In 2018, plastic processing machinery production is expected to be 576 million dollars, imports 598 million dollars, exports 180 million dollars, domestic sales 995 million dollars. In this period, the industry is expected to give 429 million dollars of foreign trade deficit.

## 6.2. PLASTICS INJECTION MACHINES

In 2017, 25 million dollars of production, 186 million dollars of imports, 12 million dollars of exports and 199 million dollars of domestic market sales (injection machines investment of plastics industry) realized. In this period foreign trade deficit of plastics injection machines realised as 174 million dollars.

It can be observed that 94 % of the domestic sales (injection machines investment of the industry) was provided by imports and export coverage of imports realized as 7% in this period.

Cumulative aggregated growth rates for the last 5 years covering 2013-2017 realized as: 5,8% for production, 3,7% for imports, 5,8% for exports, 3,8 for domestic sales and 3,6% for foreign trade deficit.

The expectations for 2018 are; 26 million dollars of production, 193 million dollars of imports, 13 million dollars of exports, 207 million dollars of domestic sales and 180 million dollars of foreign trade deficit.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	20	23	25	10	5.8	26
<b>Imports</b>	161	172	186	8	3.7	193
<b>Exports</b>	10	11	12	10	5.8	13
<b>Domestic Sales</b>	171	184	199	8	3.8	207
<b>Foreign Trade Deficit</b>	-151	-161	-174	8	3.6	-180
<b>Imports/Domestic Sales (%)</b>	94	94	94			94
<b>Exports/Imports (%)</b>	6	7	7			7

**Table 17: Injection Machines Supply & Demand Balance (Million \$)**

Source: TurkStat & ITC Trade Statistics



In 2017, injection machines imports from the first 10 countries accounted to 99% of total imports. China received a share of 47% in total imports. Apart from China, Germany, Austria, Japan and Taiwan are the countries from which Turkey imports the most.

In the same period, 63% of the exports of plastics injection machines destined to 10 countries. Algeria, Pakistan and with a total of 33% share, have been the biggest markets to which Turkey has exported plastics injection machines.

Imports			Exports		
Countries	Million \$	% - Share	Countries	Million \$	% - Share
China	87,8	47.1	Algeria	1,8	14.4
Germany	27,0	14.5	Pakistan	1,6	12.6
Austria	24,4	13.1	Turkmenistan	0,8	6.1
Japan	11,3	6.1	Bulgaria	0,7	5.4
Taiwan	9,5	5.1	S.Arabia	0,6	5.0
Italy	7,3	3.9	Romania	0,5	4.3
S.Korea	7,0	3.8	Russian Fed.	0,5	4.2
Sweetzerland	4,1	2.2	Iraq	0,5	3.8
Canada	3,4	1.8	Poland	0,5	3.8
France	2,2	1.2	S.Korea	0,4	3.2
<b>10 Countries Total</b>	<b>184,0</b>	<b>98.7</b>	<b>10 Countries Total</b>	<b>7,8</b>	<b>62.8</b>
<b>Other Countries Total</b>	<b>2,5</b>	<b>1.3</b>	<b>Other Countries Total</b>	<b>4,6</b>	<b>37.2</b>
<b>Total</b>	<b>186,5</b>	<b>100.0</b>	<b>Total</b>	<b>12,4</b>	<b>100.0</b>

**Table 18: Plastics Injection Machines Imports & Exports by Countries (2017)**

Source: TurkStat & ITC Trade Statistics

### 6.3. PLASTICS EXTRUSION MACHINES

In 2017, 69 million dollars of production, 99 million dollars of imports, 34 million dollars of exports and 133 million dollars of domestic sales (injection machines investment of plastics industry) were realized in the plastics extrusion machines. In the same period, foreign trade deficit of extrusion machines realized as 65 million dollars.

It can be observed that the 74 % of the domestic sales (injection machines investment of the industry) was met by imports and export coverage ratio of imports has been realized as 35% in the same period.

Cumulative aggregated growth rates for the last 5 years covering 2013-2017 realized as: 2,4% for production, 0,7% for imports, 2,4% for exports, 1,1% for domestic sales. On the other hand foreign trade deficit decreased by 0,1% annually in the same period.



The expectations for 2018 are; 70 million dollars of production, 100 million dollars of imports, 35 million dollars of exports, 135 million dollars of domestic sales and 64 million dollars of foreign trade deficit.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	63	71	69	-3	2.4	70
<b>Imports</b>	96	115	99	-14	0.7	100
<b>Exports</b>	31	35	34	-3	2.4	35
<b>Domestic Sales</b>	127	150	133	-11	1.1	135
<b>Foreign Trade Deficit</b>	-65	-79	-65	-19	-0.1	-64
<b>Imports/Domestic Sales (%)</b>	75	76	74			74
<b>Exports/Imports (%)</b>	33	31	35			35

**Table 19: Supply & Demand Balance in Extrusion Machines ( Million \$)**

Source: TurkStat & ITC Trade Statistics

In 2017 the extrusion machines imported from 10 countries accounted for 99% of total imports. The countries from which Turkey imports most are Germany, Italy and China with a total share of 71%.

In the same period 56% of extrusion machines exports destined to 10 countries. Algeria, Uzbekistan and Germany with a shared 24% of total exports are the main export partners in these machines.

Imports			Exports		
Countries	Million \$	% - Share	Countries	Million \$	% - Share
Germany	27,3	27.6	Algeria	3,0	8.7
Italy	23,7	23.9	Uzbekistan	2,8	8.0
China	19,0	19.2	Germany	2,5	7.1
Austria	10,0	10.1	Russian Fed.	2,4	7.0
Japan	6,6	6.7	Çorlu Avr. Free Zone	1,7	4.9
Sweetzerland	5,1	5.1	Iraq	1,6	4.6
Taiwan	4,6	4.7	China	1,5	4.5
Netherlands	0,9	0.9	Ukrayna	1,3	3.8
S.Korea	0,7	0.8	Romania	1,2	3.6
India	0,3	0.3	Iran	1,1	3.2
<b>10 Countries Total</b>	<b>98,2</b>	<b>99.3</b>	<b>10 Countries Total</b>	<b>19,1</b>	<b>55.5</b>
<b>Others</b>	<b>0,7</b>	<b>0.7</b>	<b>Others</b>	<b>15,3</b>	<b>44.5</b>
<b>Total</b>	<b>98,9</b>	<b>100.0</b>	<b>Total</b>	<b>34,3</b>	<b>100.0</b>

**Table 20: Plastics Extrusion Machines Imports & Exports by Countries (2017)**

Source: TurkStat & ITC Trade Statistics

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#### 6.4. BLOW MOLDING MACHINES

In 2017, 5 million dollars of production, 23 million dollars of imports, about 2 million dollars of exports and 26 million dollars of domestic market sales (blow molding machines investment of plastics industry) were realized. The industry gave 21 million dollars of foreign trade deficit in this period.

It can be observed that the 89 % of the domestic sales (blow molding machines investment of the industry) was provided by imports in the same period and exports coverage ratio of imports realized as 8% in the same period.

Cumulative aggregated growth rates for the last 5 years covering 2013-2017 realized as: 2,1% for imports, 87% for production and exports, 4,9% for domestic sales and 0,1% for foreign trade deficit.

The expectations for 2018 are; 9 million dollars of production, 24 million dollars of imports, 4 million dollars of exports, 29 million dollars of domestic sales and 20 million dollars of foreign trade deficit.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	0	1	5	371	87.0	9
<b>Imports</b>	21	23	23	2	2.1	24
<b>Exports</b>	0	0	2	371	87.0	4
<b>Domestic Sales</b>	22	23	26	12	4.9	29
<b>Foreign Trade Deficit</b>	-21	-22	-21	-5	0.1	-20
<b>Imports/Domestic Sales (%)</b>	99	97	89			81
<b>Exports/Imports (%)</b>	1	2	8			15

**Table 21: Supply & Demand Balance in Blow Molding Machines (Million \$)**

Source: TurkStat & ITC Trade Statistics

In 2017, Turkey imported 99% of blow molding machines from 10 countries. Germany, Italy and Swetzerland as the main import partners shared 60% of total imports.

2017 yılında Total şişirme makinaları Exportsının % 90'ı 10 Countriesye yapılmış olup, , İraq, Bulgaria ve Rusya Federasyonu Total Exportstan % 49 pay almıştır.

In this period, Turkey exported 90% of total blow molding machines to 10 countries andİraq, Bulgaria and Russian Federation as the main export partners shared 49% of total exports.



Imports			Exports		
Countries	Million \$	% - Share	Countries	Million \$	% - Share
Germany	10,2	43.7	Iraq	0,4	22.9
Italy	6,9	29.5	Bulgaria	0,3	14.6
Sweetzerland	1,4	6.0	Russian Fed.	0,2	11.5
Japan	1,1	4.9	Ukrayna	0,2	11.3
China	1,0	4.4	Kayseri Free Zone	0,2	11.0
Taiwan	1,0	4.1	Germany	0,1	5.8
Spain	0,5	2.0	Azerbaijan	0,1	5.1
India	0,4	1.8	Colombia	0,1	3.0
Austria	0,3	1.5	Tunusia	0,1	2.8
Russian Fed.	0,2	0.9	Kazakhstan	0,0	2.0
<b>10 Countries Total</b>	<b>23,0</b>	<b>98.8</b>	<b>10 Countries Total</b>	<b>1,8</b>	<b>90.1</b>
<b>Others</b>	<b>0,3</b>	<b>1.2</b>	<b>Others</b>	<b>0,2</b>	<b>9.9</b>
<b>Total</b>	<b>23,3</b>	<b>100.0</b>	<b>Total</b>	<b>2,0</b>	<b>100.0</b>

**Table 22: Plastic Blow Molding Machines Exports By Countries (2017)**

Source: Turk Stat & ITC Trade Statistics

### 6.5. THERMOFORM MACHINES

In 2017, 60 million dollars of production, 22 million dollars of imports, 24 million dollars of exports and 58 million dollars of domestic market sales (thermoform machines investment of plastics industry) realized. On the other hand, foreign trade deficit of thermoform machines realized as 2 million dollars in this period.

It can be observed that the 38% of the domestic sales (thermoform machines investment of the industry) was provided by imports and export coverage of imports ratio has been realized as about 110% in the same period.

Cumulative aggregated growth rates for the last 5 years covering 2013-2017 realized as: 13,6 % for production and exports, 6% for domestic sales. On the other hand, imports decreased by 2,5% per year.

The expectations for 2018 are; 68 million dollars of production, 21 million dollars of imports, 27 million dollars of exports, 62 million dollars of domestic sales and 6 million dollars of foreign trade deficit.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	36	47	60	28	1..6	68
<b>Imports</b>	24	15	22	47	-2.5	21
<b>Exports</b>	14	19	24	28	1..6	27
<b>Domestic Sales</b>	46	43	58	35	6.0	62

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<b>Foreign Trade Deficit</b>	-10	4	2	-42	-	6
<b>Imports/Domestic Sales (%)</b>	53	35	38			34
<b>Exports/Imports (%)</b>	60	126	110			129

**Table 23: Supply & Demand Balance in Thermoform Machines (USD Million)**

Source: TurkStat &amp; ITC Trade Statistics

In 2017, Imports from 10 countries shared 98% of total thermoform imports. Italy, Germany and China shared 72% of total imports.

In this period, 58% of total exports of thermoform machines destined to 10 countries. Russian Federation, Belgium and Indonesia as the main export partners shared 40 % of total exports.

Imports			Exports		
Countries	Million \$	% - Share	Countries	Million \$	% - Share
Italy	9,6	44.2	Russian Fed.	2,9	12.1
Germany	3,6	16.4	Belçika	1,8	7.3
China	2,5	11.3	Indonesia	1,6	6.8
Taiwan	1,8	8.2	Nijerya	1,5	6.2
France	1,6	7.2	Algeria	1,4	6.0
Sweetzerland	1,1	5.1	Ukrayna	1,1	4.7
India	0,6	2.8	USA	1,1	4.5
Austria	0,2	1.0	Iran	0,9	3.9
Poland	0,2	0.9	UK	0,9	3.7
S.Korea	0,2	0.8	Netherlands	0,8	3.3
<b>10 Countries Total</b>	<b>21,4</b>	<b>98.0</b>	<b>10 Countries Total</b>	<b>14,0</b>	<b>58.3</b>
<b>Others</b>	<b>0,4</b>	<b>2.0</b>	<b>Others</b>	<b>10,0</b>	<b>41.7</b>
<b>Total</b>	<b>21,8</b>	<b>100.0</b>	<b>Total</b>	<b>24,1</b>	<b>100.0</b>

**Table 24: Thermoform Machines Imports and Exports By Countries ( 2017)**

Source: Turk Stat &amp; ITC Trade Statistics

## 6.6. PRESSES AND OTHER MACHINES

In 2017, 188 million dollars of production, 209 million dollars of imports, 73 million dollars of exports and 323 million dollars of domestic market sales (presses and other machines investment of plastics industry) realized in presses and other machines industry. In this period foreign trade deficit realised as 136 million dollars.

It can be observed that the 65% of the domestic sales (presses and other machines investment of the industry) was provided by imports and export coverage of imports ratio realized as 35% in this period.

Cumulative aggregated growth rates for the last 5 years covering 2013-2017 realized as: 5,3 % for production, 3,6% in imports, 4,7% in exports 4,3% in domestic sales and 3% in foreign trade deficit.

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The expectations for 2018 are; 198 million dollars of production, 216 million dollars of imports, 77 million dollars of exports, 337 million dollars of domestic sales and 140 million dollars of foreign trade deficit.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	153	154	188	22	5.3	198
<b>Imports</b>	181	216	209	-3	3.6	216
<b>Exports</b>	61	57	73	28	4.7	77
<b>Domestic Sales</b>	273	312	323	4	4.3	337
<b>Foreign Trade Deficit</b>	-120	-158	-136	-14	3.0	-140
<b>Imports/Domestic Sales (%)</b>	66	69	65			64
<b>Exports/Imports (%)</b>	34	27	35			35

**Table 25: Supply & Demand Balance in Presses and Other Machines (Million \$)**

Source: TurkStat & ITC Trade Statistics

In 2017, presses and other machines have been imported from 10 countries shared 59% of total imports. China, Italy and Germany as the main import partners shared 32% of total imports.

In this period, 44% of presses and other machines were exported to 10 countries and Iran, Russian Federation and S. Africa Republic as the main export partners shared 20% of total exports.

Imports			Exports		
Countries	Million \$	% - Share	Countries	Million \$	% - Share
China	23,1	11.3	Iran	6,9	9.4
Italy	22,2	10.9	Russian Fed.	4,1	5.6
Germany	19,9	9.7	S.Africa Rep.	3,7	5.1
Japan	10,9	5.3	Algeria	3,2	4.3
Austria	10,0	4.9	Bulgaria	3,0	4.0
Germany	7,8	3.8	Romania	2,8	3.8
Tailand	7,6	3.7	Spain	2,5	3.4
USA	7,1	3.5	USA	2,2	3.0
Italy	5,7	2.8	Azerbaijan	2,0	2.7
Austria	5,3	2.6	S. Arabia	1,9	2.6
<b>10 Countries Total</b>	<b>119,6</b>	<b>58.5</b>	<b>10 Countries Total</b>	<b>32,1</b>	<b>43.9</b>
<b>Others</b>	<b>85,0</b>	<b>41.5</b>	<b>Others</b>	<b>41,1</b>	<b>56.1</b>
<b>Total</b>	<b>204,6</b>	<b>100.0</b>	<b>Total</b>	<b>73,3</b>	<b>100.0</b>

**Table 26: Presses and Other Machines Imports and Export by Countries (2017)**

Source: TurkStat & ITC Trade Statistics

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**6.7. PARTS & COMPONENTS**

In 2017, 173 million dollars of production, 44 million dollars of imports, 23 million dollars of exports and 193 million dollars of domestic market sales (accessories investment of plastics industry) were realized in the parts and components industry. On the other hand, foreign trade deficit realized as 21 million dollars in the same period.

It can be observed that the 23% of the domestic sales (accessories investment of the industry) was provided by imports in the same period and export coverage of imports ratio realized as 53% in the same period.

Cumulative aggregated growth rates for the last 5 years covering 2013-2017 realized as: 26,2 % for production, 0,7% in imports, 8,2% in exports 19,8% in domestic sales. On the other hand, foreign trade deficit decreased by 5,3 annually in the same period.

The expectations for 2018 are; 217 million dollars of production, 44 million dollars of imports, 25 million dollars of exports, 236 million dollars of domestic sales and 19 million dollars of foreign trade deficit.

	2013	2016	2017	% Increase 2017/2016	CAGR % 2013- 2017	2018/E
<b>Production</b>	68	151	172	14	26.2	217
<b>Imports</b>	43	40	44	9	0.7	44
<b>Exports</b>	17	23	23	2	8.2	25
<b>Domestic Sales</b>	94	168	193	15	19.8	236
<b>Foreign Trade Deficit</b>	-26	-17	-21	19	-5.3	-19
<b>Imports/Domestic Sales (%)</b>	46	24	23			19
<b>Exports/Imports (%)</b>	40	57	53			57

**Table 27: Supply & Demand Balance in Parts and Components (Million \$)**

Source: TurkStat & ITC Trade Statistics

In 2017 59% of parts and components have been imported from 10 countries and Germany, China and Italy, as the main import partners shared % 59 of total imports.

In this period, 44% parts and components were exported to 10 countries and Germany, Iran, and Çorlu Free Trade Zone as the main export partners shared 20% of total exports.

Countries	Imports		Countries	Exports	
	Million \$	% - Share		Million \$	% - Share
Germany	13,4	11.3	Germany	3,8	9.4
China	9,4	10.9	Çorlu Avr. Free Zone	1,8	5.6
Italy	7,5	9.7	Iran	1,8	5.1

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Japan	2,4	5.3	Russian Fed.	1,7	4.3
France	2,2	4.9	Romania	1,2	4.0
Austria	2,1	3.8	Bulgaria	0,9	3.8
USA	1,8	3.7	UAE	0,6	3.4
Taiwan	1,2	3.5	Sweetzerland	0,6	3.0
Luxembourg	1,2	2.8	UK	0,6	2.7
Sweetzerland	1,0	2.6	Italy	0,6	2.6
<b>10 Countries</b>					
<b>Total</b>	<b>42,2</b>	<b>58.5</b>	<b>10 Countries Total</b>	<b>13,8</b>	<b>43.9</b>
<b>Others</b>	<b>6,0</b>	<b>41.5</b>	<b>Others</b>	<b>9,5</b>	<b>56.1</b>
<b>Total</b>	<b>48,2</b>	<b>100.0</b>	<b>Total</b>	<b>3,8</b>	<b>9.4</b>

**Table 28: Parts and Components Imports and Exports by Countries (2017)**

Source: Turk Stat & ITC Trade Statistics

## 7. MAIN PROBLEMS OF THE INDUSTRY

General problems in the machinery manufacturing industry, can also be applied to the plastic processing machines industry. In addition to these general problems, the absence of any national strategy and enough protection for domestic manufacturers of machine industry are the major problems faced in the plastics processing machines.

Turkey, as for plastic processing machinery has a very serious investing plastics industry. Thus, Turkey is one of the world's most important market in this area. But 80% of the market is dominated by imported machines.

Turkey is a net importer in the plastics processing machines trade and machines exported are far from providing high added value when compared their unit prices.

The developments in the plastics processing machines and their accessories and parts industry, despite significantly developing the plastics industry and the propensity to invest following the similar pattern, is under constant pressure of the cheap imports conducted in China. Imports receives a higher margin in sharing the increasing demand.

The lack of a state strategy for the plastic processing machinery sector, adequate protection of domestic producers and provide competitive advantages of plastic products manufacturer, they choose the second-hand imports of machinery.

The most important problems encountered in Turkey include plastic processing machinery sector;

- ✓ There is not a certain vision of the sector.
- ✓ Horizontal and vertical cooperation before competition between firms is not available.
- ✓ R&D, P&D, industrial design and product development efforts are insufficient in the industry.
- ✓ Patents and trademark investments are not enough in the industry.

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- ✓ Industry's international technical compliance is insufficient.
- ✓ Equity capital and working capital of the companies are inadequate.
- ✓ Energy costs are high.
- ✓ The industry needs for the marketing customer relationship management.

## **8. PAGEV PROJECTS**

PAGEV which is the " Unifying Power " of the Turkish plastics industry develops different projects aiming to solve the problems outlined above. These are in summary: "PAGEV Plastic Center of Excellence" and "International Regional Plastics Production Center".

### **8.1. PAGEV PLASTICS CENTER OF EXCELLENCE**

Plastic materials, used in all areas of life, are rapidly taking place of other alternative products, because of their superior properties, in Turkey as well as in all over the world. Plastics, which usage in all sectors Increasing is becoming an indispensable material for the 21<sup>st</sup> century.

Turkish Plastics Industry which is one of the Moroccotest growing sectors in our country despite being young, is the 6<sup>th</sup> in the world and the 2<sup>nd</sup> in Europe. Growing with the goal of leadership in Europe, the Turkish Plastics Sector aims to increase the certification and added value of its products.

PAGEV, "Unifying Power" of the Turkish Plastics industry, is leading the industry with the "PAGEV Plastic Excellence Center" for realizing this purpose. The mission of the PAGEV Center for Plastic Excellence, will include the following activities.

- ✓ Research and Development
- ✓ Test and Laboratory Services
- ✓ Certification
- ✓ Training
- ✓ Competent Consulting

With the Center of Excellence, the test and laboratory support that the plastic industry needs; will be provided to the industry. So, many problems that lead to loss of time and energy such as high test costs, overseas shipping, customs clearance, long test times will be removed.

The platforms that will provide information to and knowledge sharing in the industry will be developed by the Center and detailed training programs will be prepared and presented for the benefit of the industry. While working on the newest technologies, the Center of Excellence will work together with industry organizations, universities, research institutes, professional



associations and non-governmental organizations to work for the Turkish plastics industry to be the world leader with R&D and innovation based work.

Established with the support of the Ministry of Science, Industry and Technology, PAGEV Plastic Center of Excellence will provide to the plastics industry and Turkish economy, especially the development of industrial skills and capabilities that will form the basis of Turkey's national projects.

By PAGEV Plastic Center of Excellence, which will be established by strategic cooperation, it is aimed to grow the plastic industry Moroccoter with its traceable targets, scientific quality and high potential for commercialization,

Upon completion, the Center of Excellence, which will have an area of over 30 thousand m<sup>2</sup>, rises right beside PAGEV Vocational and Technical Anatolian High School in Küçükçekmece, Istanbul. PAGEV Plastic Center of Excellence, which will make Turkey the center of plastic production in the world, will carry out innovative projects.

In addition to this, the Center will create a control mechanism for the products exported abroad. The Center will also contribute to the preservation of the reliability and reputation of the plastic products produced in Turkey. On the other hand, the introduction of poor quality and non-standard goods into the country will be prevented by determining the technical suitability of the plastic products imported from abroad without any definite importation in the laboratories.

With its superior information infrastructure, the Center of Excellence will present the important documents required by the players of the sector more economically and quickly.

By accelerating the development, we will focus on the development of products and production technologies that will increase the competitive power of our firms.

The Center of Excellence, which will develop innovative ideas by following the developments in the world plastic sector, will increase the competitive power of our firms by providing many field consultancy services from the determination of appropriate input materials to the optimization of production process.

## **8.2. INTERNATIONAL REGIONAL PLASTIC MANUFACTURING CENTER**

Although the Turkish plastics sector, with its process capacity reaching 9 million tons, has the 6<sup>th</sup> largest plastics production capacity in the world and 2<sup>nd</sup> in Europe, imports more than 85% of the plastic raw material it needs.



One of the most important advantages of the plastics industry in Turkey is that it is located between the Middle East countries which are the main petroleum and plastic raw material producer and the European market which is the main plastic consumer.

PAGEV aims to unify the plastic raw materials potential of Middle East countries with the Turkish plastics industry's competent production capability and experience at the international regional plastic production center, which Turkey aims to establish in South East Anatolia Region.

In the center, to be established with the win - win principle, the plastics raw materials producer countries will be supplying cheap and reliable raw materials having a large volume and reliable market while Turkish plastics industry will have greater competition possibilities in the global markets with its growing production capacity and falling costs.