



**2016**



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## Preface

Once again, the CAEF - The European Foundry Association - Commission No. 7 has compiled a statistical annual entitled "The European Foundry Industry 2016" from national reports and statistical material gathered from its member countries. The main tables were supplemented by information from European foundry nations being non-members of CAEF as far as data has been available.

The publication thus presents an authentic statistical picture of the European foundry industry. All the same, data in some categories, particularly those regarding output values, have remained incomplete. Despite those inadequacies the Annual Report published by Commission No. 7 remains the most comprehensive EU-wide survey of our industry.

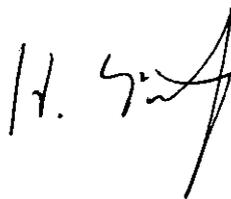
The Commission wishes to express its gratitude to all those CAEF member association representatives who helped in preparing these reports and figures.

Düsseldorf, August 2017

CAEF - The European Foundry Association



M. Schumacher  
Secretary General



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# TOTAL SURVEY



## The European Foundry Industry in 2016

### The Economy and the Casting Customer Industries

#### The Macro-economic Situation at the end of the year 2016

Europe's economy is on a solid growth path. The economic recovery in the euro area continues. A sustained acceleration of the pace of recovery is, however, still not in sight. In times of increased uncertainty and with tailwinds from lower oil prices fading, the euro area economy is expected to expand at a moderate pace with GDP rising by 1.6 per cent and 1.5 per cent in 2017 and 2018, respectively. This is the picture being painted in the economic outlook of the EUROFRAME group,

The labour market situation therefore will continue to improve with the unemployment rate at the euro area level forecast to decline by close to ½ of a percentage point per year from the 10 per cent rate registered in 2016. Consumer price inflation has picked up recently in response to higher energy prices, but underlying inflation has remained low and EUROFRAME institutes do not expect that it will rise to the ECB's target of close to 2 per cent any time soon.

#### Forecast 2017/2018

		Gross Domestic Product (2)		Consumer Prices (2)		Unemployment Rate (2)	
		Growth Rate in%		Growth Rate in%		In%	
		2017	2018	2017	2018	2017	2018
Country	Weighting (1)	2017	2018	2017	2018	2017	2018
Austria	2,2	1,4	1,3	2,1	1,8	5,9	5,9
Belgium	2,7	1,6	1,5	2,0	1,7	7,8	7,6
Croatia	0,3	2,9	2,6	1,1	1,1	15,9	n.a.
Czech Republic	1,2	2,8	2,2	2,3	1,8	3,8	4,2
Denmark	1,8	1,5	1,7	0,6	1,1	5,8	5,8
Finland	1,3	1,3	1,4	1,4	1,6	8,5	8,3
France	14,5	1,4	1,6	1,4	1,2	9,6	9,3
Germany	19,4	1,6	1,5	2,0	1,7	4,2	4,2
Hungary	0,8	2,9	3,0	2,5	3,3	5,8	n.a.
Italy	10,7	0,8	0,8	1,3	1,3	11,4	11,0
Lithuania	0,2	2,8	3,1	2,8	2,0	7,4	7,2
The Netherlands	4,6	2,1	1,8	0,9	1,4	5,4	5,3
Norway	2,4	1,2	1,9	2,6	2,5	4,5	4,2
Poland	2,9	3,4	3,2	2,3	2,3	6,2	n.a.
Portugal	1,2	1,7	1,5	1,2	1,4	10,6	10,1
Slovenia	0,3	2,5	2,0	1,5	2,0	7,0	6,6
Spain	7,5	2,6	2,1	2,4	1,4	17,7	16,6
Sweden	2,9	2,7	2,4	1,4	1,6	6,7	6,7
Switzerland	3,3	1,4	1,6	0,4	0,7	3,0	2,9
Turkey	5,8	2,5	3,3	10,1	9,1	10,2	n.a.
United Kingdom	14,1	2,0	1,5	2,5	2,6	4,9	5,1
<b>CAEF</b>	<b>100,0</b>	<b>1,8</b>	<b>1,7</b>	<b>2,3</b>	<b>2,1</b>	<b>7,7</b>	

(1) Source: Worldbank GDP 2016, (2) Source: IMF World Economic Outlook April 2017, n.a.=not available

## The Economic Situation in the Major Casting Customer Industries

### The chief client sectors of the foundry industry

#### Vehicle construction

The automotive year 2016 brought new records in the US and China, while Western Europe expanded strongly to reach its highest level since 2007. These three major automotive markets also continued growing in December.

In Western Europe, new registrations rose by 6 percent in 2016 to reach 14.0 million passenger cars. The top five markets all increased: Italy grew by 16 percent, Spain by 11 percent, France and Germany by 5 percent each, and the UK by 2 percent. Except for the Netherlands and Switzerland, all 18 Western European countries enjoyed growth in their automotive sectors. Western Europe as a whole added 2 percent in December, climbing to 1.1 million passenger cars.

In the new EU Member States, 1.2 million passenger cars were newly registered last year (+16 percent). Double-digit increases were recorded in the three largest individual markets – Poland (+17 percent), the Czech Republic (+12 percent) and Hungary (+25 percent).

The US market for light vehicles (passenger cars and light trucks) expanded by 3 percent to 1.7 million units in December. The market achieved a new record value of 17.5 million vehicles (+0.4 percent) for 2016 as a whole. Light trucks totalled almost 10.6 million units, a good 7 percent more than in the previous year. The passenger car segment shrank by around 9 percent. This shows that the shift to light trucks has continued.

The Chinese passenger car market also expanded last month. Sales rose by 11 percent to 2.6 million new vehicles. Never before have so many new vehicles been sold in a single month. One reason for the record volume is that the reduced rate of VAT on vehicles with small engines since October 2015 was increased again at the turn of the year, which boosted the December figures in anticipation. Total passenger car sales in China during 2016 rose by nearly 18 percent to 23.7 million units.

The passenger car market in Japan added 8 percent in December, climbing to 332,800 units. Sales for 2016 as a whole just exceeded 4.1 million vehicles, ending almost 2 percent below the previous year's result.

Passenger car sales in India fell last month for the first time since mid-2015. At 227,800 units, 1 percent fewer vehicles were sold. However the accumulated figure for 2016 was a welcome result: from January to December 2016, the market increased by 7 percent, which means that the Indian car market expanded to around 3.0 million vehicles.

Last month 2016 the Russian light vehicle market was unable to continue the positive development from November. December sales of new vehicles reached 145,700 units, a year-on-year fall of 1 percent. The overall number of light vehicles sold in 2016 came to 1.4 million, which was a loss of 11 percent.

Brazil's new light vehicle registrations lost nearly 10 percent, falling to 199,200 units in December. The Brazilian economy is still in deep recession. Last year this resulted in the lowest new registration figures since 2006: from January to December 2016, a total of 2.0 million new vehicles were registered (-20 percent).

#### Mechanical engineering

Since 2014, the economic situation in the European mechanical engineering industry has been characterized by constant fluctuation between slightly positive and negative rates. There have been no continuous phases of growth. In the EU as a whole, machinery production stagnated in the year 2016.

The Trends in the leading countries on the global level were reported as followed: Output in the People's Republic of China, the largest production location for mechanical engineering products, continued to grow (plus 4%). In Italy, machinery production grew by approx. 3% in 2016 compared to the year before. Engineering industry in Germany locked only weak figures on stagnation level. In Japan engineering production shrank by 2% compared to the year 2015. The production in the USA was down by 3% in the reporting year 2016.

### **Building industry**

Construction in Europe grew by 2 percent in 2016. Annual growth in the sector is expected to continue at around this rate for the next three years until the end of 2019, according to calculations by the EUROCONSTRUCT research network. The strongest stimuli will come from new residential construction, which grew by a good 7 percent in 2016. The positive development was driven by the economic recovery in many European countries, low interest rates and pronounced migrant inflows, as well as internal migration. In countries like Ireland or Spain, which were hit particularly hard by the financial and economic crisis, previously extreme constraints on new construction led to a clear counter-reaction in the year 2016. Germany's construction sector also benefited from a sharp uptick in residential demand. Estimates of around 300,000 completions in 2016, including dwellings in existing buildings, are nevertheless significantly below the country's annual requirement of 350,000 to 400,000 new dwellings. German government expenditure on transport infrastructure is also rising. Brexit seems to have had a negligible impact construction demand in Germany to date. The same applies to most of the countries in the EUROCONSTRUCT network. Even changes to forecasts for the British construction sector remain modest. This is primarily due to the absence of any concrete plans for Brexit to date, which makes it almost impossible to assess its potential economic implications.

### **Steel industry**

World crude steel production reached 1,628.5 million tonnes (Mt) for the year 2016, up by 0.8% compared to 2015. Crude steel production decreased in Europe, the Americas and Africa.

Annual production for Asia was 1,125.1 Mt of crude steel in 2016, an increase of 1.6% compared to 2015. China's crude steel production in 2016 reached 808.4 Mt, up by 1.2% on 2015. China's share of world crude steel production increased from 49.4% in 2015 to 49.6% in 2016. Japan produced 104.8 Mt in 2016, down by -0.3% compared to 2015. India's crude steel production for 2016 was 95.6 Mt, up by 7.4% on 2015. South Korea produced 68.6 Mt of crude steel in 2016, a decrease of -1.6% compared to 2015.

In 2016, the EU (28) produced 162.3 Mt of crude steel, a decrease of -2.3% compared to 2015. Germany produced 42.1 Mt of crude steel in 2016, down by -1.4% over 2015. Italy produced 23.3 Mt in 2016, an increase of 6.0% over 2015. Spain produced 13.7 Mt of crude steel in 2016, a decrease of -0.8% compared to 2015.

2016 crude steel production in North America was 111.0 Mt, the same amount as in 2015. The US produced 78.6 Mt of crude steel, down by -0.3% on 2015. Crude steel production in the CIS was 102.4 Mt in 2016, 0.8% higher than in 2015. Russia produced 70.8 Mt of crude steel in 2016, down by -0.1% on 2015. Ukraine recorded an increase of 5.5% with a year-end figure of 24.2 Mt. Annual crude steel production for South America was 39.2 Mt in 2016, a decrease of -10.6% on 2015. Brazil produced 30.2 Mt in 2016, down by -9.2% compared to 2015.

### **The Foundry Industry**

In 2016, the iron, steel and malleable foundries of the CAEF member states produced 11.4 m. tons of castings. Compared to the year before, this corresponds to a 2.8% decrease in production weight. (For Croatia and Slovenia a negative growth rate of 2.8% compared to the average minus was calculated because of partly missing data.) The six countries that dominate the industry in terms of weight, namely Germany, Turkey, France, Italy, Spain and Poland, account for 84.7% of the

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production of ferrous metal castings. The production was up in Italy, Spain and Switzerland. Turkey has logged a stable production volume. All other CAEF member countries registered a smaller production volume.

In 2016, non-ferrous metal foundries in the CAEF member states booked a production increase of 3.8% to more than 4.2 m. tons. (For Croatia and Slovenia a production growth of 3.8% compared to the average plus was calculated because of partly missing data.) In the countries that dominate the production of non-ferrous metal castings, namely Germany and Italy, the output was up for Germany by 2.3% and by 3.7% for Italy. Together, these two countries account for 52.0% of the total volume of non-ferrous metal castings produced in the CAEF member states. In the reporting year of 2016 Belgium, Denmark, Finland, Norway, Poland, Sweden and Switzerland booked negative growth rates.

The number of employees in iron and steel foundries increased in the Czech Republic, Italy, Norway, Portugal and Spain. In all other CAEF member countries with available data employment was down compared to 2015. Data from UK are not comparable because of revised data.

In 2016 the non-ferrous metal sector was dominated by positive employment trends. A negative development was logged in the Czech Republic, Finland and Portugal.

Number of foundries: In some cases closed foundries stand beside green field installations. In Belgium, Denmark, Finland, Hungary, Italy and Poland the number of foundries was stable. In all other countries foundries were closed.

The share of cast iron with lamellar graphite in the output total of iron and steel castings was 51%, the same share as in the two years before. Correspondingly, the share of ductile cast iron was stable (42%). The steel sector logged a share of 7%.

The production of castings made of non-ferrous metal alloys is still dominated by light metals. The share was up from 88% to 89%. Furthermore, the share of copper alloys holds the level of round about 6%. Therefore not surprising the share of components made of zinc alloys was nearly stable (5%).

From the data available it appears that the export quota of the iron and steel foundries decreased from 47% last year to nearly 45% in 2016. Calculation base is the foreign trade report of eleven member countries. Germany is still the country that dominates the export trade in castings with a volume of nearly 1.5 m. tons (minus 5.9%). The second place in volume, the seventh year in a row, was logged for Turkey: Turkey reported an export volume of 813 500 tons (minus 3.4%). Spain reported a volume of 681 100 tons (plus 6.7%) and the third place the second year in a row. France had to deal with a decrease of 24.1% (471 400 tons) and loses the fourth place to Italy (489 000 tons, plus 20.9%).

If we consider only those CAEF member states with current figures for the previous year, the value of the iron and steel castings produced decreased by 2.2%, in doing so the weight of castings was down by 2.6%.

From the data that was available for a year-on-year comparison, it appears that in the non-ferrous metal sector the value of production increased by 1.4% whereas the weight of castings produced was 4.5% higher. These figures are underlining that a hard international competition exists independent of the positive development of the non-ferrous production.

For all countries with missing data the data gap were filled with the average growth rates of the available data to get approximations.

### **The Situation in the Casting Material Sectors**

#### **Iron**

At 5.8 m. tons, the output of the CAEF member states was down by 3.1%. Missing data for Croatia and Slovenia were calculated with the average growth rate of available data from the other nations. A

positive growth rate was logged for Austria, Finland, France, Italy, Spain and Switzerland. As ever, the data available for the cast-iron sector is too sketchy to allow determining the overall value of production. The output of components made of cast iron with lamellar graphite is largely destined for the motor vehicle and mechanical engineering industries. For the motor vehicle industry, the highest absorption rates were reported from Portugal (87%), Germany (68%) and France (49%) respectively. This is the same ranking as the last five years. For the mechanical engineering industry the highest shares in the output were posted for 2016 by Italy (46%), Finland (35%) and Turkey (34%).

The number of persons employed in iron foundries (incl. ductile cast iron) was up only in Norway, Portugal and Spain. In Belgium the employment was stable. In all other countries the employment decreased.

### **Ductile Cast Iron**

The producers of ductile cast iron reported a decrease of output by 2.5% to 4.8 m tons (some data from 2015 were revised). Missing data for Croatia, Slovenia and Sweden were calculated with the average growth rate of available data from the other nations.

The Czech Republic, France, Germany, Hungary, Norway, Poland, Switzerland and the United Kingdom reported a downturn in production. All other countries logged an increasing production level.

Cast iron with spheroidal graphite traditionally dominates the ductile cast iron sector with an unchanged share of 99% during the last years. Correspondingly, malleable iron as a niche product holds a share of a little bit more than 1%. In this context, it should be noted that malleable casting statistics have lost some of their meaning because in some states it is impossible to break down the figures for the ductile cast-iron sector. Therefore data for malleable castings are not collected any more. Nodular iron components are mainly produced in Germany, France, Turkey, Spain and Italy. Besides, Germany, Turkey, Poland, Spain dominate the production of malleable castings.

As ever, components for the motor vehicle and mechanical engineering industries predominate in the production of ductile castings, with the building industry following in third place among the customer industries. If analysing the shares of motor vehicle castings in those countries for which data are available, one sees that the highest shares are reported from Portugal at 90%, Turkey at 51% and the United Kingdom at 49%. The mechanical engineering industry holds the highest shares in output in Finland (55%), Italy at 51% and Germany at 32%. Unfortunately, it is impossible to present the share of the building industry.

### **Steel**

In the year 2016 the output of steel castings decreased by 5.9% to 775 000 tons. Missing data for Croatia and Slovenia were calculated with the average growth rate of available data from the other nations. Germany, the leading producer, logged a production volume 8.6% lower than the year before. For Turkey, unchanged the second in line, the production was up by 10.7%. For Austria, the Czech Republic, Poland and Sweden an increasing production was logged.

In those member countries for which data for a year-on-year comparison was available, the value of the output of steel casting components decreased by 4.8%, while its weight was down only by 2.7%.

The number of persons employed in steel foundries was up only in Portugal and Spain. In Turkey the employment was stable. In all other countries the employment decreased.

### **Non-ferrous metal castings**

The output of non-ferrous metal casting components in the CAEF member countries was up by 3.8% to 4.2 m. tons. Missing data for Slovenia were calculated with the average growth rate of available data from the other nations. As before, the non-ferrous metal sector is dominated by Germany, Italy, Turkey, France and Poland. The first three countries lift their share from 61% in the year 2015 to 62%

in the reporting year. In Belgium, Denmark, Finland, Norway, Poland, Sweden and Switzerland a decreasing production volume was logged. All other countries had registered positive growth rates.

Traditionally, the production of non-ferrous metal castings is dominated by light metals, with the motor vehicle industry as the foremost customer. In the year covered by this report, the output of light metal castings (aluminium and magnesium) increased by 6.3% compared to 2015, reaching more than nearly 3.7 m. tons. Missing data for Croatia, Slovenia and Sweden were calculated with the average growth rate of available data from the other nations. Together, Germany and Italy, the two major producers, account for 51% of the light-metal castings. The production for these leading countries was up by 2.5% for Germany respectively by 2.9% for Italy. A negative development was reported by Belgium, Finland, Norway, Poland and Switzerland. Among the light metal alloys, magnesium plays a subordinate role in terms of output weight. Germany is the major producer with 17 400 tons followed by Italy (7 400 tons) and the United Kingdom (3 000 tons). For Austria another important player no data were available.

The second most important material category in the non-ferrous metal sector is that of copper and its alloys. For countries with registered production for 2015 and 2016 the level was up by 2.3%. The reported volume in 2016 reached a level of 266 000 tons. Because of the missing data of some countries it is difficult to estimate the real market volume. The production level is likely to be more than 265,000t. Production increased in Italy, Portugal, Spain, Switzerland and Turkey.

The output of zinc castings was up by 2.4% with a volume of more than 225 000 tons. Missing data for Croatia, the Czech Republic, Slovenia and Sweden were calculated with the average growth rate of available data from the other nations. Italy, Germany and Turkey are the major producers, together holding a share of more than 72% in output total. Negative growth rates were reported for Hungary, Switzerland and the United Kingdom. An unchanged production was reported for Finland and Turkey.

The statistical data available for the category of 'other non-ferrous metal alloys' are fragmentary. In addition, some countries include copper and zinc in this category because there is no facility for segregating these. Therefore, it is impossible to analyse this category more extensively.

Source: IFW Kiel, ifo Munich, Worldbank, IMF, ACEA, VDA, VDMA, Eurofer, Worldsteel, CAEF

**REPORTS OF THE COUNTRIES**



## General economic situation

The Austrian economy enjoyed in 2016 a stronger growth than in previous years. The recovery of the domestic economy should be seen in the context of the weak trend between 2012 and 2015: In those years the annual GDP growth in real terms was less than 1%. According to forecasts the GDP growth in real terms will gain momentum during the forecast period: According to WIFO Austria will grow in 2017 and 2018 by 2.0% and 1.8% respectively.

Forecast for Austria				
Change compared to previous year in %	2016	2017	2018	
<b>GDP growth, real terms</b>	+1.5	+2.0	+1.8	<ul style="list-style-type: none"> <li>■ Growth in 2016 for the first time above 1%, just like EU average.</li> <li>■ Growth in 2017 and 2018 will be driven by exports and industrial production.</li> </ul>
<b>Consumer spending, real terms</b>	+1.5	+1.3	+1.2	Consumer spending remains stable. Gradually, special effects due to tax reform come to an end.
<b>Gross capital formation, real terms</b>	+2.9	+2.6	+2.4	<ul style="list-style-type: none"> <li>■ After years of weak investment trends, investments should increase clearly during the forecast period.</li> <li>■ Recovery of investments in 2016 driven by the special effect "vehicle investments".</li> </ul>
<b>Exports of goods, real terms</b>	+1.5	+3.7	+3.6	Foreign economy increases its impact on economic growth.
<b>Actively employed persons</b>	+1.6	+1.6	+1.3	Employment will keep growing till 2018
<b>Unemployment rate in %</b>	6.0	5.9	5.9	Unemployment rate remains high.

Source: WIFO, March 2017

After an increase of about +1.7% in 2016, WIFO expects -due to the global upswing- an increase of **Austrian exports** of roughly 3.7% in real terms. This forecast is based on the rising demand from the eurozone, as well as the economic recovery of the USA and East-Central Europe. For 2018 there is expected an export growth of +3.4%.

During the last years **investments** -despite low interests- registered a weaker trend than in earlier upswing periods. According to WIFO gross capital formation in real terms increased by 2.9% in 2016, which was mainly due to vehicle investments. This growth rate is expected to slow down in 2017 (+2.6%) and 2018 (+2.4%).

Despite the still significant increase of employment the unemployment rate stagnates at a level which is high by Austrian standards. Due to migration, the raised retirement age and a higher female employment rate the labour supply has increased.

During the forecast period the **inflation** rate will remain stable at +1.7% in 2017 and 2018. This trend depends both on international (increasing commodity and import prices) and national (rise of the VAT) factors.

### Forecast 2017 - 2018: Economic recovery and high risks

- **World economy is recovering:** Accelerated growth of the world economy. The recovery of commodity prices benefits emerging countries such as China, Brazil or Russia. This has positive feedback effects on neighbouring emerging countries as well as on developed countries.

- **USA:** Currently the USA registers the third-longest upswing period, which bears the risk of a correction.
- **Recovery in Europe:** All EU-28 enjoy a growth period, in 2018 with more than 1% for every member country. Recovery of the eurozone is progressing and sustainable. Rising consumer spending, an expansive fiscal policy and the easing of credit standards help to stimulate our economies. WIFO expects an economic growth of 1.9% for 2017 and 1.7% for 2018.

**Forecasting risks** have increased during the last few months. The turnaround on interest rates in the USA can present new challenges to emerging countries. There remains also the question of the actual economic policies of the United States and the actual form the Brexit will take. Furthermore, geopolitical tensions (Ukraine, Syria, Iraq) and terrorist threats have created a high level of global uncertainty.

## **Situation of the foundry industry**

According to our own survey, production, sales and employment increased in 2016. The total production in 2016 amounted to roughly 314,859 tons, i.e. an increase of +1.7% compared to 2015. Total sales of the branch increased by + 0.8% over 2015 to a volume of about 1.39 billion €.

Iron castings registered in 2016 a total production volume of 155,416 tons (a decrease of 0.3%). Sales figures rose by 1.1% to about 395 million €.

The production volume of ductile cast iron amounted to 101,770 tons, i.e. a reduction of 3.8% over the volume of 2015.

Steel castings increased to 11,284 tons, a growth of 18.7% compared to 2015.

The production of grey castings went up by 4.2% compared to 2015 and reached a production volume of 42,362 tons.

Non-iron castings registered a production increase of 3.8%; sales went up by 0.6%.

## **Employment**

In 2016 the branch provided employment to a total of 6,828 persons (employees, skilled workers, semi- and unskilled workers), an increase of 3.5% over 2015.

The number of apprentices trained in professions related to our branch (foundry technology and metal foundrymen) declined with regard to 2015.

## **Incoming orders**

All in all the utilization of capacities was positive but differed a lot from company to company. Incoming orders also presented a mixed picture. Generally, there is a lack of predictability whereas price pressure continues to increase massively.

## **Investment plans**

The trend of investment activities remains rather positive.

## **Personnel cost**

The collective wage agreement establishes an average increase of 1.75% of the minimum wages and salaries in the different employment groups (within a range of 1.2% to 2.0%).

Allowances and apprentice remunerations according to the collective agreement were raised by 1.75%, expense allowances by 1%.

## **Supply of raw materials and energy**

In 2016 raw material prices increased significantly from the end of the year.

According to the Austrian Energy Agency energy prices dropped again. Gas prices fell to a 5-year low, fuel is as cheap as 7 years ago, district heating remains stable, only electricity increased. In 2016 the

EPI declined by 4.5% compared to the previous year and reached with 95.5 index points the level of 2010.

**Cost development**

Our survey revealed an average cost increase of 1.25% for the whole branch.

**Outlook for 2017**

The outlook shows a mixed picture as it also depends on commodity prices and energy cost.

Generally, there is expected a slight increase over 2016.

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## General economic situation

### 2016

Belgian economic growth reached 1,2% in 2016, a lower rate than in 2014 (1,7%) and in 2015 (1,4%). Export was the main support of growth, while private consumption was less dynamic.

**Export** growth reached 5,8%:

- foreign markets remained moderately supportive
- but exports growth has been enhanced by measures to curb the evolution of domestic costs and the euro's depreciation.

**Business investment** increased by 5,4% as most influencing factors were favourable / moving in a favorable direction: utilization of existing capacities was at or higher than long term average, profitability further improved, credit cost remained low.

Private **consumption** growth reached 0,7%:

- household income grew by 1% faster than inflation. It was backed by strong job creations, but limited by the wage moderation and some measures taken by the government like higher value-added tax on electricity.
- The saving rate of households increased in 2016, from a historically low level.

Thanks to low mortgage rates households' **residential investment** increased by 5,4% in 2015.

As in 2015, **public consumption** remained subdued in 2016 (+0,4%).

### 2017

Growth of GDP is expected to accelerate to 1,4%.

**Export** should remain one of the main factor driving the Belgian economy. They are expected to grow by 4,5%:

- foreign markets are expected to accelerate compared to 2016
- exporters still benefit from gains in competitiveness – consequence of measures aimed at limiting labour costs - and their market share should further improve.

**Business investment** should rise by 3,2%:

- economic activity is growing further, which keeps utilization of existing capacity at a high level,
- profitability is consolidating further
- however there expected rise of interest rates will increase financing costs.

Private **consumption** growth is expected to accelerate to 1,4%:

- the purchasing power is expected to increase by 0,9%, as a result of further job creation and the return to automatic indexation.
- the saving rate of households is expected to decline again as consumers' confidence improve (also a consequence of the improvement on the labour market).

Households' **housing investment** are expected to further grow, but more moderately: +2,1%.

**Public consumption** shouldn't increase by more than 0,2%, as a result of further limits on expanses.

## Inflation

Belgian inflation rose to 2,0% in 2016 and is expected to remain high this year, with 2,1%. The higher inflation in 2017 is largely attributable to specific factors like increase in electricity prices or higher excise duties and taxes on certain goods (alcohol, tobacco). However, higher petrol prices should also play an important role.

The “health index”, not affected by the prices of petrol and diesel, was rising faster than the general index in 2016 +2,1%. However, for 2017, it is expected to grow at a lower rate.

**Labour market**

In 2016, employment increased by 1,4%. This year, employment in the private sector is still positively influenced by the measures aimed at limiting labour costs and the stronger activity. Government employment, however, is expected to decrease by 2000 jobs. Overall, employment should increase by 1,4% in 2017 (50 700 jobs). The harmonized Eurostat unemployment rate should therefrom fall from 8,0% in 2016 to 7,6% 2017.

**The situation in the major casting customer industries**

	2012/2011	2013/2012	2014/2013	2015/2014	2016/2015	2017/2016p
Mechanical engineering	4,0	-1,2	0,2	-0,2	3,0	-3,0
Metal product	-2,2	-0,9	1,0	-1,9	2,3	3,5
Automobile	-5,9	-7,1	0,8	-10	-0,5	-5

Last year, the production of mechanical engineering recovered, with a 3% increase of turnover. The 2<sup>nd</sup> and the last quarters were especially strong. It is expected that this trend will persist in 2017. Business climate improved fast in recent months and macro-economic forecasts show a further rise of business investments in Belgium and Europe. However, the announced close down of a major plant in the sector, to be effective by the summer, will weight on the sector. Therefrom, turnover of mechanical engineering is expected to decrease by 3% in 2017 (instead of +2,5% without the close down).

The turnover of the metal product industry grew by 2,5% in 2016. As in mechanical engineering, the 2<sup>nd</sup> and the last quarters were stronger, which shows that, here also, the growth pattern remains irregular. Prospect for 2017 are of a further growth, of 3,5%. Demand from the construction sector is improving, but increasing competition from countries with low labour cost means more downward pressure on prices.

In automobile, demand for passengers cars and commercial vehicles in Europe grew further in 2016, supporting the activity of the sector. However, the close-down of the biggest assembly plant in Belgium still had a negative impact. As a consequence activity fell slightly last year, -0,5%. For 2017, a further decrease is expected, of about 5%. Production of commercial vehicles and sub-contractors for car makers are expected to suffer from a slower demand on the European market. Furthermore, production of passengers cars is also expected to slow down because of the transition to assembly of new models.

**Developments in the foundry industry**

Production of the Belgian foundry industry settled just below 87.000 tons in 2016, which is a decrease of about 16,6% against 2015, and the lowest level since 2009. However this drop was mainly due to the situation in the main plant of the sector, where an important part of the production capacity was unused. Without this enterprise, the production of Belgian foundries would have increased by 1,5%. The quarterly figures show that the difference with last year is deepening from -5% in the 1<sup>st</sup> quarter to -27% in the last period of the year.

**Steel casting**

At 17.415 tons, steel casting production collapsed by 52% compared with 2016. This fall is mainly due to the particular situation of the biggest plant in the sub-sector, but not only. Indeed, without this element, the decrease of production would still be of 5,7%. At the end of the year, the difference in production compared with 2015 reached 76%.

## Iron casting

Iron casting, remains the biggest sub-sector of the Belgian foundry industry. In 2016, its total production reached 67.100 tons. It's only slightly over (2%) the level of last year, and the second lowest figure since 2010. The year on year evolution was positive during the first 3 quarters. Only the last period was below the level of the previous year.

## Non-ferrous casting

At 2.330 tons in 2016, the production in the non-ferrous casting increased for a fourth year in a row. The growth was however limited, at 3,6%.

The quarterly profile is comparable with iron casting: the first 3 periods were positive, before a decline in the last quarter.

## Cost development

### Energy

Electricity: According to Eurostat statistics, Belgian electricity market prices for industrial users increased during the 2nd half of 2016 (before VAT). Prices (before taxes) for consumers between 2000 and 20000 Mwh were 3,5% higher than during the 1<sup>st</sup> half of the year. For consumers between 20000 and 70000 MWH, the (before VAT) price increase reached 8,4%. However, on average, prices remain 12% lower than in the EU and 15% lower than in the euro area.

Gas: market price for industrial consumer of natural gas also were stable in the 2<sup>nd</sup> half of 2016. The difference with EU is still negative -15%, as is the difference with the euro area -18%.

### Raw material

For the whole year, **steel prices** (in euro) decreased by 4% in 2016. They reached their lowest level in may last year, before increasing sharply in the next months. They remained stable for most of the 4<sup>th</sup> quarter. During the first month of 2017, the trend was slightly negative, but not enough to compensate the rise of last year.

For **non-ferrous metals**, prices in 2016 were mostly lower than in 2015 with: -3% for aluminum, -11% for copper, -10% for antimony and -18% for nickel. Prices of a few non-ferrous metals remained higher than in 2015: silver 10%; lead 5%, tin 13% and zinc 8%.

During the first months of 2017, most quotations were stable or on a limited downward trend. The only exception being antimony, still increasing strongly. However, in May, the prices are still much higher than one year ago, with differences ranging from 3%, for silver and gold, to 71% for antimony.

### Wage cost

Average wage in 2016 was 0.6% higher than in 2015. This limited growth is due to limited automatic indexations in July 2015 +0,19% and 2016 +0,88% and a reduction in social security contribution - in march 2016.

For 2017, given the high inflation in Belgium, automatic indexation is expected to reach 1,8% in July. This, combined with an increase in wage in April, should result in an increase of 1,3% for the whole year.

## Outlook for the coming months

For the coming months, business surveys produced mostly positive or neutral signals. Most indicators displayed some improvement at the beginning of the year.

This is the case for the assessment of the order book: in april 2017, the proportion of foundries regarding their orders as being "lower than normal for the period of the year" is of about 10%, its

lowest level since one year. Most of the other foundries are regarding their orders as “normal” and for a few of them, they are even at a “high” level.

Furthermore, the average secured duration of activity is back at a high level. After improving strongly during the 3<sup>rd</sup> quarter 2016, the evolution is less pronounced but remains positive. The perceived improvement of the orders has a positive impact on the activity for the sector.

However, the capacity utilization degraded in January, from 71,9 in October 2016 to 59.5% in January 2017. This deterioration was confirmed in April, when the assessment of capacity utilization reached only 64.2%.

At the beginning of 2017, a large majority of enterprises are expecting no change in their selling-prices for the next 3 month. Some of them expect an increase.

\* \* \* \* \*

## **General economic situation**

### **Macroeconomic developments**

Gross domestic product (GDP) - 47 363 523 400 euro

### **Major casting customers**

Cast iron - export for Europe (main customer) and small part for USA

Steel – for the Bulgarian mining industry and for European mining industry

Aluminum - for European automotive industry

Brass-Sanitary industry

Bronze - mainly centrifugical castings, small part for spare parts and for the mining industry

### **Production figures (information which is taken from the members of the Bulgarian foundry union)**

46 000 tones castings in total including:

38 000t cast iron castings

7 000t steel castings

1 000t non-ferros castings

## **Developments in the foundry industry**

Main source is the European grants which help the foundries to improve their technologies and reduce their costs by investing in:

Reclamation plants -1 furan moulding plant and 1 chromite separation + secondary attrition system

Automatic lines for green sand

No-bake moulding lines – **1 mixer for furan and 2 mixers for alfaset**

### **Capacity utilisation**

35% of the total capacity available.

*There are few foundries working at full capacity*

### **The employment situation**

Issues with the basic skills and knowledge of the engineers

Issues with the working conditions

Issues with the EU grants for improvement of the working conditions - *only 20% of the grant is for covering costs for building works and equipment.*

### **Investment plans**

The main source of investment is the EU grants.

The existing equipment in the foundries is very old and with low depreciation costs. So it helps the foundry to keep low production values. But if a foundry decides to make an investment by itself, it will increase a lot the production values and will make it uncompetitive.

### **Raw materials**

Raw materials – stock exchange prices +5% + transport costs - because of the small batches - 20 t

Cast iron - import from Ukraine and Russia

Scrap - stock exchange prices

### **Energy costs**

There are better price conditions for big customers (more than 6MV) but foundries are not in this group.

Price forming – stock exchange 38 -65 euro/mwh + 50% additional transfer fees and others

### **Payroll - 450 euro (medium)**

\* \* \* \* \*

## Foundry production

Values given in the table result from investigations of the Czech Bureau of Statistics and investigations made by the Association of Foundries of the Czech Republic.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	Expected for 2016
Malleable cast iron	5,427	9,734	4,068	3,145	6,951	4,307	3,722	4,100	4,000	3,800
GJS	49,990	73,218	60,106	52,412	67,025	58,058	53,193	53,352	55,000	48,000
GJL	256,566	255,054	203,238	153,344	197,666	179,394	169,456	169,654	170,000	158,000
Steel	116,106	97,863	97,366	57,888	94,013	94,929	76,380	64,606	60,000	61,000
<b>Fe metals total</b>	<b>428,089</b>	<b>435,869</b>	<b>364,778</b>	<b>266,789</b>	<b>365,655</b>	<b>336,688</b>	<b>302,751</b>	<b>291,712</b>	<b>289,000</b>	<b>270,800</b>
Light metals	101,862	69,982	52,896	65,369	80,049	77,457	88,125	88,826	95,000	98,000
Other non-ferrous metals	5,131	7,195	5,498	12,227	14,241	14,506	17,482	20,034	21,000	21,000
<b>Non-ferrous metals total</b>	<b>106,993</b>	<b>77,177</b>	<b>58,394</b>	<b>77,596</b>	<b>94,290</b>	<b>91,963</b>	<b>105,607</b>	<b>108,860</b>	<b>116,000</b>	<b>119,000</b>
<b>Total</b>	<b>535,082</b>	<b>513,046</b>	<b>423,172</b>	<b>344,385</b>	<b>459,945</b>	<b>428,651</b>	<b>408,358</b>	<b>400,572</b>	<b>405,000</b>	<b>389,800</b>

After historical minimum of casting production in the Czech Republic in 2010 the trend of the years 2014, 2015 about 400 thousand tons of castings a year is expected.

In 2016 the "mass production" mostly of cast iron and steel castings continue to reduce. In case of spheroidal graphite cast iron the reduction was slight. Total production can be expected in the amount of approximately 270 thousand tons/year. This decrease is due to the reduction of the weight of structural castings, although from the point of items the amounts are the same as in the previous years, in some cases they are even increasing.

After a dramatic slump in the years 2012 – 2014 the production has stabilized at about 60 thousand tons of steel castings. In the coming years a significant reversal cannot be expected. Alloyed steels are especially demanded.

Demands for Al alloys castings continue to grow. The main driving force of contracts is the automotive industry. To the existing production of components for lighting technology, aggregates, axles, gearboxes etc. the consumption of structural castings for automobile bodies is growing in the world. The assortment of Al alloys is increasing with these new items. The production of 100 thousand tons is exceeded every year. The same trend will be in the coming years. The production of copper alloys castings continue to reach the value about 20 thousand tons. This quantity can be expected in the coming years too. The sharp growth in the years 2009 – 2011 has stopped and the production is only gradually growing at present.

The exact values of the production for 2016 have not yet been published by the Czech Bureau of Statistics. Total production of the Czech foundry industry will slightly decrease this year, and namely to 390 thousand tons what is approximately by five percent less than in the last year. The production of cast iron castings will be influenced by the decline in orders of machine tools to Russia. Enormous pressure on the price per kilogram in particular for iron based castings will continue. The newly modified items that replace the existing ones are considerably lighter, which is negatively reflected in profit, in particular if the price is fixed only per kilogram and not according to the shape demands. The growth in the number of decreasing weight pieces can be a great danger of economic stability of firms. The determination of pricing calculated from the actual cost is more important now than ever before.

The use of progressive methods of 3D printing is in the early stages. For economic reasons it cannot yet compete with traditional methods. In spite of it the majority of foundries "flirts" with them.

In the field of production of non-ferrous alloys castings the situation is quite different, particularly for the dominant die-cast Al alloys castings. The growth in demand is expected but it is limited by manufacturing capacities and work force. The production is a reflection of automobile production in particular. The demand is extended by the newly introduced items of structural castings, which are in volume terms "extra ones". In such a way a new production "potential" opens up for the future. Currently the demand exceeds the offer, especially due to the high investment performance of this segment.

In general it can be stated that in the field of materials the traditional "iron" castings are replaced by "non-ferrous" castings and those ones are then driven out by plastics and super strong carbonaceous fibres. The reduction of energy consumption and thereby the reduction of the product weight remains the driving force and not only in the automotive industry. But here it is the most apparent.

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## The Finnish Technology Industry as a whole

The turnover of technology industry companies in Finland totaled some EUR 68.6 billion in 2016. This is almost one per cent higher than in 2015. In 2008, prior to the financial crisis, the corresponding figure was EUR 86 billion. Both new orders and order books of technology industry companies were up between October and December from the preceding quarter. However, the value of orders did not quite reach the level recorded at the end of 2015. The number of requests for tender received by technology industry companies continued to increase towards the end of 2016. Competitiveness determines the extent to which these translate into actual orders. The companies that took part in the Federation of Finnish Technology Industries' survey of order books reported that the monetary value of new orders between October and December was 23 per cent higher than in the preceding quarter, but slightly lower than in the corresponding period in 2015. Of the respondents, 59 per cent reported that the number of new orders was up since the July-September period, 33 per cent said it was down and eight per cent said it had remained stable. At the end of December, the value of order books was two per cent higher than at the end of September, but four per cent lower than in December 2015.

Forty-three per cent of companies reported an increase in their order books after September, while 40 per cent reported a decrease and 17 per cent had seen no change. Judging from order trends in recent months, the turnover of technology industry companies in early 2017 is expected to be higher than in the corresponding period last year. The number of personnel employed by technology industry companies in Finland continued to fall slightly in 2016. Personnel declined by one per cent, or by 2,500 employees from the average number in 2015. However, the number of personnel increased slightly between October and December from the July-September level. At the end of December, 11,000 employees were affected by temporary or part-time lay-offs. On average, the industry employed 286,000 people in 2016. In 2008, the industry employed a total of 326,000 people in Finland. Despite the overall reduction in personnel strength, technology industry companies recruited 28,500 new employees last year. Of these, 7,300 were recruited in the October–December period. Some companies were increasing their personnel, while others were hiring new employees due to retirements and employee turnover.

### Mechanical Engineering in Finland

The turnover of mechanical engineering companies (machinery, metal products and vehicles) in Finland totalled EUR 28.3 billion in 2016. Turnover was one per cent higher than twelve months earlier. In 2008, prior to the financial crisis, the turnover was EUR 33.3 billion. Both new orders and order books in mechanical engineering in the October-December period were higher than in the preceding quarter. However, the value of order books did not quite reach the level recorded at the end of 2015. The mechanical engineering industry companies that took part in the Federation of Finnish Technology Industries' survey of order books reported that the monetary value of new orders between October and December was 32 per cent higher than in the preceding quarter and six per cent higher than in the corresponding period of 2015.

At the end of December, the value of order books was slightly higher than at the end of September, but four per cent lower than in December 2015. Judging from order trends in recent months, the turnover of mechanical engineering companies in early 2017 is expected to be higher than in the corresponding period last year. The number of mechanical engineering personnel in Finland continued to fall in 2016. Personnel declined by slightly less than two per cent, or about 2,200 employees from the average number in 2015. On average, the industry employed 122,500 people in 2016.

### Metals Industry in Finland

The turnover of metals industry companies (steel products, non-ferrous metals, **castings** and metallic minerals) in Finland amounted to EUR 8.7 billion in 2016. This is four per cent less than in 2015. The turnover contracted due to the year-on-year decline in prices, which continued until the autumn. On average, producer prices in the industry were seven per cent lower than in 2015. In December, producer prices were 11 per cent higher than twelve months earlier. In 2007, prior to the financial crisis, the metal industry turnover in Finland totalled EUR 11.2 billion. The total production of steel products, non-ferrous metals, **castings** and metallic minerals in Finland in 2016 increased by seven per cent year-on-year. Production of steel products, non-ferrous metals and metallic minerals increased, while production of **castings** contracted by a few per cent.

The turnover of metals industry companies in early 2017 is expected to be higher than in the corresponding period last year. The number of metals industry personnel continued to decrease in 2016. It was down by slightly less than three per cent, or some 400 employees from the average number in 2015. On average, the industry employed 15,400 people in 2016.

## The Foundry Industry in Finland

### Foundry industry as a whole

In the year 2016 the total production of castings still continued to decrease in Finland. The production of iron and steel castings was 57.918 tons which is 2 % less compared to year 2015. Iron casting production increased about 5 %, but steel casting production crashed almost 33 %. Metal castings production was 4.744 tons, which is about 30 % less than the previous year. The value of the casting production of Finnish foundries was 213 m€, which was 13 % less compared to year 2015. The direct export of iron and steel castings was 42 % and of non-ferrous castings 35 %.

### Grey cast iron sector in Finland

Overview of the Finnish grey cast iron production, year 2016:

	2016	2015	%
• Number of GJL foundries	11	12	
• GJL production	15.268 t	14.544 t	+ 5 %
• Value of the GJL production	28,69 m€	27,92 m€	+ 3 %
• Export of GJL castings	5.078 t	4.005 t	+27 %
• Employees in iron foundries	768	778	- 1 %

### Ductile cast iron sector in Finland

Overview of the Finnish ductile cast iron production, year 2016:

	2016	2015	%
• Number of GJS foundries	11	12	
• GJS production	33.541 t	32.053 t	+ 5 %
• Value of the GJS production	70,08 m€	71,40 m€	- 2 %
• Export of GJS castings	17.564 t	14.124 t	+ 24 %
• Employees in iron foundries	768	778	- 1 %

### Steel castings sector in Finland

Overview of the Finnish steel casting production, year 2016:

	2016	2015	%
• Number of steel foundries	7	7	
• Steel casting production	8.423 t	12.509 t	- 33 %
• Value of the GS production	60,66 m€	85,54 m€	- 29 %
• Export of GS castings	1.108 t	1.831 t	- 40 %
• Employees in GS foundries	474	576	- 18 %

**Non-ferrous casting sector in Finland**

Overview of the Finnish non-ferrous casting production, year 2016:

	2016	2015	%
• Number of non-ferrous foundries	14	14	
• non-ferrous production	4.830 t	6.229 t	- 23 %
• Value of the non-ferrous production	53,90 m€	60,75 m€	- 11 %
• Export of non-ferrous castings	1.681 t	2.695 t	- 38 %
• Employees in non-ferrous foundries	330	376	- 12 %

\* \* \* \* \*

## **Economy and casting customers industries**

The recovery of the European automotive market is confirmed: the EU market for new commercial vehicles kept growing in 2015, with a +9.3% increase and a new rise is expected for 2016 - 2017 period.

In France, the domestic and European demand of new models has supported the French automotive production in 2016. According to the French Automobile Manufacturers' Association, the production rise reached +5% in 2016, after a high increase by +8% the previous year. This dynamism should be extended in 2017 year, but at a lower rhythm.

The French foundry companies benefited as a whole from this rebound in the automotive orders, this sector accounting for 46% of the deliveries. It's especially the exports increase which pulled the growth of the activity.

Nevertheless, the trucks and buses industry is expected to remain at a low level in the two previous years: +0% in 2016 and -2% in 2017.

In 2016, the deliveries to the mechanical industry have recovered gradually throughout the year, by +1.8% compared to 2015. The activity of the main sectors (Energy, mining and building equipment, agricultural...) should continue to support foundry activity: +1.9% expected in 2017.

The construction industry returned to growth in 2016. This sector recorded a +1.8% growth, after four years of steady decline. 2017 year should register a new increase, by +3.2%.

The public works sector returned to growth levels too: +4.5% in volume in 2016 and +1.7% expected in 2017.

The ferrous metals industry continued to decline, by -7% in 2016 after -7.2% last year, in a context of low prices.

## **Macroeconomic developments**

For the second year, the French economy recorded a GDP increase less than the European average: +1.1% in 2016 (against +1.7% in the Euro area, driven by the Spanish and German growth). Under these conditions (increase higher than 1%), France managed to put an end to three years of economic stagnation. In the coming quarters, the economy activity should continue to grow, to reach +1.4% at the end of 2017.

GDP growth is projected to edge up to 1.6% by 2018, as tax cuts and faster job growth support stronger private consumption.

The final domestic demand followed this trend, with a growth of +1.8% throughout the twelve months of 2016. This rate should stay stable during the two following years.

However, the situation remains tense with a high unemployment rate reaching 9.9% in 2016 (10.1% the previous year): at the end of December, France registered 3.6 million, reaching a new record. The French government plans to reduce this rate in future years to a more acceptable level: so, the unemployment rate should continue to gradually fall (9.6 expected in 2018), thanks to hiring subsidies and significant upscaling of training available to jobseekers. The recent Labor law reform clarifies conditions for dismissals and gives more importance to firm-level agreements on working time.

In the coming years, business investment should also continue to pick up owing to tax reductions (additional depreciation...) and low interest rates. The labor cost should continue to increase, but more slowly than before, thanks to lower social contributions.

Tax cuts and low energy prices have bolstered real wages and helped companies restore their profit margins, supporting a strong rebound in consumption and business investment. According to French economists, a slight rise of energy, metals and minerals prices is expected in 2017.

Global inflation should continue to be positive again, as energy prices have stopped declining, but it will remain low (+0.8% projected in 2017) as unemployment remains high.

## **The situation in the main casting customer industries (see "Economy and casting customer industries")**

## Developments in the foundry industry

In 2016, the French foundry sector (pipes and manholes covers included) registered a new decrease of its activity compared to the previous year:

- The total castings production fell by -3% (in tonnage) – to be compared to -2.5% the previous year
- The castings deliveries decreased by -11.9% (in tonnage) and by -3.1% (in turnover)

Those global figures cover different evolutions according to the alloys and markets, especially in the non-ferrous castings activity. The foundries benefited as a whole from the high level of orders in the automotive and aeronautic industries while the foundries which work in the others sectors (agricultural, energy, mining equipment, urban property, and lighting) continued to suffer from the weak level of their orders.

If we excluded the pipes and manholes cover results, the ferrous castings sector recorded positive results in volume compared to the previous year: +2.7% in volume (after -7.9% in 2015 and -6.8% in 2014).

The strongest increase in volume has been recorded in the grey iron activity, which rebounded by +5.4%, after some successive decreases in the last few years (-10.9% in 2015 and -11% in 2014). This sector was pulled up by the good performances in automotive and, to a lesser extent, in construction and mechanical markets.

After a recovery of its activity last year (+1.4% in volume), the pipes and manholes covers sector strongly decrease in 2016, due to the exports collapse by near -40% in the year.

In parallel, the steel castings production shrank by -9.1%, because of the weakness in orders in public works and mining business in 2016.

In spite of a moderate result of +2.1%, the non-ferrous castings production gave better figures with a yearly regular progression.

In the aluminum castings sector, the total deliveries recorded a marked increase, by +7.3% while the production volumes were up by only +2.3%. It's still the exports (+7.5% in volume) which pulled the growth of the activity.

Suffering from the high price of its raw materials which leads to a unfavourable substitution with aluminium, the copper castings gone significantly down, by -3.4%.

As a whole, the ferrous and non-ferrous foundries produced around 1.628 Million tons of cast products against 1.679 Million tons in 2015, even though they had not yet found the levels before 2008 crisis (2.47 million tons in 2007). For the seventh consecutive year, the French foundry tonnage stayed under the level of 2 million tons.

The deliveries reached 1.29 million in tonnage and 4.36 billion Euros in value.

## Employment situation

No important change in the structure of the sector in 2016, except the closure of MT TECHNOLOGY (113 salaries), investment castings plant witch produced pieces for the automotive market.

At the end of December, the number of employees in the French foundry industry continued to decrease, but at a lower rhythm, by -1.9% (after -3.5% the previous year).

They were around 30200 salaries at the end of December 2016. These figures take into account the staff cuts in most foundries, especially in the ferrous castings sector (-6%).

The French Foundry Industry registered 385 companies in December 2016 (<10 persons included) against 387 plants the previous year.

In contrast with previous years, we can notice a turnaround in hiring in a few activities. In particular, the aluminum castings and the investment castings sector proceeded with marked hiring over the past few years, boosted by the rise of the orders of the automotive and aeronautic industry.

Despite of hopeful signs of economic recovery, most of companies remain careful, promoting short-term contacts and temporary staff to face a risk of a renewed downturn in global economic growth.

## Investment plans

The French foundry spent more than 6% in investment in 2016, supported by a low level of interest rates and some favourable tax incentives for government. The priority was essentially to optimize recent investments and to invest in digital equipment improving tasks automation.

A larger number of foundries continued to invest in extension of installations, mainly in the aluminium castings industry.

## Supply of raw materials and energy

Compared to the previous year, the prices of majority of raw materials continued to fall gradually throughout the first semester of 2016. But most of them recorded from September a rapid rise in the prices, much for the ferrous as for the non-ferrous alloys.

After the significant price drop in 2015 (by -47.2% on average), the price of a barrel of oil gradually rose from February 2016, although without returning to 2015 levels. On the first four months of 2017, the prices continued to go up, by +22% compared to the average price of 2016 and by +50% compared to the last four months of 2016.

## Cost developments and metallic input materials

### Evolution of prices from 2015 to 2016 (year averages) in Euro

€	% (2016 average/ 2015 average)	% (2015 average/2014 average)	% (2014 average/2013 average)
Foundry coke	-12.2%	-7.7%	-9%
Hematite iron	-16.2%	+0.8%	-3.6%
Nodular iron	-16.9%	+0.9%	-2.0%

- Pig iron: Compared to 2015, the pig iron index fell by -17% on average, after a stable situation the previous year. After three quarters of decrease, the prices started to rise from September. Over the four first months of 2017, the prices reach the level of 367€ for iron castings and 385€ for nodular iron castings in April.

- Foundry coke: In 2016, the prices continued to fall significantly, down -12.2% on average from 2015, after a -7.7% decrease the previous year. From January 2017, the prices began rising again, having increased by around +4% on average, to reach around 356€ on this period.

Most of non-ferrous metals prices decreased all over the first part of 2016, especially for copper and aluminum metals.

Energy prices continued to fall in the whole of 2016, even if they started to recover from the last quarter of the year.

Over the full 2017 year, the energy and metals prices should maintain the momentum, supported by the rebound in demand in France and in Europe too.

## Payroll costs

The average wage in the French foundry industries registered a new increase in 2016, by around +1.4% whereas the charges continued to decrease by -1% on average.

On January 2016, the gross minimal legal wage by hour reached 9.67 € against 9.61 € the previous year. On January 2017, it recorded a new increase, by 0.9% to reach 9.76 €.

**Outlook 2017**

From the beginning of this year, the French foundry production has performed goodly, driven by growth in demand and the reconstitution of stocks.

The non-ferrous metals sector should continue to benefit from the high demand of the European automotive and aeronautic manufacturers. The smaller aluminum foundries should continue to suffer from weak demand of the other markets (electric, urban property...).

The ferrous castings sector is expected to improve: the steel castings production in volume should get better, boosting by the public works and engineering segments. The iron activities recorded good performances over the first quarter of 2017, supported by the counterweight and automotive sectors.

The well oriented order books suggest to be optimist for the French foundry for 2017 year.

**The situation in the materials sectors**

**Ferrous metals castings as a whole**

The ferrous metals production (including hydraulic and building cast iron) decreased by -4.4% in volume in 2016 while the deliveries fell by -16.3% and -7.2% in value.

In the same time, the exports decreased but at higher pace: -24.7% in tonnage.

As a whole, about 1.26 million tons of ferrous castings were produced in 2016 against 1.33 million tons last year.

The deliveries amounted to 0.99 million tons. Almost 48% of this tonnage was exported, mainly to the Europe area, particularly to Germany.

Evolution of production in volume from 2015 to 2016

	% (2016/2015)
Iron castings	+5.4%
Nodular iron castings	+0.5%
Steel castings	-9.1%
Total Ferrous metal castings (Hydraulic and building sector excluded)	+2.7%
Total ferrous metal castings (Hydraulic and building sector included)	-4.4%

**Iron and nodular iron castings**

Supported by resurging activity of the European automotive sector, the iron foundries activity in volume recovered during 2016 year, by +5.4% after -6.3% the previous year. The sector also benefitted by the revival demand from the mechanical sector last year, except the railway and agricultural equipment industry.

Contrary to the fourth last years, the pipes and manholes covers sector registered a collapse of its production, due to the worse performances of the exports.

**Steel castings**

After a collapse of -23.7% in volume last year, the steel foundries activity slightly improved in 2017, supported by the recovery of its main markets, the construction and mechanical equipment. Nevertheless, the activity did not manage to catch up. The production still decreased by -9.1% in 2016 compared to the previous year. The exports significantly increased, by +14% in volume whereas the domestic market fell by -20%.

**Non-ferrous metal castings**

The non-ferrous metal castings production is still dominated by light metals (Aluminium and magnesium), most of the output being absorbed by the automotive industry. Zinc alloys form the second most important activity.

Unlike the ferrous metal castings sector, the non-ferrous castings sector continued to improve in 2016: the production in volume rose by +2.1%, after +6.3% the previous year. The aluminium castings contributed heavily to this increase.

Looking at the sector in more detail however, most of light alloys foundries continued to benefit in 2016 from the high demand of the European automotive and aeronautic industries.

Moreover, German automotive manufacturers largely accounted for the +7.5% increase in export output of the aluminum castings industry.

On the whole, the foundries which exported had better results than the others.

The super alloys castings activity supplying the high added value markets (medical, aircraft and aerospace industry) knew a further increase in 2016, by +6.2% in volume. Contrary to 2015, the deliveries in value were supported by strong increases in raw [...] materials prices (titanium, molybdenum, cobalt...) from the second part of 2016 year. Using 84% of super alloys, the investment casting sector rose by more than +6.5% in 2016, supported by the high demand of the aeronautic manufacturers.

In 2017, the non-ferrous castings sector should still continue to benefit from the high demand of the European automotive industry, which is expected to know a new increase. The aeronautic and aerospace industry should increase its activity in volume by +5%, with orders books historically high due to the start of new programs and high production rates.

Movements in production in volume from 2015 to 2016

	<b>% (2016/2015)</b>	<b>% (2015/2014)</b>
Copper castings	<b>-3.4%</b>	<b>+2.7%</b>
Aluminium castings	<b>+2.3%</b>	<b>+6.7%</b>
Zinc castings	<b>+6.6%</b>	<b>+5.5%</b>
Other metal castings (lead...)	<b>-10%</b>	<b>-10.2%</b>
Super alloys	<b>+6.2%</b>	<b>+5.8%</b>
<b>TOTAL</b>	<b>+2.1%</b>	<b>+6.3%</b>

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## The German Economy and the Casting Customer Industries

### Macroeconomic developments

The economic situation in Germany was characterised by solid and steady growth also in 2016. According to first calculations of the Federal Statistical Office, the price-adjusted gross domestic product (GDP) rose 1.9% on an annual average in 2016 on the previous year. In the previous two years, the level of GDP growth was similar (1.7% in 2015 and 1.6% in 2014). Examining the longer-term economic growth reveals that growth in 2016 was by half a percentage point higher than the average of the last ten years (+1.4%).

The main factor contributing to the positive development of the German economy in 2016 was domestic uses. Household final consumption expenditure rose a price-adjusted 2.0% on the previous year. The increase in government final consumption expenditure (+4.2%) was markedly larger still. One of the reasons for this strong growth is that a large number of people seeking refuge immigrated, which resulted in considerable costs. Final consumption expenditure rose a total 2.5%. It was thus again the largest, though not the only pillar of German economic growth in 2016, as capital formation made some contribution, too. Price-adjusted gross fixed capital formation in construction rose a strong 3.1% in 2016, the main reason being higher gross fixed capital formation in dwellings. Also, gross fixed capital formation in machinery and equipment was up 1.7% on the previous year. GDP growth was slowed only by a reduction of inventories (-0.4 percentage points) in 2016. The balance of exports and imports of goods and services, too, had a slightly negative effect on GDP growth (-0.1 percentage points). Price-adjusted exports of goods and services were up 2.5% on the previous year; imports rose more strongly in the same period (+3.4%).

On the production side of the gross domestic product, all economic sectors contributed to the economic upturn in 2016. Total price-adjusted gross value added rose 1.8% on the previous year. Above-average development was recorded for construction, which grew a price-adjusted 2.8% year on year. In industry (excluding construction), which accounts for just over a quarter of total gross value added, the economic performance was up, too, though much more moderately (+1.6%). Marked increases were also observed in most service branches.

The economic performance in Germany on an annual average in 2016 was achieved by just under 43.5 million persons in employment whose place of employment was in Germany. This was the highest number since 1991. According to first provisional calculations, the number of persons in employment was by roughly 429,000, or 1.0%, higher in 2016 than a year earlier. Hence, the upward trend observed for the last ten years continued. Labour productivity (price-adjusted gross domestic product per hour worked by persons in employment) in 2016 was by 1.2% higher than in the previous year. Measured per person in employment, labour productivity rose by 0.9%.

The government budgets continued their consolidation in 2016. According to provisional calculations, general government – comprising central, state and local government and social security funds – recorded net lending of 19.2 billion euros at the end of the year. When measured as a percentage of the gross domestic product at current prices, this is a +0.6% surplus ratio of general government for 2016. For the third consecutive year, general government showed a surplus at the end of the year according to the most recent calculations.

Short term outlook (Results of the July 2017 Ifo Business Survey):

Sentiment among German businesses is euphoric. The Ifo Business Climate Index rose from 115.2 points (seasonally adjusted) last month to 116.0 points in July, hitting a new record high for the third month in succession. Companies' satisfaction with their current business situation reached its highest level since Germany's reunification. Their short-term business outlook also improved. Germany's economy is powering ahead.

In manufacturing the index hit a new record high. Assessments of the current business situation scaled unprecedented heights. Manufacturers once again expressed greater optimism about the short-term future. Capacity utilization rose significantly by 0.7 percentage points to 86.7 percent.

In wholesaling the business climate improved again on the back of far more optimistic business expectations. Assessments of the current business situation, by contrast, edged downwards from last month's record highs. In retailing the index dropped. Retailers were far less satisfied with their current business situation. Their optimism about the short-term business outlook also waned. Both components, however, remain at a very high level.

In construction the index rose to a new record high. Contractors assessed their current business situation as very good and expect business to pick up in the months ahead.

## **The situation in the major casting customer industries**

In December 2016, 256,600 passenger cars were newly registered in Germany. That translates into growth of 4 percent as compared with the same month last year. The market volume for 2016 thus totaled nearly 3.4 million new registrations (+5 percent). Domestic incoming orders were slightly down on the previous year's figures both for December and for 2016 as a whole (-1 percent in both cases). Orders from abroad, on the other hand, climbed by a good 7 percent in December, and during the entire year almost 3 percent more orders arrived from other countries.

In December 2016, passenger car production in German plants amounted to 365,100 units (+11 percent), far exceeding the value in the same month last year, which however was comparatively low. During the year as a whole, a good 5.7 million units were built in Germany – a rise of 1 percent.

Exports showed a corresponding increase in December, totaling 308,300 new cars (+11 percent). Over 2016 as a whole, 4.4 million passenger cars were supplied to customers abroad, which matched the volume recorded in the previous year.

The German commercial vehicle market grew strongly in the year 2016. New registrations were up by 7 percent to 357,300 units, which was a new record for the market. The large-volume van segment in particular produced very good results. Sales of light commercial vehicles up to 6 tons in Germany rose by 8 percent in 2016 to 264,500 units. This means that the van market also set a new record. The market is expected to maintain this record level in 2017. The market for heavy trucks over 6 tons also recorded good growth and produced its best result since the boom year of 2008. In all, 86,100 heavy trucks were newly registered – a rise of a good 3 percent. Starting at this high level, further slender growth may be expected for 2017.

The mechanical engineering industry in Germany is set to end 2016 at a high level, but with nearly zero growth, the second year in a row. The national association anticipates a real growth of plus 3% in the mechanical engineering industry in 2017.

In 2016, the output of crude steel in Germany was registered with a volume of 42.1 m tons, 1.4% less than in 2015. The Capacity utilization stagnated at 86%. World steel forecasts for the EU in 2017 a plus in steel demand of 0.5% (158.2 m. tons).

After two good years 2014/2015 (plus 3.0% and plus 1.5%) the residential building sector once again grew by more than 4.0% in 2016. But on the other hand all other sectors (e.g. Investments in civil engineering) were in the black too. All in all in 2016 the volume of the building industry increased only by 3.0%.

## **Developments in the foundry industry**

In 2016, Germany's iron, steel, and malleable foundries received orders for around 4.04 m. tons of castings. Compared to 2015, this marks a decrease of 2.8%. Orders from the biggest customer industry, motor-vehicle engineering, were 1.1% lower than the year before (2.32 m. tons). At 1.00 m. tons, the volume of orders from the mechanical-engineering industry was down by 5.4% compared to

the previous year. 719 100 tons of parts for miscellaneous applications were ordered, a level that is 4.2% lower than in the preceding year. We have to pay attention that there is a lack of definition between engineering and miscellaneous applications, e.g. electrical engineering.

Germany's foundries focused on non-ferrous components received an order volume of 1.31 m. tons. The demand was up by 12.4%. With approx. 83.3 of incoming orders the vehicle industry is dominating the non-ferrous sector (2015=80.0%). The demand grew by 17.0% (1.09 m. tons). The foundries related to mechanical engineering received orders with a volume of 10 000 tons (+22.0%). 209 700 tons of miscellaneous parts were ordered, a decrease of 7.0%.

In 2016, the weight of castings produced by Germany's iron, steel, and malleable foundries amounted to 3.92 m. tons. Compared to 2015 this corresponds to a 4.9% decrease. If we look at the two major customer industries, motor-vehicle and mechanical engineering, the output destined for the motor-vehicle industry decreased by 5.9% to 2.18 m. tons, while that for the mechanical engineering sector shrank by 4.5% to 989 500 tons. The output of castings for miscellaneous purposes (including rolls, moulds and castings for buildings as well as pipes and fittings) reached a volume of 761 600 tons, 2.3% less than in the year before.

In 2016, 38.9% of the total sales volume was exported directly (ferrous). All in all, 1.53 m. tons were sold to customers abroad, representing a 5.9% decrease. At the non-ferrous side the share of exports is significant lower (14-15%) because of the strong demand of domestic car manufacturers.

By the end of 2016, orders in stock equaled a weight of more than 1.86 m. tons of castings, 4.7% higher than at the end of 2015 (ferrous). The non-ferrous back orders had a volume of nearly 414 100 tons (plus 19.9%).

Capacity utilization in the iron (grey and nodular) foundry industry amounted to 79.4% in 2016 in comparison to 2015, this means a downturn of 0.2 percentage points. Steel foundries have reported a capacity utilization of 79.7%, 2.1 percentage points higher than in 2015. Capacity utilization in the non-ferrous industry is calculated as 77.8% in 2016 (plus 1.5 percentage points). Capacity utilization in ferrous-, steel- and non-ferrous foundries cannot be compared!

### **The employment situation**

As of December 31, 2016, Germany's foundries (ferrous and non-ferrous) employed about 77 300 persons, 2.2% less than at the end of 2015. This figure corresponds with 409 foundries (survey cut-off at <50 employees per company).

At the end of 2016, 582 foundries (ferrous and non-ferrous, no cut off!) were operating in Germany.

### **Investment plans**

In 2016, a volume of 718 m. Euro was invested by Germany's foundries. The investments were up by 5.0%. It is expected that investments will expand in 2017 by 2.0%.

### **Raw materials and energy**

As many raw materials and energy carriers are supplied and demanded at highly inelastic prices, it is inescapable that prices should fluctuate widely if the balance between supply and demand is to be established by product prices. Even infinitesimal changes in the quantity supplied or demanded will necessarily lead to steeply increasing or possibly decreasing prices. Moreover, these fluctuations are regularly exaggerated by speculation.

Beyond that, the salient facts relating to the year 2016 are the following: since the end of 2015, developments varied widely from product to product. While some prices went (markedly) up, other remained (at first) on the level of the preceding year, whereas yet others kept declining for many

months, sometimes even to the end of the year. There was only one common feature: in 2016, price fluctuations remained large once again. At the moment, there is nothing to indicate that the current situation will change in 2017.

## **Cost developments**

In 2017 as in the years before, important factors caused total production costs to develop in widely different ways. In many cases, raw-material prices had a controlling influence, if only because of their high share, for they confronted foundries once again with major price **fluctuations**. At the same time, the foundries that had to cope with the biggest cost **increases** in 2016 were those with a labour-intensive product range or, alternatively, those that use oil for melting.

If we leave the cost of raw materials aside for the moment and concentrate on the development of the cost of production, we find that the latter increased by 2.4% in 2016.

## **Metallic input materials**

Because the prices of metallic input materials have risen steeply in the last 15 years, they now frequently account for about 25% of the total cost of production. The only item of greater significance is payroll costs. The big problem is this:

Because of the unusually violent price fluctuations on the raw-material markets, it is impossible to plan ahead even for a few months into the future. Moreover, foundries have nothing with which to 'cushion' these powerful changes. This being so, the only solution is to figure in raw-material costs separately and on a day-to-day basis. After all, an increase of no more than 10% in the price of raw materials causes the cost of production to go up by about 2.5%. In many cases, this alone would be enough to swallow up the often meagre return on sales in our industry.

Raw-material prices are subject to marked cyclical fluctuations. As far as the current economic cycle is concerned, prices apparently reached their zenith in 2011. Since then, they have been inclined to flag, with occasionally wide fluctuations. Thus, for example, pig iron could be purchased at 10% lower prices even in the autumn of 2016. The same holds true for copper, which showed no recognisable trend until October. By the end of the year, however, the price of both these commodities had risen by about 20%. Conversely, the end of 2015 probably marks a turning point for many other products. Since that time, the price of aluminium has gone up by about 5%, that of cast-iron scrap by 10%, that of deep-drawing steel sheet packs by 15%, and that of foundry steel scrap by c. 20%. Even steeper increases were recorded in the prices of nickel at 50% and zinc at 65%. Whether or not the year 2016 really marks the beginning of a new cycle is almost impossible to say at the moment; fluctuations and temporary setbacks are too large for that. Moreover, none of the peak prices reached early in December could be maintained later on.

At all events, the way in which price levels develop in 2017 will crucially depend on the evolution of the global economy. The point is that a sustained and/or renewed increase in dollar prices may be expected only if the economy should revive. If no such revival occurs, prices may be expected to remain constant in 2017. Another factor that is important for the prices that must be paid in Germany is the way in which the exchange rate of the euro develops.

## **Payroll costs**

The unusually steep rise in the prices of raw materials and energy has caused the proportion of payroll costs in the total cost of production to decline in recent years. At a share of almost 30%, however, their importance is still outstanding in our industry. Any change directly and immediately exerts a significant influence on the total cost of production.

The payroll cost total is influenced by many factors. Among them, the agreements concluded between social partners deserve particular mention because they define the annual changes in pay rates and the collectively agreed non-wage labour costs. Beyond that, non-wage labour costs that are required by law (relating to social insurance) must be mentioned as well. Lastly, sick leave, the number of

public holidays, overtime and shift-bonus payments, and other (voluntary) employer contributions influence the annual development of payroll costs (per hour or per capita).

In 2016,

- the employees' wages have been raised by 2.8% on 01-07-2016 and
- a one-off payment of EUR 150 has been agreed for the month of June.

In addition, the share to be paid in the insolvency insurance has been lowered slightly  
- from 0.15 to 0.12% of the gross pay subject to apportionment.

In a benchmark consideration, therefore, the income of an average wage earner working in production amounting to EUR 2,600 per month resulted in a payroll cost increase of 3.2% in 2016.

Because the life of the current collective agreement extends to December 31, 2017, we are even now in a position to state in concrete terms how payroll costs are going to develop in 2017. Thus,

- pay rates are going to rise by 2.0% on 01-04.

Beyond that, the agreement envisages further reducing the share to be paid in the insolvency insurance

- from 0.12 to 0.09% of the gross pay that is subject to the levy.

A benchmark consideration of an average wage earner employed in production thus suggests that payroll costs will rise by 2.0% in 2017.

Given that payroll costs have account for 30% of the total cost of production, an increase of 3.2% caused the total cost of production to go up by 0.96% in 2016. If we apply the change in payroll costs to the manufacturing cost (i.e. the cost of production without raw-material costs) with a share of about 40%, this results in a rise of 1.28% in 2016.

Assuming that payroll costs will increase by another 2.0% in 2017, the total cost of production and the manufacturing cost will consequently rise by 0.6 and 0.8%, respectively.

## Energy

Considering the prices that had to be paid for (crude) oil in the years before the summer of 2014, the prices of 2015 and 2016 may be regarded as very low. Since that time, dollar prices have declined by more than 50%. However, since the euro lost a great deal of value vis-à-vis the US dollar at the same time, the price of fuel oil declined to a much lesser extent in Germany, although there is a chance that the turn of the year 2015/16 might also mark a turning point for (crude) oil. After all, its price has risen 40% above the low it reached in December/January. For 2017, however, we assume that it will rise by no more than 5%.

Electricity prices showed no recognisable trend until September, after which they rose by 6% until the end of 2016. For 2017, we assume that they will go up by another 2%.

The prices of foundry coke declined until the autumn. Surveys carried out by the BDG suggested a decline of some 10%. By the end of the year, however, a noticeable increase occurred in a manner that was hard to quantify, with prices rising to a level above of 350 EUR/t. We do not expect any further rise in 2017.

In 2016, the price of gas continued to develop in the same way as in 2015, declining by 9%. However, we assume that it will rise by 5% in 2017.

Depending on the share of the various energy carriers in production, energy costs may have remained approximately constant or may have gone up by as much as 25% in 2016. Those foundries that use gas to melt in a crucible probably experienced the lowest exposure or even a certain relief. Conversely, those that use oil as an energy carrier for melting had to bear the heaviest increases. It is likely that in 2017, cost developments will again be determined by the kind of energy used for melting.

The share of energy costs in the cost of manufacturing amounts to 13%.

## **Outlook 2017**

It is certain even now that payroll costs will go up by another 2% in 2017, which alone is enough to exert a critical influence on the cost of manufacturing. For 2017, we expect another 1.8% increase.

Given the many uncertainties that plague forecasts regarding future cyclical developments, making any statements regarding the development of raw-material and energy prices is as difficult as ever. Ultimately, these prices affect the total cost of production. At the same time, there are no signs indicating that price fluctuations might grow less extensive.

## **The Situation in the Material Sectors**

### **Grey cast iron**

Throughout 2016, production decreased by 5.7% to 2.23 m. tons (2015 figures were revised!). The output of motor-vehicle components was down by 5.3% to more than 1.53 m. tons. The volume of casted parts for mechanical-engineering shrank by 7.7% to 473 400 tons. Other grey-iron components (including moulds and railway parts, fittings and components for the steel industry) reached an output volume of 232 700 tons (minus 4.1%).

Iron foundries received orders for 1.50 m. tons of castings from the motor-vehicle industry, a 1.9% decrease. The demand of the mechanical-engineering industry reached a volume of 478 600 tons. The orders were down by 8.8%. Orders for parts for miscellaneous applications made of cast iron reached a volume of 211 600 tons, 4.8% less than in the preceding year.

At the end of December 2016, the order backlog amounted to 1.01 m. tons, 3.9% higher compared to the end of December 2015.

### **Ductile cast iron (nodular and malleable)**

At 1.51 m. tons, the production of ductile iron castings was down by 3.2% compared to the year before. A separate calculation of nodular and malleable castings is not useful anymore because of the low volume of malleable castings. Nonetheless malleable castings have their specific markets. The output of motor-vehicle components was down by 7.6% (626 800 tons). The volume of casted parts for mechanical-engineering grew by 1.3% to 476 500 tons. Other components reached an output volume of 406 600 tons (minus 1.2%).

At the ductile sector the volume of incoming orders reached 1.67 m. tons (plus 0.4%). Ductile iron foundries received orders for nearly 800 000 tons of castings from the motor-vehicle industry, a 0.5% increase. With minus 0.1% compared to the order volume received the year before, the demand of the mechanical-engineering industry reached a volume of 477 700 tons. Orders for parts for miscellaneous applications made of ductile cast iron reached a volume of 396 900 tons, 0.7% more than in the preceding year.

At the end of December 2016, the order backlog amounted to 778 100 tons, 7.2% more compared to the end of December 2015.

### **Steel**

Throughout 2016, production of steel castings was down by 8.6% (174 200 tons). The output of motor-vehicle components decreased by 3.0% to 12 300 tons. The volume of casted parts for mechanical-engineering shrank by 24.6% to 39 600 tons. Other components reached an output volume of 122 300 tons (minus 2.5%).

At 165 000 tons, the volume of orders received by the producers of steel castings in 2016 was decreasing by 5.7% compared to the year before. Steel foundries received orders for 12 200 tons of castings from the motor-vehicle industry, a downturn of 6.3%. The demand of the mechanical-engineering industry reached a volume of 42 100 tons (minus 19.3%). Orders for parts for

miscellaneous applications made of steel castings reached a volume of 110 700 tons, 0.9% more than in the preceding year.

At the end of December 2016, the order backlog amounted to more than 68 700 tons. The order cushion was 10.0% lower compared to the end of December 2015.

### **Non-ferrous Metal Castings**

In 2016 the production of aluminium castings was up by 2.3% (1.10 m. tons). For the magnesium sector the production reached a level of more than 17 400 tons (plus 14.2%). The output of copper castings shrank by 1.2%. The level was nearly 78 500 tons. 56 200 tonnes of zinc castings were produced, marking an increase of 2.9% (some volumes from 2014/15 were revised!).

Aluminium foundries received orders for 1.14 m. tons (plus 13.2%). More than 94.2% of the demand (1.07 m. tons) came from the vehicle industry. Up by 20.8% compared to the order volume received the year before, the demand of magnesium castings reached a volume of 25 900 tons. Orders for parts made of copper castings reached a volume of more than 87 000 tons, 5.0% higher as the year before. Foundries producing casted parts from zinc logged an order level of more than 62 000 tons (plus 6.8%). As described some volumes from 2014/15 are revised!

Source: BDG, Stat. BA, VDA, VDMA, IFO, WV Stahl

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## General Situation

The GDP increasing in 2016 was around 2% and for 2017 it is forecasted to 2,3%. The inflation ratio was reported by the government around 0,1% but it were reported by independent economy researchers more than 1,1% and for 2017 it is forcasted minimum 1,9%. (IMF forecast is 2,4%). The unemployment rate is forecasted to catch the 5,8% in 2017 after the 2016 level of 6,7%. According to the declared illiberal democracy the government faced sharp conflicts with the EU, the US, several social strata as well as domestic and foreign business groups. As a consequence of these factors, the performance of the Hungarian economy is predicted to weaken significantly in 2017 compared to 2016, even to 2015 although the government has published more optimistic data as well.

Main figures of the country has no significant changing:

### Strengths

- Declared generally stable parliamentary democracy
- Strong specialization for automobile industry
- Current account surpluses since 2010
- Low but increasing inflation

### Weaknesses

- Deteriorating investment climate, as a consequence of unconventional economic policy measures since 2010
- Difficult relations with the IMF and the EU
- High public debt and large total external debt burden
- Exchange rate volatility (reflecting high vulnerability to domestic and external shocks)
- Banking sector remains vulnerable

## The Foundry sector

The tendencies of the Hungarian foundry industry in 2016 showed much smaller but still significant average growth of the total Hungarian foundry Industry than in 2015. Some sectors especially iron and steel castings in average have reduced the production in 2016 even the two biggest iron foundries have increased the performance of their than it was forecasted before.

For the Hungarian foundries all together 2016 was successful year again. It is more or less visible that the Hungarian foundry sector is in a significant growth and will be a stronger and stronger supplier for the automobile and vehicle industry of EU – first of all in the sectors of aluminium - there is no changing basically. As it was declared before the two biggest Hungarian iron foundries increased the Hungarian iron casting capacities but not so strong is the increasing as it was forecasted before. About one of the group of companies the production of investment castings is slowly increased year after year. The productions of steel, heavy metal, zinc and magnesium castings are stagnating or even a little bit reduced since years. The foundry supplier companies at the sector increased their activities. The biggest problem is constantly the missing well-educated skilled workers (foundrymen) and university level educated trained foundry engineers. After 15 years in 4 different regions have started again the skilled foundry man education in secondary school so from 2018 some 40-45 students will finish every year the secondary schools. At the Miskolc University the so called dual BSc education has started in 2015 with a large interest of students and foundries too.

The casting performance in figures, HUNGARY, 2016

<b>Hungarian casting productions, 2016;</b>		<b>Value in tons</b>
<b>Denomination</b>	<b>2016</b>	
Grey iron casting	21 363	
Nodular iron castings	40 889	
Compacted graphite iron castings	17 019	
Alloyed iron castings	378	
Malleable iron castings	11	
<b>Total iron castings</b>	<b>79 660</b>	
Unalloyed steel castings	2 110	
Alloyed steel castings	1 011	
<b>Total steel castings</b>	<b>3 768</b>	
Aluminium gravity die castings	66 388	
Aluminium pressure die castings	51 746	
Aluminium sand castings	112	
<b>Total aluminium castings</b>	<b>118 246</b>	
Bronze castings	671	
Brass castings	1 010	
Zinc castings	2 985	
Other heavy metal castings	123	
<b>Total heavy metal castings incl. investment cast.</b>	<b>4 789</b>	
<b>Magnesium castings</b>	<b>39</b>	
Investment casting all together in total	<b>391</b>	
<b>TOTAL</b>	<b>206 854</b>	

The basically export orientated Hungarian foundries continuously have relative steady market position. It is more than average that the budgets for 2017 are created as an optimistic one because of the very strong Hungarian export dependence at the foundry sector: everything is depending of the market situation of the countries to where appr. 85-87% of the Hungarian casting export is stationary fulfilled.

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## Macroeconomic developments

**The Italian economy continued to grow in 2016**, at a rate of **0.9 per cent**, mainly thanks to strong monetary policy stimulus, mildly expansionary fiscal policy, and persistently low oil prices.

**The expansion in economic activity affected all the main geographical areas and continued in the first quarter of 2017**. However, GDP is still 7 percentage points below pre-crisis levels, with a larger gap for the South. Economic activity remains far short of its potential.

**The contribution to GDP growth of domestic demand, net of inventories, was higher than in 2015**. Household consumption, though slowing, supported economic activity for the third consecutive year while investment spending strengthened. General government consumption returned to growth after five years of decline, while public investment contracted further. The contribution of trade to GDP growth, negative in 2015, was substantially nil owing to the slowdown in imports.

**The recovery in production spread more evenly across the various sectors of the economy**: economic activity continued to pick up in industry and accelerated slightly in the service sector; the long recessionary phase in construction came to a halt.

**Spending on fixed investment strengthened, especially for capital goods**, and for the first time since 2007 the improvement extended to the construction sector. The recovery in investment was fostered by expansionary monetary and financial conditions, new fiscal incentives introduced by the Government, and stronger business confidence.

**Corporate profitability grew**. The drop in interest rates was a factor in lowering firms' financial vulnerability indicators and reducing borrowing requirements. The ratio of self-financing to investment reached its highest level in more than fifteen years.

**Credit supply conditions have improved, but business lending is struggling to expand**, largely on account of the modest demand for financing. Credit trends continue to vary greatly across different types of firms.

**The growth in households' disposable income gained momentum, mostly thanks to the ongoing recovery in employment**. The inequality indices, which had fallen slightly between 2014 and 2015, remained unchanged but many people are still in financial difficulty; the absolute poverty index continued to be high.

**Consumption expanded further, supported by the improved outlook for income and favourable credit conditions**. Household confidence indices fell in 2016, although remaining high. Households' propensity to save stabilized significantly below the average for the past ten years.

**The growth in employment that began in the second half of 2014** continued and spread. The increase in labour demand also extended to the categories worst hit by the recent long recession: the young, the less-educated, and workers in southern Italy. In the private sector the number of payroll employees returned to pre-crisis levels, benefiting from the social security contribution relief for permanent hirings. The number of open-ended positions continued to rise. In the first few months of 2017, overall employment dynamics remained positive, largely thanks to fixed-term positions.

**Average inflation was slightly negative in 2016**. Deflationary pressures from abroad compounded the weakness in domestic inflation. The latter was partly due to slack wage growth caused by still high unemployment and by low inflation expectations that were slowly incorporated into new labour contracts.

**Although core inflation remains weak, price dynamics have increased since the autumn** and, in the first few months of 2017, reached their highest levels in four years, mostly owing to the rise in crude oil prices.

**The current account surplus increased to 2.6 per cent of GDP** following an improvement in net investment income and a contraction in the energy deficit. The structural current account, i.e. adjusted for the effects of the unfavourable business cycle on imports, is also expected to maintain a strong surplus, thanks to the sound performance of exports and the drop in energy prices.

**Goods exports kept pace** with demand from outlet markets and Italy's share of world trade held stable. Imports continued to gain momentum, though less rapidly than in 2015.

**General government net borrowing fell from 2.7 to 2.4 per cent in 2016**, the combined result of a reduction in interest expense and an increase in the primary surplus. The debt-to-GDP ratio rose from 132.1 to 132.6 per cent; however, excluding the change in the Treasury's balance with the Bank of Italy it was virtually stable. The primary aim of fiscal policy was to not hinder the strengthening economic recovery while keeping within the margins of flexibility allowed by European rules. The fiscal stance is expected to remain expansionary in 2017 as well.

## The situation in the major casting customer industries

### Automotive

The 2016 was the third consecutive year in growth for the **Italian automotive industry**. In the whole year 2016, the production volumes amounted to **1.103.000 units**, namely up by **9%** on the previous year; broken down by: **passenger cars 713,000 (+8%)**, **344,000 commercial vehicles (+9%)** and **46,000 industrial vehicles (+36%)**. Domestic and export demand has driven the production of cars in Italy also in 2016 and the automotive industry as a whole. **Exports** with over **716,000 motor vehicles** increased by **5%**. **Incoming orders** last year rose by **7.8%**, with the greatest contribution to growth coming mainly from **domestic demand, which increased by 8.7%**, while **foreign orders rose by 6.8%**.

### Mechanical Industry

**Machine tool orders index** on annual basis, reported an average rise of **1.6%** versus 2015. The performance of foreign orders was certainly not brilliant: they went down by 2.6%. On the other hand, a strong growth was registered with regard to **domestic orders, increased by 7.4% as a testimony to the liveliness of the Italian market**. By making a comparison between the absolute indexes calculated on an annual basis, we observe that 2016 was the best year in terms of order collection with 130.8. This figure shows that all the ground lost during the recession has not yet been regained, but however we are very close to the level recorded in 2008, when the absolute index scored 140.

In this really favourable framework, we have to consider the reduction in the order collection registered in the last quarter of 2016 in the domestic market. This drop can partly be due to the comparison with the extremely positive performance of the fourth quarter of 2015, which was immediately after EMO MILANO, the world exhibition of the sector that reported record-breaking figures in October 2015. **Nevertheless, the real reason is to be mainly seen in the decision of Italian users to suspend the investments, while waiting to understand methods, time and application technicalities of the provisions included in the National Plan "Industry 4.0", with particular reference to Hyper-Depreciation at 250%.**

### Mechanical and Engineering akin

**In 2016 44,7 were the billions of euro in technology products, machinery and equipment by the Italian mechanics**, of which **26,1 billion euro sold abroad**. The companies of **mechanics in 2016 produced a +1,1% compared to 2015 and exported +0,9%**.

With the exception of three segments, the declinations Italian **mechanical industry** ended the year 2016 positively both in terms production and export. By machines that produce energy and that are meant chemical and oil industry, including assembly of the industrial equipment, logistics and cargo handling up to technologies and equipment for food and water. As well as technologies and products for the industry, for the building and for the human and environmental safety.

In 2016, the output of **crude steel in Italy** was registered with a volume of **23,341 m tons namely an increase of 6%** over the previous year and slightly below the 2014 results.

**The Building sector** last year once again fell by 0.9% compared to 2015.

## Developments in the foundry industry

In 2016 the weight of castings produced by Italy (ferrous and non ferrous), amounted to 2,088,664 tons. Compared to the previous year this corresponds to a growth in production volumes of +2.8%. The turnover trend in the same period was substantially flat (€ 6.99 billion, -0.2% compared to 2015). This average result hides inside the very different dynamics of two main sectors (ferrous and non-ferrous). Ferrous castings output grew only by 1.9%, while non-ferrous castings increased by 3.8%. The downward trend in the energy commodities and major raw materials (scrap and pig iron) during the first 10 months of 2016, has curbed the development of ferrous turnover which dropped by -6.9%. Regarding to the non-ferrous foundries, turnover trend grew by +3.6%.

Recovery is still characterized by strongly diversified dynamics between the various metal sectors, but often with high spreads even within of the same market segment. The average result hides these trends:

- +2.5 Iron castings (grey and ductile)
- -8.1% Steel castings
- +3.8% Non-ferrous castings (Aluminum, Copper, Zinc, October, Bronze).

Capacity utilization in the iron (grey and ductile) foundry industry amounted to 70% in 2016; steel foundry 66% and non ferrous foundry to 78%.

Foreign trade continues to produce very positive signals. In 2016 the direct exports of ferrous castings recorded a strong growth (+20% in volume and +10% in value).

### Structure of Foundry Industry

Until last year, figures of employment and number of foundries, came from Assofond estimates. Since 2012 ISTAT (Italian institute of statistics) developed a “virtual” census, since only data from the Business Register were used, integrated with new administrative sources that extend its content with respect to the employment. This allows to define and analyze the profile of entrepreneurs more accurately. Starting from this year, Assofond decided to use only official data from ISTAT Censuses and Statistical registers, as a result data previously reported were revised. The data for 2016 are not available yet.

### The employment situation

In 2014 (this is the last available data from census) the total number of operating foundries was 1.055, of which 571 (54%) were micro foundries (from 0 to 9 persons employed). Mainly non-ferrous foundries (523 units).

Year 2014	Total Foundries		Ferrous Foundries		Non Ferrous Foundries	
	Foundries (N)	N. of persons employed (*)	Foundries (N)	N. of persons employed	Foundries (N)	N. of persons employed
0-1	138	14			121	12
2-9	433	1.490			402	1.381
0-9	571	1.504	48	111	523	1.393
10-19	191	2.373	26	340	165	2.033
20-49	156	4.659	36	1.170	67	1.972
50-249	123	12.654	54	5.866	69	6.788
250 e più	14	5.583	3	1.132	8	3.378
<b>Total</b>	<b>1.055</b>	<b>26.773</b>	<b>167</b>	<b>8.619</b>	<b>832</b>	<b>15.564</b>

(\*) Total Internal employees = 28,143 – persons employed, split in employees (26,773) and self-employed (1,368). If we add the external component of employment, which includes outworkers and temporary workers, the total of Workers rises to 29,830.

### Structural business statistics (year 2014)

Colonna1	Total Foundries	Iron Foundries	Steel Foundries	Light metal non ferrous foundries	Other non-ferrous metals foundries
number of enterprises	1.055	140	37	536	342
turnover - thousands of euros	6.293.126	1.579.492	517.476	2.525.024	1.671.134
production value - thousands of euros	6.321.753	1.611.269	503.931	2.555.038	1.651.515
value added at factor cost - thousands of euros	1.671.951	445.714	161.518	698.425	366.294
gross operating surplus - thousands of euros	504.385	148.680	48.760	197.890	109.055
total purchases of goods and services - thousands of euros	4.726.166	1.163.932	356.556	1.884.084	1.321.594
personnel costs - thousands of euros	1.167.564	297.034	112.757	500.536	257.237
wages and salaries - thousands of euros	815.034	205.782	78.464	350.510	180.278
gross investment in tangible goods - thousands of euros	275.280	115.321	24.125	97.906	37.928
number of persons employed	28.143	6.988	2.371	12.356	6.429
number of employees	26.773	6.846	2.335	11.622	5.970

### The Situation in the material Sectors

PRODUCTION (t)	2015	2016	2016/2015 (t)	2016/2015 (%)
Grey iron	694.141	714.234	20.092	2,9%
Ductile iron	374.591	381.217	6.626	1,8%
<b>Total Iron castings</b>	<b>1.068.732</b>	<b>1.095.450</b>	<b>26.718</b>	<b>2,5%</b>
Alloyed steel	37.886	36.295	-1.591	-4,2%
Inox steel	11.099	9.701	-1.398	-12,6%
Carbon steel	13.021	10.989	-2.033	-15,6%
<b>Total steel castings</b>	<b>62.006</b>	<b>56.984</b>	<b>-5.023</b>	<b>-8,1%</b>
Investment castings	1.209	1.562	353	29,2%
<b>TOTAL FERROUS CASTINGS</b>	<b>1.131.947</b>	<b>1.153.996</b>	<b>22.049</b>	<b>1,9%</b>
Aluminium	760.521	790.075	29.554	3,9%
Zinc	68.254	70.474	2.220	3,3%
Brass, Bronze, Copper	63.752	66.081	2.329	3,7%
Magnesium	7.294	7.384	90	1,2%
Other non ferrous c	630	654	24	3,8%
<b>TOTAL NON-FERROUS CASTINGS</b>	<b>900.451</b>	<b>934.668</b>	<b>34.217</b>	<b>3,8%</b>
<b>TOTAL</b>	<b>2.032.398</b>	<b>2.088.664</b>	<b>56.266</b>	<b>2,8%</b>

#### Grey cast iron

In 2016, the sector's output grew by +3% to 714.234 tons. The production of motor-vehicle components expanded by +10% to 250.397 tons. The volume of mechanical-engineering components decreased by -1.8% to 327.477 t, while the output of building components decreased by -15% to 35.744 t. Roll manufacturers logged a production of 13.046 t, marking a fall of -3%. Miscellaneous grey iron components reached a production volume of 85.570 t (+13%).

#### Ductile cast iron (nodular and malleable)

The weight of ductile castings produced in 2016 amounted to 381.217 tons. Compared to the year before, this marks an increase of +1.8%. Manufactures of mechanical-engineering remained at the previous year's level of 195.053 t (+0.33%). At 125.294 tons, the output of motor-vehicle components was up by +7%. Components for the building sector went down by -4% at a volume of 45.666 tons. While the output of rolls shrank by -1% to 15.204 tons.

**Steel**

In 2016, **steel foundries** had a worse performance than the others material sectors. Production declined by **-8.1% to 56.984 tons** mainly due to the downturn in the downstream sectors, particularly as regards investments in oil and gas and mining sectors.

**Non-Ferrous Metal castings**

In 2016, the Italian non-ferrous metal foundries were in a position again to continue the recent three positive trend and to achieve another **production increase (+3.8%)**. In 2014 they expanded by +4.3% and +4.6% in 2015. For the current year, it is expected that production and turnover will increase again. In detail, growth rates are underpinned by the intensive demand for **light alloy castings** (aluminium), representing about **84%** of total non ferrous metal castings. In this sector, castings production increased to **790.075 t (+3.9%)**, while the **magnesium output increased slightly (+1.2%) to 7.384 tons**. The good performance of non ferrous sector was the result of the ongoing high demand of **light weight materials in the automotive industry**. This industry is the most important customer for non ferrous castings in Italy, in 2016 it absorbed about **57%** of the **total non ferrous output!**

Good the situation for the other heavy-metal casters. **Production of Zinc achieved to 70.474 tons with a growth of +3.3%; while brass, bronze and copper logged an output increase of +3.7% and a volume of 66.081 tons.**

**Outlook 2017**

The forecast for the current year is optimism for all ferrous and non ferrous sectors. There is a highest percentage of those who declare that the coming months will get better than previous year.

**Production Costs Trend**

The main metal inputs for castings production from 2011 to October 2016 came down following these prices evolution on annual averages:

- **Bales of deep drawing steel 30x30 = -39%** (-162 € / t)
- **Pig Iron (hematite) = -32%** (-168 € / t)
- **Pig Iron (for ductile iron) = -31%** (-163 € / t)

By the end of 2016, scrap and pig iron, after some timid attempt in the previous months, raise their heads recovering a good part of the land lost in the previous five years.

**From November 2016 to March 2017:**

- **Bales of deep drawing steel 30x30 = + 30%** (+74 € / t)
- **Pig Iron (hematite) = + 30%** (+100 € / ton)
- **Pig Iron (for ductile iron) = + 26%** (+90 € / t)

**Special problems**

Pig iron prices are still under pressure caused by the interruption of imports from the Ukraine whose production stopped for several months.

	<b>2016 VS 2015 (%)</b>	<b>February 2017 VS October 2016 (%)</b>
Electric power	-6%	+5%
Natural gas	-25%	+17%
Coke	-3%	+22%

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## General economic situation

According to a release by Statistics Netherlands (CBS) by the end of March 2017, The Netherlands has left the economic crisis behind. The Dutch economy grew in 2016 with 2.2 percent, a fraction faster than the year before. Just like in 2015, the total amount of jobs increased with about one hundred thousand jobs in 2016 and the strongest decline of unemployment was registered in ten years' time.

The GDP per capita rose at the end of 2016 above the level of before the crisis. For the first time since 2008, the government balance was a positive one and government debt decreased further towards the EMU standard of 60 percent.

Compared to our neighbour countries, The Netherlands did well. The GDP of The Netherlands grew faster than that of Belgium and Germany, while the natural gas exploration for the third consecutive year strongly decreased. The export grew without delay, also the export of Dutch products, of which the Dutch industry benefited.

### Forecast of the general economic situation in the Netherlands in 2017 and 2018

The GDP is expected by the Netherlands Bureau for Economic Policy Analysis (CPB) to increase in 2017 by 2.1 percent, for 2018 they predict a GDP growth of 1.8 percent. Over the years 2018 - 2021 they predict an average growth of 1.7 percent per year.

An unemployment rate of 4.9 percent is foreseen by the Netherlands Bureau for Economic Policy Analysis (CPB) for 2017. For 2018 they expect this rate to decrease slightly to 4.7 percent.

The Dutch Government surplus predicted by the Netherlands Bureau for Economic Policy Analysis (CPB) is 0.5 percent of GDP in 2017 and 0.8 percent of GDP in 2018. This percentage is expected to increase to 1.3 percent in 2021.

### The foundry industry in The Netherlands in 2016 (and forecasts 2017 and 2018)

Despite the recovery of the Dutch economy in general during the last few years, the Dutch foundries stay behind with this trend. For the Dutch foundry industry the year 2016 was pretty similar to the previous year 2015: the foundry industry in general was having a rather difficult year. Some foundries however have customers in good performing markets (automotive) and were doing well. But most foundries experienced rather difficult economic times again in the year 2016. They had to work hard to achieve positive figures by the end of the year. More and more it becomes clear that this is the new economic reality and that it will take years to get the same performances as before the economic crisis.

The forecasts for the foundry industry in The Netherlands for 2017 and 2018 are not easy to tell. Expected is the situation in general to improve slowly every year. AVNeG is convinced that there are good prospects for a healthy foundry industry in The Netherlands. Much will depend however on the economic performances of the customers of the foundries. The Dutch foundries are highly export driven. The creation of a level playing field is an important goal to pursue. Increasing labour, energy and material prices will probably affect the profitability of the Dutch foundries.

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## General Economic Development

After 0.4 per cent growth in the 4th quarter of 2016, gross domestic product (GDP) for mainland Norway increased by 0.6 per cent in the 1st quarter of 2017. It is slightly higher than the projected trend growth.

Following two years of decline, seasonally adjusted figures show a clear rise in manufacturing and mining of 0.9 per cent in the 1st quarter. Activity growth was particularly marked in the accommodation and food industry, such as the production of chemical and pharmaceutical raw materials. For other parts of the industry, such as manufacturing of metal products, machinery and shipbuilding, activity fell in the 1st quarter after positive figures at the end of last year. Other goods-producing industries in the mainland grew by 0.6 per cent in the 1st quarter. Reduction in electricity production pulled down the growth for the fourth quarter in a row, while the value added in building and construction activities continued the strong growth that started in early 2015. Traditional fishing also increased in the 1st quarter, while production in aquaculture was nearly unchanged from the quarter before.

	2011	2012	2013	2014	2015	2016	2017E
GDP	1,6	2,9	0,6	2,2	1,6	1,0	1,5
-Mainland Norway	2,6	3,4	2,3	2,3	1,1	0,8	1,8
Unemployment rate	3,3	3,2	3,5	3,5	4,4	4,7	4,4
Consumer prices	1,2	0,8	2,1	2,0	2,1	3,6	2,0
Investment in the Oil-sector	11,3	15,1	17,1	-3,2	-15,0	-14,7	-7,0

Moderate household consumption growth continues.

Public consumption increased by 0.4 per cent in the 1st quarter and was dampened by a decline in defence spending.

### Increase in mainland investment

Investments in mainland Norway have seen a clear increase in the last five quarters, and 0.7 per cent in the 1st quarter of 2017. This development is largely linked to strong growth in dwelling investments. In the first quarter, they increased by 3 per cent, while the annual average growth rate was 9.9 per cent in 2016. Public sector investment increased in the first quarter after increasing by almost 7 per cent from 2015 to 2016. On the other hand, total investments in mainland industries and in manufacturing and mining decreased after a clear growth through 2016.

**Exports of goods and services** increased overall by 0.9 per cent in the 1st quarter of 2017. However, the strong growth of 7.8 per cent for exports of traditional goods has to be seen as a result of an even greater decline in the previous quarter. Meanwhile, exports are back at a normal level in the 1st quarter of 2017. Export volumes of both oil and gas and services, however, were reduced and thus dampened the increase in total exports.

Imports of goods and services increased by 2.8 per cent in the 1st quarter after a decline of 1.5 per cent in the 4th quarter of 2016. As a yearly average, imports increased by 0.8 per cent last year.

### Slight increase in employment

Preliminary calculations show that seasonally adjusted employment increased by 0.1 per cent or about 3100 people from the 4th quarter of 2016 to the 1st quarter of 2017. The number employed in the 1st quarter of 2017 was about 14 000 higher than in the same quarter in 2016. A large part of the employment increase in public administration is approximately equal to the increase in total employment in both the first quarter and the last four quarters. There was also a significant increase in building and construction, but also in business services and in accommodation and catering operations there has been a clear growth. On the other hand, in petroleum and manufacturing, the decline we have seen since 2014 continued.

## The Foundry Industry

There has been a reduction in production of iron and aluminium castings.

There are three steel foundries in Norway – one of these went bankrupt in 2016 and is now restarted with the new name; Stavanger Steel AS.

The capacity utilization in the foundry sector was in average 52% in 2016, compared to 65% in 2015.

50% of the foundries expect production volumes to be stable or increase in 2017, while 50% of the foundries expect a reduction.

57% of the foundries expect increased profits in 2017 while 14 % expect decreased profits.

58% of the sold castings were exported in 2016. The Nordic and German export markets are the most important. The still weak Norwegian krone is favourable for the competitiveness.

There is less pressure on salaries mainly due to lower activity in the oil and gas sector.

The average payment pr. hour (per 2. Quarter 2016) in the foundry sector was 21,7€ for skilled foundry workers, 19,9€ for semiskilled and 19,1€ for unskilled foundry workers.

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## Foundry industry in Poland

In Poland there are around 400 foundries. According to statistical data, about 60% of foundry plants in Poland are independent foundries. The remaining 40% are usually the departments of larger companies in which the casting department supplies the castings to their final products.

The production of castings including ferrous and non-ferrous alloys in 2016 - calculated on the basis of actual data from the foundries and estimated by approximation for previous years for foundries, was 1,048,800 tons.

By analyzing the last decade in the foundry industry in Poland, it has been observed that by 2008 the production of total castings from ferrous and non-ferrous alloys had shown upward trends. In 2010 castings production increased significantly, while the years 2011-2016 produced very satisfactory results. The production volume of castings for 5 years has exceeded 1 million tons.

Castings from grey and alloy cast iron have the largest share in the total castings production, although over the last decade their share in total castings has been declining. In 2016 it amounted to 46.1%.

Ductile iron castings account for 14.8% of total castings. In 2015 there was a decrease compared to the previous year.

Malleable iron castings have the smallest share, 1.0% of total casting production. For several years there has been a downward trend in the share of cast iron production in malleable cast iron in total production.

In 2015 the share of steel castings amounted to 4.8% of the total cast production.

Non-ferrous metal castings accounted for 33.2% of total cast production in 2016. Over the last ten years there has been an upward trend. Total production of non-ferrous metal castings in 2016 amounted to 348.1 thousand tons and showed a decrease compared to 2014 by 1.4%. In the last decade, the production of non-ferrous metal castings has shown an uptrend.

According to data for 2016, export of castings including ferrous and non-ferrous alloys (tonnage) was 620.6 thousand tons, including 313.6 thousand tons of cast iron and steel cast and 307.0 thousand tons of non-ferrous castings.

The share of exports in total castings production in 2016 was lower than in previous years and amounted to 59.2%. Analysis of export share of castings from individual plastics showed that this share amounted to 44.8% of the total production of iron alloy castings and 88.2% of the total production of non-ferrous metal castings.

In the last decade, the export volume of castings, despite a decline in 2009, is showing an upward trend (from 424.6 tons in 2006 to 612.6 tons in 2016).

In 2016, domestic foundries reported lower productivity (yield) than in previous years - 43.2 tons / employee. Performance in domestic foundries is significantly lower than in the other EU countries.

The number of foundry plants in Poland at the end of 2016 is estimated at around 400 foundries (including small craft enterprises with small production and employment).

According to statistics, the number of foundries employing more than 250 people constitutes 5.5% of the total number of foundries, and total employment in this group is estimated at 10,750.

The remaining 94.5% are foundries employing less than 250 people (total 13 550 employees), the SME sector. Employment in the SME sector amounts to 55.8% of total employment and production of 38.5% of total cast production.

## General economic situation in Poland

- A growth in sold industrial production amounted to 7.3%. In the manufacturing section, production grew by 8.1%. Construction and assembly production grew by 3.9%.
- Consumer Price Index was higher by 2.0%.
- The number of registered unemployed amounted to 1,324.2 thousand (down by 17.3%).
- Registered unemployment rate amounted to 8.1% in 2016 (and to 7.6 in I quarter of 2017).
- The Monetary Policy Council did not change the interest rates.

GDP in Poland is estimated to increase to 3.1 percent in 2017, up from 2.5 percent in 2016. In 2018 and 2019, the economy is forecast to grow by 3.3 and 3.4 percent, respectively, supported by robust domestic demand, especially private consumption.

Previously, in October 2016, the World Bank had estimated Poland's GDP growth to reach 3.2 percent in 2016, and 3.4 and 3.5 in 2017 and 2018, respectively. However, the lower forecasts published in the January 2017 are the result of a higher than expected deceleration of investment in recent quarters.

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## General Economy

In 2016, according to the INE (National Statistics Institute), the Portuguese economy registered an increase in GDP of 1.4%, in real terms, in relation to the previous year (+1.6% in 2015 and 0.9% in 2014).

The contribution of domestic demand to the annual variation of GDP reduced, standing at 1.5% in 2016, reflecting mostly a reduction in total gross fixed capital formation and a slowdown of private consumption (+2.3% in 2016), whereas public consumption continued to increase (+0.8%).

The real increase in exports and imports of goods and services was 4.4%, in both cases, during the last year.

Last forecast from the Banco de Portugal for 2017, points to the continued gradual recuperation of the Portuguese economy, with a GDP increase of 1.8% in 2017 and 1.7% in 2018, above the growth projected by the European Commission (1.6% and 1.5% respectively) and close to that forecast for the Euro Zone, which is 1.6% in 2017 and 1.8% in 2018.

According to the Banco de Portugal, the volume of exports in GDP should continue to increase in the next few years and is predicted to go from 40% in 2016 to 46% in 2019. The Portuguese economy's financing capacity should continue stable, foreseeing a combined current and capital account, of around 1% of GDP during the 2017 - 2018 period.

## The employment situation

The unemployment rate has reduced in the last few years, reaching 11,1% of the active population in 2016. This tendency should continue (9,9% in 2017 and 9% in 2018). During 2017-2018, employment should continue to grow, albeit at a more moderate rate.

In foundry area, mainly in the automotive suppliers, the demand for specialized technicians, operators and maintenance staff is quite high, and there isn't enough offer in the market. The existing of new players and production units in the market also create a very particular situation for those specialists.

## Foundry Industry

The automotive industry keeps being the main customer market, which demands roughly 75% of the global Portuguese production.

The Portuguese foundry sector exports around 85% of the total production, in weight, mainly to the European market.

## Production

In 2016, the outcome of the Portuguese foundry industry was roughly 191 thousand tons, 140,5 thousand tons from ferrous and 50,5 thousand tons from non-ferrous sector.

The total volume production, compared with 2015, increased 4.2%, mainly due to the influence of aluminium and nodular iron (and also grey iron in one specific foundry), to the automotive sector, that compensate some contraction in the steel and grey iron.

In global terms, the ferrous sector improved 2% of the activity. The non-ferrous production improved around 11,1%, mainly due to aluminium (die casting), and copper based alloys.

## Ferrous Production

### Grey Cast Iron

Despite some new business in the automotive, concentrated in one production unit, the grey iron castings sector had a fall of 0,9%, reflecting the global tendencies.

#### Ductile Cast Iron (Nodular)

The nodular iron castings globally increased 3,8%, mainly due to new business in the automotive industry, also concentrated in one production unit, with a mix behavior in the remaining foundries.

#### Steel Castings

The steel castings sector faced a reduction of 4,3% in production, due to the global contraction of the market. Eight companies in Portugal, dedicated to technical parts and market niches.

### Non Ferrous Casting Production

In 2016, the non-ferrous metal castings production, as a whole, had registered an improvement of 11,1%, mainly due to new projects for the automotive industry, especially in the light castings (aluminium pressure diecasting), as well as in the copper castings, in the production of domestic brass taps and accessories. No major changes in the zinc alloys.

Looking at the sector in detail, increase in production was balanced between the aluminium pressure diecasting and copper based alloys. Exception for the bronze components for boat propellers, that faced a reduction (less boat construction for off-shore due to low oil price).

### New casting plants and investments

In 2016, a new aluminium pressure die casting plant (second from an existing player), was installed in the center/north of Portugal, with a planned global investment of 49,7M€ along the project. With foreign capital, the new plant will produce mainly automotive components for the EU market. Serial production started officially in May 2017.

Global investments in the non-ferrous sector during 2016 went up to around 41M€, mainly supported by aluminium die casting for automotive. In 2017, planned investment can go up to 37M€.

In the ferrous side, a new project including a production plant and a school/technical institute was installed during 2016 and officially inaugurate in February 2017. Belonging to the actual biggest casting producer in Portugal (nodular iron for automotive), the investment reached 36M€ in 2016, value that can double in the next 5 years. Remaining companies invested around 9M€, for a global value of 45M€ in 2016. For 2017, planned investment points to 18M€.

### Industrial Cost

In 2016, the price of most raw materials on the ferrous sector follow a very small reduction, not significant, including the pig iron and steel scrap.

In the non-ferrous sector, the price of raw materials reflected an increase on aluminium, zinc and copper alloys along the year, inverting the tendency from the previous year (2015).

Electricity - in 2016, companies could negotiate in the liberalized market, allowing in some cases cost reductions. Even though, Portugal keep having one of the highest energy costs from the EC, due to access taxes that can go up to 48% of the invoice cost, as result of the supporting of the investments in the renewable energies.

The gas price decreased in 2016 due to external factors, as the price reduction of the oil in the global market. For some industrial consumers, the price reduction could reach up to 25% from middle of the year on.

Due to the economic situation of the country, most of the foundries expect an increase of the wages close to inflation for 2017.

The implementation of the Industrial Emissions Directive to Portugal, who brought new requirements for the foundry operations, will continue causing increased costs for business.

### **Incoming orders**

Suppliers of the automotive sector, especially in the premium segment, are in good order situation and with high utilization of the available capacities.

Incoming orders and production for general engineering stay in a lower level as in previous year.

For 2017, tendencies are positive for non-ferrous and moderate for ferrous (positive for automotive).

### **Foundry vocational training**

The Portuguese Foundry industry has its own training and vocational center, CINFU, a joint partnership with APF and the Portuguese Institute of Employment and Vocational Training, which has once more made an outmost job training foundry men – those in active jobs and those being prepared for future employments. There is also a long partnership with the University of Porto – Faculty of Engineering, for the training of future foundry engineers.

Comparing to 2015, in 2016 there was an important increase in training hours, as well as in the number of people attending courses, for a similar number of the actions taken. In numbers, CINFU implemented 305 training actions, involving 4452 people (more 14,5% than in 2015) and a training volume activity of 242 298 hours (more 24,1%).

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## Short Report about Economic Developments – Forecast 2016 And 2017

**The Autumn Forecast is based on the favourable economic developments recorded in previous quarters and assumes that the current economic policies and stability in the euro area will continue.** International institutions expect economic growth in the euro area to maintain its pace. The UK's decision to leave the EU (Brexit) has not significantly affected business results or the stability of the financial market thus far. The forecast for the domestic environment assumes that the economic policies planned, including fiscal consolidation, will continue. Given the improved situation in the banking system, we have also assumed that there will be a rebound in bank lending to the corporate sector, as well as a further increase in the importance of non-banking and internal sources of funding. All this will support Slovenia's further economic growth, which has strengthened in recent quarters and become broad-based. The labour market and fiscal performance will be increasingly affected by demographic change that is characterised by an expected decline in the working-age population and a rise in the share of the older population.

**The autumn forecast for GDP growth in 2016 and the two years that follow envisages a continuation of favourable economic trends; GDP growth dynamics will be marked primarily by government investment related to the absorption of EU funds.** The forecasts for GDP growth are 2.3% in 2016, 2.9% in 2017 and 2.6% in 2018. Exports will remain the key driver of economic activity over the entire forecasting period. They will continue to be fuelled by not only the expected growth in foreign demand but also competitiveness gains in the tradable sector. Economic growth is becoming broad-based as the contribution of domestic consumption gradually rises. Household consumption is therefore expected to increase significantly in 2016, with a marked improvement in labour market conditions and a high level of consumer confidence, and these positive trends will also continue in 2017 and 2018. From 2017 onwards, higher growth will also be recorded for government investment co-financed by EU funds, where delays and a lower absorption rate than planned continue to be seen this year. This will have a pivotal influence on the growth of total investment. Throughout the period, we also expect further growth in investment in machinery and equipment and a gradual rebound in housing investment growth owing to the continued recovery of the real estate market. The reasons for this increase in private investment, which is now financed by internal and other non-banking sources to a greater extent than in the past, will be similar to those in the last two years. With high capacity utilisation, the growth in private investment primarily reflects the favourable and more stable expectations of businesses, the persistence of low interest rates, strong business performance and the improving ratio of profit to debt. Government consumption will also continue to increase this year and next, chiefly on account of public sector pay rises, a larger number of employees and an increase in some other forms of expenditure, particularly health care.

**Favourable labour market trends will persist, but they will be increasingly characterised by demographic change.** In 2016 employment continues to rise, not only in most private sector activities but also in the public sector owing to the relaxation of hiring restrictions. Given the improvements to the indicator for expected employment, employment growth should be significantly higher this year (at 1.9%) than in 2015, with the number of unemployed falling to around 103,000 for the year as a whole. In addition to the further recovery of the economy generally, higher employer confidence in economic growth and increased use of flexible forms of employment will also contribute to employment growth in 2017 and 2018. Towards the end of the forecasting period, the labour market will be increasingly affected by changes in the demographic structure, particularly the contraction of the working-age population.

**Nominal growth in average earnings will hover around 2.0% in 2016 and the next two years; it will rise steadily in the private sector, but will slow down in the public sector after this year's high.** In the first half of this year, both sectors recorded the highest wage growth in the past five years, and this figure will reach 1.9% for the year as a whole. Nominal wage growth in the private sector will continue to rise in 2017 and 2018. In addition to strong business performance, wage growth will also be underpinned by a considerable decline in unemployment. However, owing to the efforts made by companies to maintain competitiveness, wage growth is projected to hover around the level of productivity growth. The public sector wage rises this year are a consequence of the payment of deferred promotions and the elimination of some austerity measures. In the next two years growth is forecast to slow.

**Although consumer prices will rise in the next two years, inflation will remain relatively low.** In 2016 average consumer prices will remain unchanged, mainly due to the influence of the low price of oil. The impact of energy prices on the total price decline is gradually easing. Core inflation is rising slightly, fuelled by the higher prices of Services, while the average prices of non-energy goods remain unchanged. Given the assumed growth in import prices for oil and commodities over the next two years, we expect rises in energy prices, as well as a slightly higher rate of core inflation owing to a rebound in domestic consumption and a gradual closing of the output gap. With stronger domestic demand, businesses (particularly those in the non-tradable sector) will have more leeway to convert the rising costs into higher prices. Price rises will, however, continue to be restrained by the efforts made by companies to improve competitiveness, which means that inflation will remain relatively low (below 2%).

**The surplus of trade in goods and services continues to rise under the influence of the relatively strong growth of exports and better terms of trade.** The current account surplus in 2016 will therefore be the highest thus far (6.7% of GDP), despite the slightly higher deficits in the balances of primary and secondary income (together around 4% of GDP). On the one hand, the large surplus of gross savings over investment is mainly due to a strong decline in gross investment and the vigorous deleveraging of banks and enterprises since the beginning of the crisis, which slowed domestic consumption among other effects. On the other hand, in addition to favourable terms of trade, the growth in surplus is also influenced by exports amid several years of improvement in Slovenia's competitive position on foreign markets. The expected further recovery in domestic consumption will boost the growth of imports, but the growth rates of private consumption and fixed Capital formation will remain modest. With export growth similar to that recorded thus far, the surplus will decline very gradually (to 5.6% of GDP in 2017 and 5.3% of GDP in 2018). The narrowing of the current account surplus in the next two years will also be partly attributable to deteriorated terms of trade. The deficits in primary and secondary income will remain roughly the same as this year.

**The key risks to the central scenario of IMAD's Autumn Forecast arise from the international environment; the risks associated with the domestic situation are less pronounced and more balanced than in previous forecasts.** To a greater extent than in previous forecasts, the risks relate to the narrower international environment, particularly the effects of Brexit. Global challenges remain, which are partly geopolitical and these are reflected in the uncertainty regarding future migration flows; however, for the most part, these challenges are increasingly associated with the different speeds of recovery of the largest world economies and thus the expected different directions of economic policy actions taken. The risks in the domestic environment are less pronounced and more balanced than in previous forecasts. The prospects regarding the future absorption of EU funds and hence the volume of government investment are particularly uncertain. On the upside, however, an improvement to Slovenia's competitive position in the years to come could lead to stronger growth in exports and private investment than assumed in the baseline scenario. Upside risks also predominate in terms of final consumption and stem primarily from favourable developments on the labour market.

**Slovenian foundry industry** – the production of different casting quality. We made an analysis of the quantities of different castings. We can say:

The production of gray iron in 2016 was 74.234 tons, the production of nodular graphite iron was 30.986 tons, steel casting and malleable castings – 34.443 tons, aluminum casting 47.584 tons, on magnesium base only 26 tons, copper base 947 tons, zinc base 3.494 tons, other casting materials 64 tons.

All together we have a production of 191.780 tons of different qualities in the year 2016. The maximum quantity of production was in the year 2014, it was almost 200.000 tons.

**Sources:**

UMAR

Foundrymans Society of Slovenia

Chamber of Commerce and Industry of Slovenia

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## Overall Economy and Metal Sector in particular

The Spanish economy maintains the expected growth for the 2016-2018 period compared to that published in autumn last year, estimating an annual GDP growth of 3.2%, 2.3% and 2.1%, respectively. With these results, the Commission expects Spain's growth to remain above the average of the euro area countries (1.7% in 2016, 1.6% in 2017 and 1.8 % in 2018). The GDP growth for the whole 2016 is estimated at 3.2%.

The industrial Metal production recorded an increase of 2.4% (5.8% in 2015) in the whole year. By sectors of activity, it could be emphasized the positive tone of almost all, except electronics and electric material.

Metal Industry's Turnover Index, which measures the evolution of current demand and turnover, accumulates an increase of 2.7% in 2016. According to activity branches, the evolution of turnover has been positive in all of them, except in metallurgy (which drags falls in the entire year).

Metal Industry's Incoming Orders Index, which measures the evolution of future demand, accumulates a growth of 1.8% in the year. According to activity branches, the evolution of the entry orders has been unequal throughout the year 2016. It can be highlighted the progress of manufacturing of other transport material and motor vehicles, as opposed to the decline in metallurgy.

Exports of the metal sector increased by 2.2% over the previous year (9.4% in 2015). Metal imports meanwhile increased by 8.4% in December, accumulating a 4.6% increase in the year (15.8% in 2015).

Regarding the labor market, unemployment rate stood at 18.63%, the lowest since 2009. With respect to Metal Industry, stated an increase of 4.1% throughout the year, confirming this way its improvement. The affiliates number in Metal Industry increased by 3.7% in 2016.

Thus, it is made a moderate balance of Metal in 2016, as the exports and imports of the metal sector slowed its growth during the year.

According to the latest forecasts, the Spanish economy will continue its growth in 2017 and 2018, albeit at a slower pace than in the previous year. It is forecasted a growth of 2.3% for 2017 and 2.1% for 2018. Domestic demand will be the engine of growth in 2017 and 2018. Spain will grow more than the average of the euro zone.

## Foundry Sector

### Iron Casting Section. Automotive Casting

The year 2016, in general, has been closed above the budgeted, with increases in production over the previous year. In some cases important increases.

Mayor automakers are performing well.

### Iron Casting Section. Mechanical Molding

The Wind Energy Sector, for medium pieces, has worked well in 2016.

The Railway Sector in the national market has had a loose behavior.

The Valve Sector has been loose, especially in the latter part of the year.

### Iron Casting Section. Manual Molding

The Die Sector performed well during the first months of 2016 while it has had a downward trend in the last semester.

The Wind Energy Sector has worked well during 2016. There is widespread optimism in the market for 2017. Every year are also multiplied the quality and certification requirements, without being able to raise pieces prices. Incoming orders have remained in a good level during 2016.

The Machine Tool Sector continues quite weak, with exemption of automotive components.

The Demand in all customer sectors has fallen sharply in the last quarter.

In general you cannot raise prices, despite all the improvements requested by customers. Thus margins are very scarce.

**Stainless Steel**

Pumps and valves, Oil & Gas and water sectors have been stopped.

Requirements from the clients are increasing. They are accepting almost nonassumable orders regarding delivery times.

Regarding exports, during this year, devaluations in some currencies have not favored.

**Steel Castings**

Agricultural machinery, Oil & Gas, Off-shore, Mining and Constructions sectors have had a downward evolution during 2016.

Die Sector is behaving reasonably.

Customers requirements are increasing and management is getting more complicated.

Environmental, Occupational Health and Safety requirements (silica, resins, etc.) are much higher than those of European competitors in Europe.

In general the situation is not good and there is much uncertainty and concern for 2017.

**Non Ferrous Castings**

Aluminum foundries have increased their production more than 10% over the previous year.

In 2016 the production of parts in zamak has increased 4% over the previous year.

**Raw Materials and Auxiliaries**

**Analysis of the Evolution of Raw Materials Prices And Auxiliaries in 2016**

Throughout the year the scrap prices have remained stable (-0.36%). Pig iron have remained stable with a little bit lower prices compared to a year earlier (-3.51% for pig iron and -1.35% for the scrap), while the nodular iron ingot has dropped slightly more (-5.68%).

Ferrous alloys have evolved as follow: Nickel (+1.54%) and FeMo (+29.04%). Only FeCr has evolved downward (-9.52%).

Molding sands have risen 1,5%, while resins and shot have maintained.

The average decrease in electricity prices in the year 2016 has been close to 10%.

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## General economic situation

The overall Swedish economy has had a great year with high growth overall and low unemployment numbers. The number of unemployed has during the 2016 continued to decrease and is at the end of 2016 on 6,9%, with the prognoses of further decrease to 6,6% in year 2017. For individuals born in Sweden the unemployment rate is around 4%, however the overall total is increased due to the many immigrants who have arrived in the past years. A recent survey showed that nearly 60% of all SME's are planning to increase the number of employees within 6 months.

Inflation has changed during the year starting at 0,8% in January 2016 and ending at 1,7% in December 2016. GDP risen to 3,3% in 2016. Companies in the manufacturing industry report strong order growth in the domestic market in the beginning of 2017, compared with the last three months of 2016.

## The Foundry sector

In Sweden, there are currently about 100 foundries (27 iron foundries, 12 steel foundries and 61 metal foundries, mainly aluminum). The number of foundries is slowly decreasing but the production is more or less stable. Among the customers, the automotive industry is dominating and uses about 70% of the total tonnage. The automotive industry has also been a major reason to why metal foundries have been increasing in production during 2016. Without the automotive industry, the overall number and growth would not have been as high as it has been during the last year.

### Production

Between the years 2015 and 2016 the Swedish production of castings has decreased to 291 800 tons going back to the levels of 2014. However, due to some uncertainties regarding the figures for 2015, it might be so that the production for 2015 and 2016 has been more or less stable at a level just under 300 000 tons.

The strongest trend was noted for High Pressure Die Casting components in aluminum, mainly for the automotive industry. The steel industry is still struggling however it has slowly started to recover from the downfall in production due to reduced purchases from the Norwegian oil industry and a recession in the mining industry. The production is still not satisfactory, however stable. The companies that were under reconstruction during the past year are all, but one, back in operation.

Material	2012	2013	2014	2015	2016
Iron	205 000	207 900	212 000	242 000	209 000
Steel	23 400	20 400	19 600	19 200	21 200
Non-ferrous metals	55 000	56 000	58 200	62 600	61 600

### Labour

The demand for skilled people in the foundry industry remains high, and foundries are continuously looking for new employees, specifically those with a higher level of education. At the moment, the Swedish foundry sector has approximately 7 500 employees. However, this figure might be significant lower due to three different circumstances; i) official statistics do not separate foundry workers from all employees, ii) a majority of the Swedish foundries use hired personnel which is not included and finally iii) automation reduces the number of employees and change the work title from "foundry worker" to "process operator". All together this means that the official number of foundry employees in Sweden have decreased quite a lot. Among white color employees we are still at a level of approx. 10% with higher academic education. Approximately 32% of all companies find it difficult to employ engineers due to the current low unemployment level and high demand for engineers from the overall industry. In order to attract more engineers to the foundry industry a new master of Science with a major in Product Development, specialisation in Materials and Manufacturing has been developed at Jönköping University.

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## Situation of the foundry industry

The 47 companies amalgamated in the Swiss Foundry Association (GVS) saw a 4.2 percent decrease in sales last year to 580 million Swiss francs: turnover in 2015 was 605 million Swiss francs. The continuing strength of the franc and the increasing outflow of customers with lucrative large orders to lower-cost countries abroad were the foremost reasons for the further losses. Across all material groups the total of tonnages delivered in 2016 was down 8.2 per cent at 51,625 tonnes. In the current year, too, the competitiveness of the export-oriented Swiss foundry industry is being severely tested.

The creeping de-industrialisation of Switzerland is the main feature of the tense situation in the Swiss foundry industry. The tonnages delivered by the **iron and steel foundries** in 2016 were 7.8 per cent down on the previous year at 35,426 tonnes. The Swiss **light metal industries** reduced their tonnages processed in 2016 by 13.5 per cent to 12,902 tonnes. Only in the **copper alloy** segment was an increase of 4.3 per cent on the previous year to 3,297 tonnes achieved. Across all material groups the Swiss foundry industry closed 2016 with a total reduction of 8.2 per cent to 51,625 tonnes. Last year the total turnover of the 47 companies amalgamated in the SFA was 580 million Swiss francs, 4.2 per cent down on the 2015 figure of 605 million Swiss francs.

In terms of user markets, in 2016 primarily cars and the transport sector with rolling stock and commercial vehicles again generated new orders and moderate growth rates. Orders for special pumps, turbines and compressors, as well as generally for spare parts and the manufacture of prototypes in 3-D printing were partly responsible for the Swiss foundries' good utilisation of production capacity. Demand from the packaging industry and the medical sector was positively stable. On the other hand the order situation in the electrical, tool-making and mechanical engineering sector, plant and equipment engineering stagnated or continued to decrease. The opportunity for the Swiss foundry industry to generate new business with sizeable volumes on the domestic front increasingly dwindled in 2016. The European foundries' generally weak utilisation of production capacity also increased the pressure of competition. In every user sector there was demand first and foremost for innovative development solutions and the production of more and more complex, ready-to-install cast parts in small batch sizes with comprehensive logistical services from the Swiss foundry industry. This is a trend continuing into 2017 and necessitating further fundamental adaptation of company and production organisation.

Like last year, the industry is pressing ahead with lean management measures and the honing of technological manufacturing processes through automation. Joint ventures at home and abroad are on the increase, for instance in cast post-treatment.

Outsourcing series production to lower-cost countries in Eastern Europe together with specialised production at Swiss sites is proving a largely good mix for maintaining competitiveness and innovative capacity. With the operational improvement measures already taken and ongoing, the Swiss foundries definitely see potential for improving earnings again this year and also being able to continue to make investments for the future in core competencies: the development of innovative cast parts with the customarily high level of Swiss service.

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## General Political & Economic Overview For 2016

Year 2016 as a whole was a difficult year for Turkey both in terms of political and economic situation.

First off all, the coup attempt: Turkish economy was influenced negatively by this situation. Secondly, the presidential election: Throughout 2016, there was an unclear situation due to the presidential election that took place in April 2017.

Moreover, the sector of tourism faced one of the most difficult periods ever in 2016. The tourism sector was influenced badly by the growing number of terrorist acts in the country.

Also, the unpredictable situation on the Turkish border in the South East Region is also one of the reasons why Turkey has faced a difficult period in 2016.

Due to the aforementioned events cited above, foreign investment has been reduced by 30% in 2016 compared to 2015. Thus, the local currency depreciated against USD and Euro causing the economic parameters to go down in general throughout 2016.

General macroeconomic indicators are shown in Table 1 below:

TURKEY	2011	2012	2013	2014	2015	2016
Population (million)	74,2	75,2	76,1	76,9	77,7	78,6
GDP per capita (USD)	11.205	11.588	12.480	12.112	11.014	10.807
GDP % (YoY)	8,8	2,1	4,2	3,0	4,0	2,9
Producer Price Index (PPI) %	13,3	2,5	7,0	6,4	5,7	9,9
Consumer Price Index (CPI) %	10,5	6,2	7,4	8,2	8,8	8,5
Total imports (US \$ bn)	240,8	236,5	251,7	242,2	207,2	198,6
Total exports (US \$ bn)	134,9	152,5	151,8	157,6	143,8	142,5
Current account balance (US \$bn)	-74,4	-48	-63,6	-46,4	-32,2	-32,6
Current account / GDP %	-9,6	-6,1	-7,7	-5	-3,8	-3,8
Unemployment rate %	9,1	8,4	9,0	9,9	10,3	10,9

**Table 1:** 2016 Economic Indicators / Source: Turk stat, Treasury

As depicted in Table 1; there is a significant decrease on GDP growth rate in 2016. However, the GDP per capita has been in a decreasing trend since 2013. According to the expectation survey that is run by the Central Bank of the Republic of Turkey (CBRT) in April 2017, GDP growth rate is expected to be 3 % for 2017 and 3.7 % for 2018.

Compared to 2015, CPI remained almost stable in 2016. However, PPI increased sharply in 2016 from 5.7 % to 9.9 % due to the fact that the industrial firms' cost is mostly based on the raw material prices. Raw material costs are based in USD as most of it is currently exported from abroad. As a result of the local currency depreciation, the production cost of the industrial companies increased accordingly. According to the latest data, yearly CPI in April 2017 was 11.9 % and yearly PPI 16.4 %.

As we know, the inflation in Turkey is mainly linked to the foreign exchange rates meaning that the inflation rate is based on the cost rather than the demand.

The unemployment rate has also been increasing since 2012. The unemployment rate was 10,9 % at the end of 2016. Unfortunately, it is continuing to grow in 2017 and became 13 % in January 2017.

The current account deficit of Turkey is in a decreasing trend since 2013 mainly due to the decrease of GDP and the significant decrease of petrol price within the market. Due to the fact that GDP decreased between the years 2013 and 2016, total import also went down during the same period and in conclusion, the current account deficit of Turkey has been reduced. According to the expectation

survey that is run by the Central Bank of the Republic of Turkey (CBRT), the current account deficit is expected to grow by 2 % in 2017 compared to 2016.

**Structure of Foundry Industry**

Turkish foundry sector acts an important role in world casting production, as well as it is in Europe. If we evaluate the level of casting production in 2015, after Germany and Italy, Turkey has taken the 3rd place in Europe. According to AFS’s 50th Census of World Casting Production, which was published in December 2016 issue; Turkish foundry industry production in 2015 constitutes 1.8 % of the world production. Accordingly, Turkey is globally ranked 10<sup>th</sup>.

The Turkish foundry production of 1.898.500 tons and valuation 4 billion Euros in 2016 is produced by 928 foundries operating in the country. The Turkish foundry sector export value was more than 2,7 billion Euros with an export volume over 1.0 M tons in 2016. There are 34.000 employees in the sector. Most of the production in the foundry sector was made by private owned companies.

Foreign investment in Turkish foundry industry is actually below the expected level. There are currently 6 foreign investors operating in the sector (Nemak, Çelik Granül, Componenta, Maxion, Federal Mogul and Schweiser). Componenta from Finland owns the shares of the largest iron and aluminum automotive foundry and Maxion has a partnership with a local company producing aluminum wheels.

In 2016, Nemak, one of the leading aluminum casting suppliers in the world, has acquired 100% share of Cevher Aluminum foundry.

**Developments in The Foundry Industry**

In 2016, the total number of operating foundries is 928; of which 161 are big foundries.

The number of SME’s is 374 and of micro foundries 393. There are also 17 public and military foundries but their production is negligible. As a result, calculated number of operating foundries is 928.

Total foundry production in 2016 has increased by 2.6 % compared to 2015. Figures of year 2016 are calculated from the data collected from the members of TUDOKSAD (See Table 2).

<b>Castings Shipped</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Change (%)</b>
<b>Grey Iron (x1000 tons)</b>	591	625	610	600	650	675	650	-3,7
<b>Ductile (x1000 tons)</b>	423	480	502	500	600	630	640	1,6
<b>Malleable (x1000 tons)</b>	4,7	5,5	8	8	10	15	15	0,0
<b>Steel (x1000 tons)</b>	124	152	140	135	140	150	166	10,7
<b>Non Ferrous (x1000 tons)</b>	149	170,5	185	300	350	380	428	12,5
<b>Total Production (x1000 tons)</b>	<b>1.292</b>	<b>1.433</b>	<b>1.445</b>	<b>1.543</b>	<b>1.750</b>	<b>1.850</b>	<b>1.899</b>	<b>2,6</b>
<b>Total employed</b>	<b>30.500</b>	<b>33.000</b>	<b>33.000</b>	<b>35.000</b>	<b>33.000</b>	<b>33.000</b>	<b>34.000</b>	
Number of foundries operating in Turkey								
Micro	374	440	370	402	397	385	393	
Small	381	423	410	390	371	370	374	
Large	148	177	182	163	161	160	161	
<b>Total</b>	<b>903</b>	<b>1.040</b>	<b>962</b>	<b>955</b>	<b>929</b>	<b>915</b>	<b>928</b>	

\* Calculations includes HPDC, Wheel, steel shots & grits and ductile pipe productions

**Table 2:** Census of 2016 Casting Production in Turkey (1.000 tons)

## Situation in the major customer Industries 2016

### Main customer industries - domestic;

#### Vehicle production can be summarized with figures as;

Passenger car, increased in 2016 compared to 2015  
Light Commercial vehicle, remained stable in 2016 compared to 2015  
Light trucks, decreased in 2016 compared to 2015  
Heavy trucks, decreased in 2016 compared to 2015  
Agricultural Tractors, remained stable in 2016 compared to 2015

#### General engineering and machinery,

General Machinery - local demand is very low,  
Rolls for steel mills - partial recovery in steel industry, small increase in 2016 compared to 2015,  
Castings for electricity production – waiting for local wind energy investments.

#### Construction, mining, roads, railways

Cement industry - stable  
Earth moving machines – low and stable  
Crushers, mining equipment – negative  
Railways heavy and light cabins planned to construct locally, expecting future business.

## Situation by the metal groups

### Grey Iron and Ductile Iron Castings - In 2016:

Automotive orders from foreign and local customers higher than expected,  
Investments on vertical integrated machining/finishing capabilities for automotive sector,  
New capacity investments with modern moulding machines in medium sized foundries for mainly non-automotive markets (municipality castings, sewage, manhole covers, grills),  
Heavy competition of neighbouring countries,  
Ductile castings with high value increasing its share in total production,  
Calculated settled capacity around 2 m tones.

### Steel Castings - In 2016;

Average capacity utilization 50%, similar to 2015.  
Steel foundries looking for new customers and new markets.  
Investments on moulding lines, sand reclamation, computer simulation and energy efficiency.  
Strong competition on local market with cement making, earthmoving, crusher equipment castings.  
Customer demands on very short delivery times, resulting additional labour and transport costs.  
Local demand is very low.

### Non Ferrous Light Alloy Castings – 2016

Local demand growing steadily on HPDC.  
New orders mainly from automotive part & component producers of EU and Turkey.  
Investments of new HPDC machines.  
Heavier and value added castings with machining are on progress.

### Investment plans:

2 new Aluminum HPDC foundries with new investments and growing demand from automotive industry.  
Ductile and ADI production are expected to rise at least 5% with new machining, finishing investments of foundries.  
A new Greenfield steel foundry planned to start up in 2017.

**Supply of Raw Materials and Energy:**

Stable market in 2016 compared with previous years.

Prices of Input Materials (all delivered to foundry door) are given below.

Costs	Units	Sept 2008	Feb 2009	Dec 2009	Aug 2010	Feb 2011	Feb 2012	May 2013	Dec 2014	Dec 2015	Dec 2016
of electricity	€/kwhr	10,0	8,3	8,97	9,75	9,71 10	9,5 10,5	10,2 13	7 11,9	6 10	6 10
of natural gas	€/m3	35	37	36	39	36	36	37	36	32	30
of baled steel scrap	€/ton	300	231	260	360	380	373	375	306 328	246 264	221 234
Low Mn basic pig iron	€/ton	550	312 408	300 360	400 440	440	415	420	360 380	300 329	275 298

**Table 3.** Raw Material Prices

**Cost developments**

Manufacturing costs of foundries are mostly based on USD due to the fact that the raw material price imported from abroad is on USD basis. During the last 3 years, Turkish foundries had to negotiate with EU customers as a result of the depreciation of Turkish Lira against Euro.

**Metallic input**

Raw material prices on Euro basis went down slightly throughout 2016.

**Wages: increasing**

Additionally, from the beginning of 2016 avg wages increased, as proposed in the previous year elections, and this brought about a big increase in labor costs.

**Energy**

Energy prices: was stable in 2016.

**SOURCES:**

Summary by TUDOKSAD: The Turkish Foundry Association.

Industry figures: TUDOKSAD members,

Economic figures and information: CBRT: Central Bank of Turkey, Ministry of Treasury and Turk Stat: Turkish Statistical Institute.

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## Economy

2016 was a year of unpredicted political outcomes, creating uncertainty for the future direction of the United Kingdom and its relationship with its allies in Europe and abroad. It is too early to make an assessment of the long term effects these changes will have.

UK gross domestic product growth in 2016 increased by 1.8% which was slower than the previous two years, which showed growth of 2.2% and 3.1% respectively <sup>#1</sup>.

Although UK GDP growth continues to be driven by services output, UK manufacturing growth improved in 2016 overall. Growth in the latest calendar year was 0.7%, higher than 2015 (negative 0.2%) and the average rate of calendar year growth in the decade prior to the downturn (0.3%) <sup>#2</sup>.

Overall GDP growth in Quarter 1 (Jan to Mar) 2016 showed the slowest positive quarter growth in 2016 of 0.2% but GDP growth then became steady and consistent. During Quarter 4 2016, the UK experienced the strongest rate of growth among European groupings and G7 countries <sup>#1</sup>.

Following the UK's decision to leave the European Union it appears that there were no immediate changes in the UK's economic growth, as highlighted by the strong Q4 GDP figures quoted above. Also, both the Bank of England and IMF have improved UK GDP growth forecasts for 2017, though projections for 2018 show a reduction in anticipated growth.

The unemployment rate for the UK was 4.7% at the end of 2016, down 0.4% from 5.1% for 2015 and 5.5% for 2014. UK unemployment has not been lower since Q3 1975 <sup>#3</sup>. Early signs in 2017 show this trend is continuing.

Between October to December 2015 and October to December 2016, in nominal terms, total pay increased by 2.6%, lower than the growth rate between September to November 2015 and September to November 2016 (2.8%) <sup>#4</sup>.

UK Public sector net debt (excluding public sector banks) was £1,729.5 Billion at the end of March 2017, equivalent to 86.6% of gross domestic product (GDP); an increase of £123.5 Billion (or 3.0 percentage points as a ratio of GDP) on March 2016 <sup>#7</sup>.

UK Public sector net borrowing (excluding public sector banks) decreased by £20.0 Billion to £52.0 Billion in the financial year ending March 2017 (April 2016 to March 2017), compared with the financial year ending March 2016; this is the lowest net borrowing since the financial year ending March 2008 <sup>#7</sup>.

A general review of 2016 shows a tough start to the year, then followed, in June, by the Brexit referendum outcome, which then resulted in movements in the strength of the pound. This made UK manufactured products more competitive on the global marketplace and we then saw a stronger end to the year.

## Foundry Industry

For the UK foundry industry, 2016 was another challenging year for the majority of UK foundries and proved to be patchy. The non-ferrous sector benefited from the continued growth of the automotive industry which resulted in strong demand levels and increased orders.

However, offshore oil and gas projects have continued to suffer, due to the global economic situation and the continued low price of oil. Aerospace continued its slow pace until the later part of the year where there was a reported increase in orders.

With regard to castings production in 2016 compared with 2015, the estimated output for each material was: -

<b>Grey Iron –</b>	<b>Decrease of 10%</b>
<b>Ductile iron –</b>	<b>Decrease of 10%</b>
<b>Steel –</b>	<b>Decrease of 15%</b>
<b>Light Alloy –</b>	<b>Increase of 12%</b>
<b>Non Ferrous –</b>	<b>Decrease of 5%</b>

At the start of 2016, the export performance was struggling due to a strong pound and increased pressures from cheaper global competitors. However, following Brexit and the market reactions weakening the pound, an increase in new export opportunities with EU and especially with non-EU countries arose in Q4 2016 <sup>#5</sup>.

UK foundries invested in new equipment and increased capabilities to improve their efficiency and competitiveness. The number of UK foundries at the end of 2016 was 420, a reduction of 2 on 2015.

There had been some job losses, and reports of reduced hours as companies looked to retain skilled staff rather than making redundancies.

Foundry salaries and wages increased on average by 3.5% from Dec 2015 to Dec 2016. Overall business costs increased around 10% over 2016, with large increases in the costs of coke and resins as a result of the changes in exchange rates.

Comparing changes in the Producer Prices index, factory gate prices (output prices) rose 0.1% in December and 2.7% on the year to December 2016, which was the sixth consecutive period of annual growth <sup>#8</sup>.

Prices of imported materials and fuels was the largest driver of input price growth, which was largely a result of sterling depreciation and a recovery in global crude oil prices <sup>#8</sup>.

The Producer Price indices for castings in December 2016 were up 3.5% for JV33 (Iron Castings) and up 1.98% for JV3B (Light Alloy Castings) compared to their position in December 2015. These sit either side of the UK general manufacturing ‘factory gate price’ of 2.7%.

**OUTLOOK**

2017 is looking very good so far. UK foundries are reporting increased orders both domestically and for export. In some cases, our members have reported the best Q1 order book in living memory. There are still some areas struggling however. Steel sector in particular continues to find market conditions tough.

Suppliers into the Oil & Gas industry are yet to see an improvement in orders, though there has been some positive news with new reserves located in the North Sea, and investments made in North Sea infrastructure.

Aerospace, Defence and Construction seem to be improving, as customers who have been delaying or postponing large projects seem to be deciding that now is the time to proceed.

The Automotive sector has continued its strong performance, with UK car production hitting 1.7 million vehicles in 2016 (+8.5%), which was a 17 year high <sup>#6</sup>. There is some uncertainty following Brexit over long term effects as around 80% of UK produced cars are exported, but so far most British based OEM’s are sounding positive.

The weaker pound is making exports easier, but is leading to a rise in the costs of certain raw materials. The ongoing uncertainty of the future trading relations between the UK and its various allies in Europe and worldwide does not seem to have affected the UK’s confidence in the short term.

Some major investments have been announced in Q1 2017 at several foundries, and there is a feeling that after what has been a tough 10 years, UK foundries are well positioned and prepared to weather the upcoming challenges and make the most of new opportunities.

The UK industry is feeling positive currently, enjoying some favourable trading conditions in most markets that seems to be progressing with new orders and growth. But the UK is aware that market conditions will be changing in the near future and the outcomes of these changes are far from certain.

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\* \* \* \* \*



## **TABLES**



**IRON, DUCTILE IRON AND STEEL CASTINGS**



**Table 1**

Total production in 1000 t - Iron, Steel and Malleable iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	150,0	152,7	155,4	155,9	154,8	0,3	-0,7
Belgium	74,4	71,4	76,5	71,6	51,5	-6,4	-28,1
Croatia	41,3	42,8	43,5		42,9		
Czech Rep.	336,7	328,0	293,5 a)	289,0 a)	270,8 a)	-1,5	-6,3
Denmark		76,2	78,9	77,9	72,8	-1,2	-6,5
Finland	78,6	70,1	63,3	59,0	57,9	-6,7	-1,9
France	1.436,4	1.419,2	1.393,6	1.328,5	1.263,7	-4,7	-4,9
Germany d)	4.267,4	4.122,7	4.150,9	4.120,4	3.919,0	-0,7	-4,9
Hungary	52,6	69,0	86,6	92,1	83,4	6,3	-9,4
Italy	1.115,4 b)	1.146,3 b)	1.164,0 b)	1.130,7 b)	1.152,4 b)	-2,9	1,9
Lithuania							
The Netherlands							
Norway	52,8	53,3	40,1	33,7	30,1	-15,9	-10,7
Poland	688,0	700,0	700,0 a)	709,0 a)	696,0 a)	1,3	-1,8
Portugal	116,9	108,3	121,5	137,9	131,5	13,5	-4,6
Slovenia	159,0	143,8	153,1		202,6		
Spain	985,5	976,3	1.006,2	1.065,6	1.116,9	5,9	4,8
Sweden	228,4	228,3	231,6	261,2	230,3	12,8	-11,8
Switzerland	47,8	47,3	45,1	38,1	59,1	-15,4	54,9
Turkey	1.260,0	1.243,0	1.400,0	1.470,0	1.471,0	5,0	0,1
United Kingdom	396,3	363,1	371,2	387,3	345,0	4,3	-10,9
<b>Total CAEF</b>	<b>11.487,4</b>	<b>11.361,7</b>	<b>11.574,9</b>	<b>11.428,0</b>	<b>11.351,7</b>		
Romania	60,1	44,7	44,8	40,8			
Russia	3.827,0 c)	3.500,0	3.738,0				
Slovakia							
Ukraine	1.130,0	985,0	1.130,0				

a) estimated

b) without investment castings

c) 2011

**Table 2**

Production value in Mio. € (a) - Iron, Steel and Malleable iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	438,7	465,0	479,7	390,8	395,3	-18,5	1,1
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	223,3	204,5	191,1	184,9	160,4	-3,3	-13,2
France	3.206,0	3.102,0	2.871,0	2.584,0	2.710,0	-10,0	4,9
Germany	7.678,3 b)	7.268,6 b)	7.224,8 b)	6.985,3 b)	6.638,1 b)	-3,3	-5,0
Hungary		186,0	190,0	220,0	212,0	15,8	-3,6
Italy	2.600,0	2.500,0	2.560,0	2.540,0	2.447,0	-0,8	-3,7
Lithuania							
The Netherlands							
Norway	190,0	191,0	141,0	76,0	56,8	-46,1	-25,3
Poland							
Portugal	211,8	197,7	222,7	263,1	255,0	18,2	-3,1
Slovenia							
Spain	1.795,0	1.728,0	1.832,0	1.862,0	1.884,0	1,6	1,2
Sweden							
Switzerland							
Turkey	1.772,0	1.792,0	2.010,0	1.985,5	1.961,3	-1,2	-1,2
United Kingdom					1.770,0 c)		
<b>Total</b>							

a) rate of exchange: Ø 2016 or fixed

b) revised figures: foundries &gt;50 employees, turnover

c) using exchange rate 1£ -1.18€

**Table 3**

Number of foundries (Production units) - Iron, Steel and Malleable iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	29	28	28	27	23	-3,6	-14,8
Belgium	18	18	16	16	15	0,0	-6,3
Croatia	33	32	32		32		
Czech Rep.			81	90	71	11,1	-21,1
Denmark		9	8	8	8	0,0	0,0
Finland	20	19	19	19	17	0,0	-10,5
France	129	125	124	121	120	-2,4	-0,8
Germany	265	258	254	248	242	-2,4	-2,4
Hungary	26	28	28	28	28	0,0	0,0
Italy	178 a)	174 a)	174 a)	174 a)	189 b)c)	0,0	8,6
Lithuania							
The Netherlands							
Norway	10	10	9	8	9	-11,1	12,5
Poland		233	216	216	216	0,0	0,0
Portugal	38	38	37	31	31	-16,2	0,0
Slovenia	15	15	15		11		
Spain	79	78	76	75	74	-1,3	-1,3
Sweden	47	47		40	39		-2,5
Switzerland				15	17		13,3
Turkey	674	672	561	550	544	-2,0	-1,1
United Kingdom	224	221	219	217	216	-0,9	-0,5
<b>Total</b>	<b>1.785</b>	<b>2.005</b>	<b>1.897</b>	<b>1.883</b>	<b>1.902</b>		

a) without 17 companies active in investment casting

b) including investment casting

c) revised data, employment statistics register

**Table 4**

Employment in the foundry industry - Iron, Steel and Malleables iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	3.125	3.124	3.222	3.200	2.905	-0,7	-9,2
Belgium	1.368 b)	1.319 b)	1.147 b)	1.066 b)	1.066 b)	-7,1	0,0
Croatia	2.196	2.214	2.216				
Czech Rep.			18.000 d)	10.000 d)	11.000	-44,4	10,0
Denmark			1.205		914		
Finland	1.891	1.602	1.428	1.354	1.242	-5,2	-8,3
France	15.749	15.120	14.671	13.994	13.300	-4,6	-5,0
Germany	45.358 a)	44.191 a)	44.584 a)	43.969 a)	41.992 a)	-1,4	-4,5
Hungary	1.760	1.710	1.460	2.170	1.980	48,6	-8,8
Italy	13.533 c)	13.476 c)	13.603 c)	13.548 c)	14.047 e)g)	-0,4	3,7
Lithuania							
The Netherlands							
Norway	1.207	1.106	935	783	850	-16,3	8,6
Poland				16.200	16.000		-1,2
Portugal	2.133	2.056	2.133	2.198	2.250	3,0	2,4
Slovenia	1.590	1.180	1.746		1.400		
Spain	11.078	10.832	10.405	10.501	10.980	0,9	4,6
Sweden	3.500	3.500			4.746		
Switzerland				1.198	1.116		-6,8
Turkey	24.180	24.150	23.150	22.630	20.020	-2,2	-11,5
United Kingdom	9.500	9.200	9.100	9.100	15.000 f)	0,0	64,8
<b>Total</b>	<b>138.168</b>	<b>134.780</b>	<b>149.005</b>	<b>151.911</b>	<b>160.808</b>		

a) foundries &gt;50 employees

b) only workmen

c) without investment casting

e) including investment casting

g) revised data, employment statistics register

d) incl. non-ferrous

f) new survey, more accurate figures!

**Table 5**

Direct exports total in 1000 t - Iron, Steel and Malleable iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014		2016 : 2015	
						+/- %			
Austria									
Belgium									
Croatia	25,7	26,8							
Czech Rep.			108,5	190,0			75,2		
Denmark									
Finland	23,3	26,3	21,9	20,0	23,8	-8,7		19,0	
France	508,1	578,4	647,1	620,8	471,4	-4,1		-24,1	
Germany	1.664,4	1.601,0	1.645,4	1.621,9	1.525,7	-1,4		-5,9	
Hungary	43,4	61,4	65,8	72,7	53,8	10,5		-25,9	
Italy	374,8	366,4	391,2	406,4	489,2	3,9		20,4	
Lithuania									
The Netherlands									
Norway	29,6	31,1	14,7	13,9	16,8	-5,5		20,9	
Poland			317,6	323,7	313,6	1,9		-3,1	
Portugal	90,0	89,5	101,9	125,0	121,4	22,7		-2,9	
Slovenia									
Spain	558,3	568,5	575,7	638,2	681,1	10,8		6,7	
Sweden	54,0				47,7				
Switzerland									
Turkey	688,0	701,5	756,5	842,5	813,5	11,4		-3,4	
United Kingdom									
<b>Total</b>	<b>4.059,5</b>	<b>4.051,0</b>	<b>4.646,4</b>	<b>4.875,0</b>	<b>4.558,0</b>				



# **IRON CASTINGS**



**Table 6**

Total production in 1000 t - Iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	39,7	40,8	40,7	40,6	42,4	-0,2	4,2
Belgium	36,5	35,0	34,3	28,7	26,9	-16,2	-6,3
Croatia		33,9	33,4		31,1		
Czech Rep.	179,4	170,0	160,0 a)	170,0 a)	158,0	6,3	-7,1
Denmark		28,4	30,8	30,8	20,4		-33,9
Finland	24,6	19,3	17,2	14,5	15,3	-15,9	5,5
France	657,7 b)	635,4 b)	566,2 b)	504,4 b)	531,5	-10,9	5,4
Germany	2.392,7	2.336,5	2.381,1	2.369,7	2.234,9	-0,5	-5,7
Hungary	49,0	30,9	25,7	23,4	21,7	-8,9	-7,0
Italy	626,4	689,0	702,9	694,1	714,2	-1,2	2,9
Lithuania							
The Netherlands							
Norway	13,4	13,6	11,8	11,3	10,9	-4,1	-3,7
Poland		700,0	489,0 a)	485,3 a)	484,0 a)		-0,3
Portugal	35,0	33,1	33,5	39,8	39,4	18,8	-0,9
Slovenia	100,2	77,5	80,5		139,7		
Spain	328,6	321,3	334,7	348,2	379,9	4,0	9,1
Sweden	153,9	163,0	212,0	242,0	159,6	14,2	-34,0
Switzerland	16,2	15,9	14,9	12,2	35,4	-17,7	189,8
Turkey	610,0	600,0	650,0	675,0	650,0	3,8	-3,7
United Kingdom	128,0	121,0	133,1	139,8	125,8	5,0	-10,0
Total	5.391,3	6.064,7	5.951,6	5.829,8	5.821,0		-0,2

a) estimation

b) incl. malleable castings

**Table 7**

Production value in Mio. € (a) - Iron castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	44,3	37,0	31,9	27,9	28,7	-12,4	2,8
France							
Germany b)	6.382,5 c)	6.028,8 c)	5.982,2 c)	5.785,8 c)	5.541,2	-3,3	-4,2
Hungary							
Italy							
Lithuania							
The Netherlands							
Norway	51,0	51,0	48,0	13,0	10,2	-72,9	-21,5
Poland							
Portugal	54,2	49,1	51,7	61,9	57,6	19,9	-7,1
Slovenia							
Spain b)	1.415,0		1.427,0	1.495,0	1.539,0	4,8	2,9
Sweden							
Switzerland							
Turkey	700,0	710,0	720,0	722,0	675,0	0,3	-6,5
United Kingdom							
Total							

a) rate of exchange: Ø 2016 or fixed

b) incl. nodular and malleable iron castings

c) revised figures: foundries &gt;50 empl., turnover

**Table 8**

Production of iron castings in 1000 t / subdivided by the major customer industries

Country	Year	1	2	3	4	5	6 7		8	Total iron castings
		Pressure pipes and fittings	Drain pipes and fittings	Building and domestic goods	Ingot moulds and bottoms	Rolls	Iron castings for		Any other iron castings	
							Eng. plant and machinery	Vehicle industry		
Austria	2015									40,6
	2016									42,4
	± %									4,2
Belgium	2015									28,7
	2016									26,9
	± %									-6,3
Croatia	2015									
	2016									31,1
	± %									
Czech Rep.	2015									170,0
	2016									158,0
	± %									-7,1
Denmark	2015									30,8
	2016									20,4
	± %									-33,9
Finland	2015			0,4		1,0	4,6	3,5	5,002	14,5
	2016			0,0		1,5	5,3	2,6	5,812	15,3
	± %			-88,3			15,2	-25,7	16	5,5
France c)	2015	a)	a)	75,3			135,9	236,9	56,5	504,4
	2016	a)	a)	77,8			143,9	253,9	55,9	531,5
	± %			3,3			5,9	7,2	-1,0	5,4
Germany	2015	a)	a)		a)	a)	513,0	1.614,0	242,6	2.369,7
	2016						473,4	1.528,8	232,7	2.234,9
	± %						-7,7	-5,3	-4,1	-5,7
Hungary	2015						19,5	2,1	1,7	23,4
	2016									21,7
	± %									-7,0
Italy	2015	b)	b)	41,9	13,4		227,9	333,5	77,4	694,1
	2016	b)	b)	35,7	13,0		327,5	250,4	87,6	714,2
	± %			-14,7	-3,0		43,7	-24,9	13,2	2,9
Lithuania	2015									
	2016									
	± %									
The Netherlands	2015									
	2016									
	± %									
Norway	2015			9,2			0,1		2,0	11,3
	2016			9,0			0,1		1,7	10,9
	± %			-1,6			6,7		-13,7	-3,7
Poland	2015									485,3
	2016									484,0
	± %									-0,3
Portugal	2015		0,9	3,2			2,9	32,2	0,7	39,8
	2016		0,7	2,2			2,0	34,2	0,4	39,4
	± %		-23,8	-31,7			-31,0	6,2	-38,0	-0,9
Slovenia	2015									80,5
	2016									139,7
	± %									73,5
Spain	2015									348,2
	2016									379,9
	± %									9,1
Sweden	2015									242,0
	2016									159,6
	± %									-34,0
Switzerland	2015									12,2
	2016									35,4
	± %									189,8
Turkey	2015	10,0	10,0	60,0	20,0	25,0	250,0	250,0	50,0	675,0
	2016	10,0	10,0	90,0	25,0	15,0	220,0	240,0	40,0	650,0
	± %	0,0	0,0	50,0	25,0	-40,0	-12,0	-4,0	-20,0	-3,7
United Kingdom	2015		14,9	11,3	1,4		37,5	51,0	23,7	139,8
	2016		13,3	10,2	1,3		33,6	46,0	21,4	125,8
	± %		-10,2	-10,1	-10,3		-10,3	-9,8	-9,8	-10,0

a) contained in: Pos. 8

b) contained in: Pos. 3

**Table 9**

Number of foundries (Production units) - Iron castings (incl. nodular and malleable castings)

Country	2012	2013	2014	2015	2016	2015 : 2014		2016 : 2015	
						+/- %			
Austria	25	24	24	23	20	-4,2	-13,0		
Belgium	13	12	11	11	10	0,0	-9,1		
Croatia		26	26		26				
Czech Rep.				63	71				12,7
Denmark		9	8	8	8	0,0	0,0		
Finland	16	14	12	12	11	0,0	-8,3		
France	93	89	88	86	86	-2,3	0,0		
Germany	212	207	203	199	195	-2,0	-2,0		
Hungary	15	16	16	16	28	0,0	75,0		
Italy	152	149	149	149	140 a)	0,0	-6,0		
Lithuania									
The Netherlands									
Norway	7	7	6	5	6	-16,7	20,0		
Poland		185	180	180	185		2,8		
Portugal	31	31	30	23	23	-23,3	0,0		
Slovenia		8	11						
Spain	49	48	46	45	45	-2,2	0,0		
Sweden	34	34		30	27		-10,0		
Switzerland				14	15		7,1		
Turkey	603	603	490	481	439	-1,8	-8,7		
United Kingdom									
<b>Total</b>	<b>1.250</b>	<b>1.462</b>	<b>1.300</b>	<b>1.345</b>	<b>1.335</b>				

a) revised data, employment statistics register

**Table 10**

Employment in the foundry industry - Iron castings (incl. nodular and malleable castings)

Country	2012	2013	2014	2015	2016	2015 : 2014		2016 : 2015	
						+/- %			
Austria									
Belgium	825 b)	786 b)	612 b)	570 b)	570 b)	-6,9	0,0		
Croatia		1.826	1.820		2.125				
Czech Rep.					7.000				
Denmark			1.205		914				
Finland	1.239	1.074	847	778	768	-8,1	-1,3		
France	11.980	11.460	11.231	10.894	10.370	-3,0	-4,8		
Germany	37.498 a)	36.582 a)	36.975 a)	36.530 a)	35.494 a)	-1,2	-2,8		
Hungary									
Italy	10.922	10.862	11.013	10.969	6.984 c)	-0,4	-36,3		
Lithuania									
The Netherlands									
Norway	1.043	943	774	660	743	-14,7	12,6		
Poland				12.600	12.500				
Portugal			1.584	1.584	1.762	0,0	11,2		
Slovenia			1.306						
Spain	8.684	8.482	8.062	8.176	8.585	1,4	5,0		
Sweden	2.500	2.500			3.477				
Switzerland					984				
Turkey	15.500	24.150	16.000	16.000	13.520	0,0	-15,5		
United Kingdom									
<b>Total</b>	<b>90.191</b>	<b>98.665</b>	<b>91.429</b>	<b>98.761</b>	<b>105.796</b>				

a) foundries &gt;50 employees, end of the year

b) only workers

c) revised data, employment statistics register

**Table 11**

Direct exports total in 1000 t - Iron castings (incl. nodular iron castings)

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia		26,7	28,5				
Czech Rep.							
Denmark							
Finland	20,9	24,2	20,7	18,1	22,6	-12,4	24,9
France	477,2 a)	549,1 a)	619,4 a)	602,8 a)	450,8 a)	-2,7	-25,2
Germany	1.575,7	1.515,2 a)	1.562,1 a)	1.544,4 a)	1.450,5 a)	-1,1	-6,1
Hungary	42,2	56,9		71,1	51,7		-27,2
Italy							
Lithuania							
The Netherlands							
Norway	28,0	29,7	13,9	13,5	16,8	-2,8	24,3
Poland		352,7	300,0	307,6	297,0	2,5	-3,4
Portugal	83,9		96,3	118,0	115,7		-1,9
Slovenia							
Spain	501,1 a)	510,6 a)	514,7 a)	548,2 a)	631,7 a)	6,5	15,2
Sweden	50,0				46,9		
Switzerland							
Turkey	595	600	650	750	680	15,4	-9,3
United Kingdom							
<b>Total</b>	<b>3.374,0</b>	<b>3.665,1</b>	<b>3.805,6</b>	<b>3.973,7</b>	<b>3.763,8</b>		

a) incl. malleable iron castings

# **DUCTILE IRON CASTINGS**



**Table 12**

Total production in 1000 t - Ductile iron castings (Nodular and Malleable iron castings)

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	93,0	98,9	97,7	95,5	101,8	-2,3	6,6
Belgium	6,4	5,8	6,7	6,9	7,2	2,6	3,6
Croatia		8,6	10,0		11,8		
Czech Rep.	61,0	60,0 a)	58,5 a)	59,0 a)	51,8	0,9	-12,2
Denmark		47,7	48,1	47,1	52,5	-2,0	11,4
Finland	38,4	37,0	33,1	32,1	33,5	-3,2	4,6
France	675,7	703,1	745,2	761,2	675,2	2,2	-11,3
Germany	1.676,3	1.572,0	1.563,6	1.560,1	1.509,9	-0,2	-3,2
Hungary	31,0	33,1	48,8	63,0	57,9	29,1	-8,0
Italy	416,8	387,6	389,9	374,6	381,2	-3,9	1,8
Lithuania							
The Netherlands							
Norway	36,4	37,2	25,9	21,2	19,2	-18,2	-9,3
Poland		156,0 a)	156,0 a)	173,9 a)	166,2 a)		-4,4
Portugal	73,9	67,6	80,7	90,0	93,4	11,4	3,8
Slovenia	24,9	34,9	34,2		31,0		
Spain	580,7	579,7	583,5	644,8	671,4	10,5	4,1
Sweden	51,1	44,9			49,5		
Switzerland	29,7	29,6	28,6	24,7	22,8	-13,6	-7,8
Turkey	510,0	508,0	610,0	645,0	655,0	5,7	1,6
United Kingdom	194,3	178,1	190,1	199,6	178,5	5,0	-10,5
<b>Total</b>	<b>4.499,7</b>	<b>4.589,9</b>	<b>4.710,7</b>	<b>4.798,6</b>	<b>4.769,6</b>		

a) incl. malleable iron castings

b) estimated

**Table 13**

Production value in Mio. € (a) - Ductile iron castings (Nodular and Malleable iron castings)

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	86,3	82,1	73,9	71,4	70,1	-3,4	-1,8
France							
Germany	b)	b)	b)	b)	b)		
Hungary							
Italy							
Lithuania							
The Netherlands							
Norway	105,0	106,0	68,0	53,0	46,6	-22,1	-12,1
Poland							
Portugal	109,6	100,9	120,9	147,6	152,3	22,1	3,1
Slovenia	b)	b)	b)	b)	b)		
Spain	b)	b)	b)	b)	b)		
Sweden							
Switzerland							
Turkey	690,0	700,0	850,0	860,0	885,0	1,2	2,9
United Kingdom							
<b>Total</b>							

a) rate of exchange: Ø 2016 or fixed

b) contained in: Tab. 7

Table 14

Production of Ductile iron castings (Nodular and Malleable iron castings) in 1000 t / subdivided by the major customer ind

Country	Year	1	2	3	4	Total nodular iron castings
		Pressure pipes and fittings	Nodular iron castings for:		Any other nodular iron castings	
			Eng. plant and machinery	Vehicle industry		
Austria	2015					95,5
	2016					101,8
	± %					6,6
Belgium	2015					6,9
	2016					7,2
	± %					3,6
Croatia	2015					
	2016					11,8
	± %					
Czech Rep.	2015					55,0
	2016					51,8
	± %					-5,8
Denmark	2015					47,1
	2016					52,5
	± %					11,4
Finland	2015		17,6	10,6	3,86	32,1
	2016		18,5	13,4	1,65	33,5
	± %		5,1	26,5	-57,3	4,6
France	2015	a)	22,7	193,4	545,2	761,2
	2016	a)	20,8	199,0	455,4	675,2
	± %		-8,7	2,9	-16,5	-11,3
Germany b)	2015	a)	470,3	639,5	411,7	1.521,5
	2016	a)	476,5	626,8	406,6	1.509,9
	± %		1,3	-2,0	-1,2	-0,8
Hungary	2015					63,0
	2016					57,9
	± %					-8,0
Italy	2015	47,7	194,4	117,1	15,4	374,6 b)
	2016	45,7 c)	195,1	125,3	15,2	381,2 b)
	± %	-4,2	0,3	7,0	-1,3	1,8
Lithuania	2015					
	2016					
	± %					
The Netherlands	2015					
	2016					
	± %					
Norway	2015		3,3		17,9	21,2
	2016		1,9		17,4	19,2
	± %		-43,8		-2,9	-9,3
Poland	2015					162,2
	2016					166,2
	± %					2,5
Portugal	2015	6,3	1,8	80,9	0,9	90,0
	2016	6,5	2,4	83,8	0,6	93,4
	± %	1,9	33,4	3,6	-27,6	3,8
Slovenia	2015					
	2016					31,0
	± %					
Spain	2015					637,4
	2016					671,4
	± %					34,2
Sweden	2015					
	2016					49,5
	± %					
Switzerland	2015					24,7
	2016					22,8
	± %					-7,8
Turkey	2015	110,0	150,0	315,0	55,0	630,0
	2016	79,0	183,0	332,0	61,0	655,0
	± %	-28,2	22,0	5,4	10,9	4,0
United Kingdom	2015	7,0	50,8	96,4	44,2	198,5
	2016	6,2	45,7	86,8	39,8	178,5
	± %	-11,1	-10,1	-10,0	-10,0	-10,1

a) contained in: Pos. 4

b) incl. malleable iron castings

c) total building industry

# **STEEL CASTINGS**



**Table 15**

Total production in 1000 t - Steel castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	17,3		16,9	9,5	11,3		18,7
Belgium	31,5	30,6	35,5	36,0	17,4	1,4	-51,6
Croatia		0,2	0,1		0,05		
Czech Rep.	94,9	95,0 a)	75,0	60,0	61,0	-20,0	1,7
Denmark							
Finland	15,6	13,9	13,0	12,5	8,4	-3,4	-32,7
France	102,2	80,7	82,3	62,8	57,0	-23,7	-9,1
Germany	215,4	214,2	206,3	190,6	174,2	-7,6	-8,6
Hungary	3,5	5,0	12,1	5,7	3,8	-53,0	-33,8
Italy	72,2	69,7	71,2	62,0	57,0	-12,9	-8,1
Lithuania							
The Netherlands							
Norway	3,0	2,5	2,4	1,2		-48,8	
Poland		55,0 a)	55,0 a)	49,9 a)	50,5 a)	-9,4	1,3
Portugal	8,0	7,6	7,3	8,1	7,8	11,8	-4,3
Slovenia	33,9	31,4	38,4		32,0		
Spain	76,1	75,3	82,4	72,6	65,6	-11,9	-9,7
Sweden	23,4	20,4	19,6	19,2	21,215	-2,0	10,5
Switzerland	2,0	1,8	1,7	1,2	1,1	-26,2	-13,8
Turkey	140,0	135,0	140,0	150,0	166,0	7,1	10,7
United Kingdom	74,0	64,0	48,0	48,0	40,7	0,0	-15,2
<b>Total</b>	<b>913,0</b>	<b>902,1</b>	<b>907,0</b>	<b>789,3</b>	<b>775,0</b>		<b>-1,8</b>

a) estimated

**Table 16**

Production value in Mio. € (a) - Steel castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	92,7	85,4	85,3	85,5	60,7	0,3	-29,1
France							
Germany	1.295,8 b)	1.239,8 b)	1.242,6 b)	1.199,4 b)	1.090,6 b)	-3,5	-9,1
Hungary							
Italy							
Lithuania							
The Netherlands							
Norway	34,0	34,0	25,0	10,0		-60,0	
Poland							
Portugal		47,8	50,1	53,5	54,0	6,9	0,9
Slovenia							
Spain	380,0	345,0	405,0	367,0	345,0	-9,4	-6,0
Sweden							
Switzerland							
Turkey	350,0	350,0	400,0	345,0	401,3	-13,8	16,3
United Kingdom							
<b>Total</b>							

a) rate of exchange: Ø 2016 or fixed

b) revised figures :foundries &gt;50 employees, turnover

Table 17

Production of steel castings in 1000 t / subdivided by the major customer industries

Country	Year	1	2	3	4	Total steel castings
		Steel castings castings for:		Steel castings for railways, locomotives, carriages, wagons and trams	Any other steel castings	
		Eng. plant and machinery	Vehicle industry			
Austria	2015					11,3
	2016					-100,0
	± %					
Belgium	2015					36,0
	2016					17,4
	± %					-51,6
Croatia	2015					0,05
	2016					
	± %					
Czech Rep.	2015					60,0
	2016					61,0
	± %					1,7
Denmark	2015					
	2016					
	± %					
Finland	2015	3,9	1,003	0,002	7,6	12,5
	2016	3,2	0,065		5,2	8,4
	± %	-19,6	-93,5		-31,4	-32,7
France	2015	39,7	3,9	18,1	1,1	62,8
	2016	35,7	3,8	17,0	0,6	57,0
	± %	-10,1	-3,6	-6,3	-43,1	-9,1
Germany	2015	52,6	12,7		125,4	190,6
	2016	39,6	12,3		122,3	174,2
	± %	-24,6	-3,0		-2,5	-8,6
Hungary	2015					5,7
	2016					3,8
	± %					-33,8
Italy	2015	9,4	2,9	1,4	48,4 c)	62,0
	2016	8,6	2,9	1,3	44,1 c)	57,0
	± %					-8,1
Lithuania	2015					
	2016					
	± %					
The Netherlands	2015					
	2016					
	± %					
Norway	2015	0,7			0,5	1,2
	2016					
	± %					
Poland	2015					49,9
	2016					50,5
	± %					1,3
Portugal	2015	6,1	0,3	0,7	1,0	8,1
	2016	2,8	0,2	0,4	4,4	7,8
	± %	-54,5	-41,5	-46,1	331,4	-4,3
Slovenia	2015					32,0
	2016					
	± %					
Spain	2015					72,6
	2016					65,6
	± %					-9,7
Sweden	2015					19,2
	2016					21,2
	± %					10,5
Switzerland	2015					1,2
	2016					1,1
	± %					-13,8
Turkey	2015	80,0	25,0	30,0	15,0	150,0
	2016	65,5	18,0	20,0	62,5	166,0
	± %	-18,1	-28,0	-33,3	316,7	10,7
United Kingdom	2015					48,0
	2016					40,7
	± %					-15,2

a) included in position 2 vehicle industry

b) estimated

c) incl. mining industry, building and domestic goods and steel industry

**Table 18**

Number of foundries (Production units) - Steel castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	4	4	4	4	3	0,0	-25,0
Belgium	6	6	5	5	5	0,0	0,0
Croatia		5	5		5		
Czech Rep.				27			
Denmark							
Finland	7	9	7	7	7	0,0	0,0
France	36	36	36	35	34	-2,8	-2,9
Germany	53	51	51	49	46	-3,9	-6,1
Hungary	10	11	11	11	9	0,0	-18,2
Italy	26	25	25	25	37 a)	0,0	48,0
Lithuania							
The Netherlands							
Norway	3	3	3	3	3	0,0	0,0
Poland		48	36	36	36	0,0	0,0
Portugal	7	7	7	8	8	14,3	0,0
Slovenia		2	3				
Spain	30	30	30	30	29	0,0	-3,3
Sweden	13	13		10	12		20,0
Switzerland				2	2		0,0
Turkey	68	66	68	66	105	-2,9	59,1
United Kingdom							
<b>Total</b>	<b>263</b>	<b>316</b>	<b>291</b>	<b>318</b>	<b>341</b>		

a) revised data, employment statistics register

**Table 19**

Number of persons employed total - Steel castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium	543 a)	533	535		496		
Croatia		168	168		168		
Czech Rep.							
Denmark							
Finland	652	528	581	576	474	-0,9	-17,7
France	3.769	3.660	3.440	3.100	3.050	-9,9	-1,6
Germany	7.652 b)	7.694 b)	7.728 b)	7.630 b)	6.960 b)	-1,3	-8,8
Hungary							
Italy	2.611	2.614	2.590	2.580	2.369 c)	-0,4	-8,2
Lithuania							
The Netherlands							
Norway	164	163	161	123	107	-23,6	-13,0
Poland				3.600	3.500		-2,8
Portugal			549	614	619	11,8	0,8
Slovenia			440				
Spain	2.394	2.350	2.343	2.325	2.395	-0,8	3,0
Sweden	1.000	1.000			1.269		
Switzerland					132		
Turkey	8.500	8.000	7.000	6.500	6.500	-7,1	0,0
United Kingdom							
<b>Total</b>	<b>27.285</b>	<b>26.710</b>	<b>25.535</b>	<b>27.048</b>	<b>28.039</b>		

a) only workmen

b) foundries &gt;50 empl.

c) revised data, employment statistics register

**Table 20**

Direct exports total in 1000 t - Steel castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia		0,06	0,05				
Czech Rep.							
Denmark							
Finland	2,4	2,1	1,2	1,8	1,1	58,3	-39,5
France	30,9	29,2	27,7	18,0	20,6	-35,0	14,0
Germany	86,2	85,8	83,3	77,5	75,2	-7,0	-3,0
Hungary	1,2			1,6	2,1		31,1
Italy							
Lithuania							
The Netherlands							
Norway	1,6	1,4	0,8	0,4		-53,4	
Poland			16,5	15,0	15,7	-9,4	5,0
Portugal	6,1	6,0	5,6	7,0	5,7	25,0	-18,7
Slovenia							
Spain	57,2	58,0	61,1	54,0	49,4	-11,6	-8,5
Sweden	4,0				0,9		
Switzerland							
Turkey	88	96	100	115	125,5	15,0	9,1
United Kingdom							
<b>Total</b>	<b>277,7</b>	<b>278,6</b>	<b>296,2</b>	<b>290,3</b>	<b>296,1</b>		

# **NON-FERROUS METAL CASTINGS**



**Table 21**

Total production in 1000 t - Non-ferrous metal castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	142,4	131,6	138,0	140,7	147,1	2,0	4,5
Belgium	0,8	1,7	1,9	2,2	0,8	18,4	-64,9
Croatia	13,0	20,0	22,3				
Czech Rep.	92,0	95,0 a)	108,0 a)	116,0 a)	119,0 a)	7,4	2,6
Denmark		4,1	4,0	4,3	3,9	9,9	-10,4
Finland	6,9	7,6	7,1	8,0	4,8	12,9	-39,4
France	362,3	328,9	335,8	356,9	362,2	6,3	1,5
Germany	988,2 c)	1.007,1 c)	1.134,2 c)	1.221,3	1.248,8	7,7	2,3
Hungary	102,6	104,6	108,2	112,4	123,3	3,9	9,7
Italy	844,3	825,4	860,9	900,5	934,0	4,6	3,7
Lithuania							
The Netherlands							
Norway	5,6 b)	6,5 b)	6,6 b)	7,2 b)	6,4 b)	10,0	-11,7
Poland	348,0	358,0	358,0 a)	353,0 a)	348,8 a)	-1,4	-1,2
Portugal	29,2	30,6	34,9	45,4	48,7	30,1	7,2
Slovenia	33,4	38,8	44,9		52,1		
Spain	133,4	131,3	135,6	146,0	163,5	7,6	12,0
Sweden	55,0	56,9	58,2	62,6	61,5	7,6	-1,7
Switzerland	21,6	19,1	20,4	18,1	16,2	-11,4	-10,4
Turkey	185,0	300,0	300,0	380,0	427,5	26,7	12,5
United Kingdom	124,0	123,1	131,0	131,0	141,7	0,0	8,1
Total CAEF	3.487,4	3.590,2	3.809,9	4.005,6	4.210,2		
Romania	51,8	58,3	63,5	88,2			
Russia	473,0	600,0	462,0				
Slovakia	46,0 d)						
Ukraine	402,0	380,0	430,0				

a) estimated  
b) without copper (only 2 foundries = no data collection)  
c) revised figures  
d) 2011

**Table 22**

Production value in Mio. € (a) - Non-ferrous metal castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	893,9	876,0	938,2	991,3	997,5	5,7	0,6
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	64,1	83,5	76,4	60,8	55,9	-20,5	-8,0
France	2.552,0	2.673,0	2.706,0	2.805,0	2.707,0	3,7	-3,5
Germany d)	5.083,4 c)	5.117,3 c)	5.488,9 c)	5.743,5	5.770,4	4,6	0,5
Hungary	216,0	284,0	304,0	370,0	387,0	21,7	4,6
Italy	4.150,0	3.950,0	4.160,0	4.460,0	4.431,0	7,2	-0,7
Lithuania							
The Netherlands							
Norway	42,0 b)	44,0 b)	43,0 b)	63,0 b)	61,0 b)	46,5	-3,2
Poland							
Portugal	284,0		243,7	291,5	315,0	19,6	8,1
Slovenia							
Spain	763,0	750,0	763,0	853,0	896,0	11,8	5,0
Sweden							
Switzerland							
Turkey	897,0	1.420,0	1.575,0	1.730,0	1.995,0	9,8	15,3
United Kingdom					826,0 e)		
Total							

a) rate of exchange: Ø 2016 or fixed  
b) without copper (only 2 foundries = no data collection)  
c) revised figures  
d) foundries >50 employees, turnover  
e) using exchange rate 1£ -1.18€

**Table 23**

Number of foundries (Production units) - Non-ferrous metal castings

Country	Total		thereof:					
			Pressure die casting		Other Light casting		Other Heavy metal alloy casting	
	2015	2016	2015	2016	2015	2016	2015	2016
Austria	35	35						
Belgium	6	6						
Croatia								
Czech Rep.	41	37						
Denmark	7	7						
Finland	14	13						
France	292	291						
Germany	340	340						
Hungary	87	87						
Italy	911	878						
Lithuania								
The Netherlands								
Norway	6	6						
Poland	240	240						
Portugal a)	57	57						
Slovenia		46						
Spain	53	52						
Sweden	60	59						
Switzerland	29	30						
Turkey	350	383						
United Kingdom	205	204						
Total	2.733	2.771						

a) One new foundry in 2015:

Remaining difference concerns to already existing foundries, added to the census in 2015

**Table 24**

Employment in the foundry industry - Non-ferrous metal castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	3.960	4.030	4.159	3.399	3.923	-18,3	15,4
Belgium	282 a)	276	258	262	262	1,6	0,0
Croatia		1.540	1.545				
Czech Rep.				6.000	4.000		-33,3
Denmark					408		
Finland	441	450	447	376	330	-15,9	-12,2
France	12.780	12.013	11.900	11.800	12.000	-0,8	1,7
Germany	32.144 b)	32.765 b)	34.201 b)	34.897 b)	35.255 b)	2,0	1,0
Hungary	3.360	4.034	4.870	5.190	5.490	6,6	5,8
Italy	14.563	14.330	14.428	15.092	15.100	4,6	0,1
Lithuania							
The Netherlands							
Norway	278	346	423	447	452	5,7	1,1
Poland				8.000	8.300		
Portugal	1.102	1.625	1.724	2.356	2.300	36,7	-2,4
Slovenia	2.667	2.200	2.243		2.500		
Spain	4.568	4.645	4.810	4.862	5.027	1,1	3,4
Sweden	2.700	2.700			3.157		
Switzerland				1.239	1.297		4,7
Turkey	9.000	14.000	10.000	10.000	14.000	0,0	40,0
United Kingdom	9.000	8.800	8.900	8.900	14.000 c)	0,0	57,3
Total	96.845	103.754	99.908	112.820	127.801		

a) only workmen

b) foundries &gt; 50 empl.

c) new survey, more accurate figures!

# **COPPER ALLOY CASTINGS**



**Table 25**

Total production in t - Copper alloy castings

Country	2012	2013	2014	2015	2016	2015 : 2014		2016 : 2015	
Austria									
Belgium									
Croatia		164	183		221				
Czech Rep.	14.506 c)	14.000 ac)	18.000 ac)	21.000 ac)	20.000 ac)	16,7	-4,8		
Denmark		1.094	1.099	1.055	779	-4,0	-26,2		
Finland	3.008	4.346	3.953	3.903	2.630	-1,3	-32,6		
France	17.688	17.618	17.864	18.344	17.724	2,7	-3,4		
Germany	76.640	68.523	72.064	79.403	78.471	10,2	-1,2		
Hungary	1.745	2.333	2.175	1.796	1.681	-17,4	-6,4		
Italy	62.727	63.122	65.855	63.752	66.081	-3,2	3,7		
Lithuania									
The Netherlands									
Norway	b)	b)	b)	b)	b)				
Poland		6.000 a)	6.000 a)	6.950 a)	6.100	15,8	-12,2		
Portugal	9.206	9.502	10.464	14.152	15.967	35,2	12,8		
Slovenia	1.052	598	754		947				
Spain	11.760	11.756	10.176	10.876	15.098	6,9	38,8		
Sweden	10.300	10.300			6.934				
Switzerland	2.347	2.334	2.090	2.068	2.308	-1,1	11,6		
Turkey	14.000	14.000	19.000	20.000	22.500	5,3	12,5		
United Kingdom	10.000	9.200	8.832	8.832	8.500	0,0	-3,8		
<b>Total</b>	<b>234.978</b>	<b>234.889</b>	<b>238.509</b>	<b>252.131</b>	<b>265.941</b>				

a) estimated

b) only 2 foundries = no data collection

c) copper and zinc

**Table 26**

Production value in Mio. € (a) - Copper alloy castings

Country	2012	2013	2014	2015	2016	2015 : 2014		2016 : 2015	
Austria									
Belgium									
Croatia									
Czech Rep.									
Denmark									
Finland	22,7	44,0	41,4	30,7	27,2	-25,9	-11,5		
France									
Germany	757,7 b)	760,0 b)	795,1 b)	869,3 b)	863,7 b)	9,3	-0,6		
Hungary									
Italy									
Lithuania									
The Netherlands									
Norway									
Poland									
Portugal	160,9		102,2	107,7	114,7	5,4	6,5		
Slovenia									
Spain									
Sweden									
Switzerland									
Turkey	122,0	116,0	150,0	150,0	170,0	0,0	13,3		
United Kingdom									
<b>Total</b>									

a) rate of exchange: Ø 2016 or fixed

b) copper and zinc, revised figures: foundries &gt;50 employees, turnover

Table 27

Copper alloy castings in t

Country	Year	Total Production	thereof:									
			Sandcast and Gravity die castings	thereof:				Pressure die casting Messing Laiton Brass	general engineering	automotive industry	other	
				Copper	Aluminium Bronze	other Bronzes	Brass					
Austria	2015											
	2016											
	± %											
Belgium	2015											
	2016											
	± %											
Croatia	2015											
	2016	221,0										
	± %											
Czech Rep. C)	2015	21.000										
	2016	20.000										
	± %	-4,8										
Denmark	2015	1.055										
	2016	779										
	± %	-26,2										
Finland	2015	3.903	3.903		1.449	1.380	1.074		3.903			
	2016	2.630	2.630		504	1.158	968		2.630			
	± %	-32,6	-32,6		-65,2	-16,1	-9,9		-32,6			
France	2015	18.344										
	2016	17.724										
	± %	-3,4										
Germany	2015	79.403	39.871						177	19	79.207	
	2016	78.471	38.399						150	16	78.305	
	± %	-1,2	-3,7						-15,3	-12,2	-1,1	
Hungary	2015	1.796										
	2016	1.681										
	± %	-6,4										
Italy	2015	63.752			63.752							
	2016	66.081										
	± %	3,7										
Lithuania	2015											
	2016											
	± %											
The Netherlands	2015											
	2016											
	± %											
Norway	2015		a)									
	2016		a)									
	± %											
Poland	2015	6.950	b)									
	2016	6.100										
	± %	-12,2										
Portugal	2015	14.152			2.200	260	9.692		2.000			
	2016	15.967			2.000	260	11.707		2.000			
	± %	12,8			-9,1		20,8		0,0			
Slovenia	2015											
	2016	947										
	± %											
Spain	2015	10.876										
	2016	15.098										
	± %	38,8										
Sweden	2015											
	2016	6.934	3.562					3.372				
	± %											
Switzerland	2015	2.068	2.068									
	2016	2.308	2.308									
	± %	11,6										
Turkey	2015	20.000	12.500	3.000	3.000	1.000	5.500	3.500	3.000	1.000		
	2016	22.500	12.000	3.500	2.500	1.000	5.000	4.000	4.500	2.000		
	± %	12,5	-4,0	16,7	-16,7	0,0	-9,1	14,3	50,0	100,0		
United Kingdom	2015	8.832										
	2016	8.500										
	± %	-3,8										

a) only 2 foundries = no data collection

b) estimated

c) copper and zinc

# **LIGHT AND ULTRALIGHT CASTINGS**



**Table 28**

Total production in t - Light and ultralight castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	129.552	131.586	138.029	140.749	147.096	2,0	4,5
Belgium	790	646	742	878	783	18,3	-10,8
Croatia		19.781	22.075		25.174		
Czech Rep.	77.457	81.000 a)	90.000 a)	95.000 a)	98.000 a)	5,6	3,2
Denmark		2.853	2.756	3.086	3.117	12,0	1,0
Finland	3.619	2.966	2.854	2.240	2.114	-21,5	-5,6
France	324.509	290.721	297.117	316.931	324.102	6,7	2,3
Germany	863.244	883.468 b)	1.008.795 b)	1.087.211 b)	1.114.105	7,8	2,5
Hungary	96.327	98.291	102.388	106.873	118.637	4,4	11,0
Italy	724.003	702.426	730.338	767.815	790.075	5,1	2,9
Lithuania							
The Netherlands							
Norway	5.575	6.474	6.562	7.221	6.373	10,0	-11,7
Poland		340.000 a)	340.000 a)	334.600 a)	331.500	-1,6	-0,9
Portugal	18.940	20.014	23.169	29.150	32.382	25,8	11,1
Slovenia	30.065	35.521	37.244		47.610		
Spain	112.384	110.601	116.374	125.652	138.591	8,0	10,3
Sweden	40.400	40.100			46.053		
Switzerland	17.970	15.646	17.120	14.922	12.902	-12,8	-13,5
Turkey	157.000	270.000	300.000	325.000	370.000	8,3	13,8
United Kingdom	104.500	105.000	113.400	113.400	126.200	0,0	11,3
<b>Total</b>	<b>2.706.335</b>	<b>3.157.094</b>	<b>3.348.963</b>	<b>3.470.728</b>	<b>3.734.814</b>		

a) estimated

b) revised

**Table 29**

Production value in Mio. € (a) - Light and ultralight castings

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	39,6	37,6	33,3	28,7	25,9	-13,8	-9,7
France							
Germany b)	4.325,6	4.357,4	4.693,8	4.874,2	4.901,2	3,8	0,6
Hungary							
Italy							
Lithuania							
The Netherlands							
Norway	42,0	44,0	43,0	63,0	61,0	46,5	-3,2
Poland							
Portugal	115,0		131,8	167,6	185,5	27,2	10,6
Slovenia							
Spain							
Sweden							
Switzerland							
Turkey	720,0	1.240,0	1.300,0	1.450,0	1.700,0	11,5	17,2
United Kingdom							
<b>Total</b>							

a) rate of exchange: Ø 2016 or fixed

b) revised figures: foundries &gt;50 employees, turnover

Table 30

Light and ultralight castings in t

Country	Year	Total Production	thereof:						general engineering	automotive industry	other
			Aluminium			Magnesium					
			Sandcast and gravity die castings	Pressure die casting	Total	Sandcast and gravity die cast.	Pressure die casting	Total			
Austria	2015	140.749	69.894	64.219	134.113						
	2016	147.096	71.233	69.607	140.840						
	± %	4,5	1,9	8,4	5,0						
Belgium	2015	878									
	2016	783									
	± %	-10,8									
Croatia	2015										
	2016	25.174	2.480	22.694	25.174						
	± %										
Czech Rep.	2015	95.000									
	2016	98.000									
	± %	3,2									
Denmark	2015	3.086									
	2016	3.117									
	± %	1,0									
Finland	2015	2.240	1.098	1.142	2.240			1.740	500		
	2016	2.114	966	1.148	2.114			1.714	400		
	± %	-5,6	-12,0	0,5	-5,6						
France	2015	316.931									
	2016	324.102									
	± %	2,3									
Germany	2015	1.087.211	443.127	621.058	1.071.975	15.235	15.235	6.800	978.766	101.626	
	2016	1.114.105	454.776	631.456	1.096.707	17.398	17.398	7.268	1.058.394	48.422	
	± %	2,5	2,6	1,7	2,3	14,2	14,2	6,9	8,1	-52,4	
Hungary	2015	106.873	50.089	56.406	106.495						
	2016	118.637	66.500	51.746	118.246						
	± %	11,0	32,8	-8,3	11,0						
Italy	2015	767.815			760.521						
	2016	790.075			782.691						
	± %	2,9			2,9						
Lithuania	2015										
	2016										
	± %										
The Netherlands	2015										
	2016										
	± %										
Norway	2015	7.221	7.158	63	7.221						
	2016	6.373	6.296	77	6.373						
	± %	-11,7	-12,0		-11,7						
Poland	2015	334.600			334.600						
	2016	331.500									
	± %	-0,9									
Portugal	2015	29.150	1.387	27.763	29.150						
	2016	32.382	1.453	30.929	32.382						
	± %	11,1	4,8	11,4	11,1						
Slovenia	2015										
	2016	47.610									
	± %										
Spain	2015	125.652									
	2016	138.591									
	± %	10,3									
Sweden	2015										
	2016	46.053	5.597	37.485	43.089	1.482	1.482				
	± %										
Switzerland	2015	17.120	4.779 d)	12.341 d)	17.120						
	2016	12.902	2.625 d)	10.277 d)	12.902						
	± %	-24,6	-45,1	-16,7	-24,6						
Turkey	2015	325.000,0	191.000	134.000	325.000						
	2016	370.000,0	200.000	170.000	370.000						
	± %	13,8	4,7	26,9	13,8						
United Kingdom	2015	113.400			110.000			3.400			
	2016	126.200			123.200			3.000			
	± %	11,3			12,0			-11,8			

a) Difference = Other casting processes

b) estimated

c) Difference to reported processes = no specific data available

d) Aluminium and Magnesium

**ZINC**



**Table 31**

Total production in t - Zinc

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria	12.871						
Belgium							
Croatia		30	30		25		
Czech Rep.					1.000		
Denmark							
Finland	259	258	250	86	86	-65,6	0,0
France	20.064	17.765	18.083	18.083	20.329	0,0	12,4
Germany	48.306 b)	55.142	53.294	54.661	56.247	2,6	2,9
Hungary	4.367	3.798	3.480	3.543	2.985	1,8	-15,7
Italy	56.846	59.120	63.961	68.254	70.474	6,7	3,3
Lithuania							
The Netherlands							
Norway							
Poland		8.000 a)	8.000 a)	7.540 a)	7.600	-5,8	0,8
Portugal	1.027	1.073	1.296	2.135	2.152	64,7	0,8
Slovenia	2.250	2.650	6.889		3.494		
Spain	8.639	8.288	8.426	8.771	9.079	4,1	3,5
Sweden	4.300	6.500			8.531		
Switzerland	1.235	1.104	1.207	1.094	989	-9,4	-9,6
Turkey	14.000	16.000	31.000	35.000	35.000	12,9	0,0
United Kingdom	8.500	7.900	7.800	7.800	7.000	0,0	-10,3
<b>Total</b>	<b>182.664</b>	<b>187.628</b>	<b>203.716</b>	<b>206.967</b>	<b>224.992</b>		

a) estimated

b) revised figures

**Table 32**

Production value in Mio. € (a) - Zinc

Country	2012	2013	2014	2015	2016	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland	1,8	1,9	1,6	1,3	0,8	-18,5	-39,4
France							
Germany	b)	b)	b)	b)	b)		
Hungary							
Italy							
Lithuania							
The Netherlands							
Norway							
Poland							
Portugal	8,1			16,1	17,0		
Slovenia							
Spain							
Sweden							
Switzerland							
Turkey	55,0	64,0	125,0	130,0	125,0	4,0	-3,8
United Kingdom							
<b>Total</b>							

a) rate of exchange: Ø 2016 or fixed

b) included in table 33

Table 33

Zinc in t

Country	Year	Total Production	thereof:					
			Sandcast and Gravity die casting	Pressure die casting	general engineering	automotive industry	other	
Austria	2015							
	2016							
	± %							
Belgium	2015							
	2016							
	± %							
Croatia	2015							
	2016	25			25			
	± %							
Czech Rep.	2015							
	2016	1.000						
	± %							
Denmark	2015							
	2016							
	± %							
Finland	2015	86			86			
	2016	86			86			
	± %	0,0						
France	2015	18.083						
	2016	20.329						
	± %	12,4						
Germany	2015	54.661		54.661	1.550	295	52.816	
	2016	56.247		55.966	701	666	54.880	
	± %	2,9		2,4	-54,8	125,7	3,9	
Hungary	2015	3.543						
	2016	2.985						
	± %	-15,7						
Italy	2015	68.254						
	2016	70.474						
	± %	3,3						
Lithuania	2015							
	2016							
	± %							
The Netherlands	2015							
	2016							
	± %							
Norway	2015							
	2016							
	± %							
Poland	2015	7.540 a)						
	2016	7.600 a)						
	± %							
Portugal	2015	2.135			2.135,0			
	2016	2.152			2.152,0			
	± %	0,8						
Slovenia	2015							
	2016	3.494						
	± %							
Spain	2015	8.771						
	2016	9.079						
	± %	3,5						
Sweden	2015							
	2016	8.531						
	± %							
Switzerland	2015	1.094						
	2016	989						
	± %	-9,6						
Turkey	2015	35.000			15.500	7.500	12.000	
	2016	3.500			4.500	8.500	22.000	
	± %	-90,0			-71,0	13,3	83,3	
United Kingdom	2015	7.800						
	2016	7.000						
	± %	-10,3						

a) estimated

## **OTHER ALLOY CASTINGS**



**Table 34**

Total production in t - Other alloy castings

Country	2012	2013	2014	2015	2015	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia		20	20		15		
Czech Rep.							
Denmark		150	102	207	128	102,9	-38,2
Finland							
France	2.295	2.818	2.754	2.533	2.340	-8,0	-7,6
Germany	9 b)	3 b)	13 b)	2 b)	1 b)	-86,0	-48,3
Hungary	124	170	115	169	123	47,0	-27,2
Italy	680	693	697	630	654	-9,6	3,8
Lithuania							
The Netherlands							
Norway							
Poland		4.300 c)	4.300 c)	3.860 c)	2.900	-10,2	-24,9
Portugal							
Slovenia							
Spain	601	584	665	711	706	6,9	-0,7
Sweden							
Switzerland							
Turkey							
United Kingdom	1.000	1.000	1.000	1.000		0,0	
<b>Total</b>	<b>4.709</b>	<b>9.738</b>	<b>9.666</b>	<b>9.112</b>	<b>6.867</b>		

a) incl. copper and zinc

b) since 2010: new survey

c) estimated

**Table 35**

Production value in Mio. € (a) - Other alloy castings

Country	2011	2012	2013	2014	2015	2015 : 2014	2016 : 2015
						+/- %	
Austria							
Belgium							
Croatia							
Czech Rep.							
Denmark							
Finland							
France							
Germany							
Hungary							
Italy							
Lithuania							
The Netherlands							
Norway							
Poland							
Portugal							
Slovenia							
Spain							
Sweden							
Switzerland							
Turkey							
United Kingdom							
<b>Total</b>							

a) rate of exchange: Ø 2016 or fixed

**Table 36**

Other alloy castings in t

Country	Year	Total Production	thereof:	
			Sandcast and Gravity die casting	Pressure die casting
Austria	2015			
	2016			
	± %			
Belgium	2015			
	2016			
	± %			
Croatia	2015			
	2016	15,0		
	± %			
Czech Rep.	2015			
	2016			
	± %			
Denmark	2015	207		
	2016	128		
	± %	-38,2		
Finland	2015			
	2016			
	± %			
France	2015	2.533		
	2016	2.340		
	± %	-7,6		
Germany	2015	2		
	2016	1		
	± %	-48,3		
Hungary	2015	169		
	2016	123		
	± %	-27,2		
Italy	2015	630		
	2016	654		
	± %	3,8		
Lithuania	2015			
	2016			
	± %			
The Netherlands	2015			
	2016			
	± %			
Norway	2015			
	2016			
	± %			
Poland	2015	3.860 a)		
	2016	2.900 a)		
	± %	-24,9		
Portugal	2015			
	2016			
	± %			
Slovenia	2015			
	2016			
	± %			
Spain	2015	711		
	2016	706		
	± %	-0,7		
Sweden	2015			
	2016			
	± %			
Switzerland	2015			
	2016			
	± %			
Turkey	2015			
	2016			
	± %			
United Kingdom	2015	1.000		
	2016			
	± %			

a) estimated

# **WORLD PRODUCTION**



**Table 37**

World production 2015, selected countries - Iron and Steel castings in t

		Iron castings	Nodular iron castings	Malleable iron castings	Steel castings	Total	
Austria		40.600	95.500		9.500	145.600	
Belgium		28.700	6.900		36.000	71.600	
Bosnia/Herzegovina		20.950	11.510		3.700	36.160	
Brazil		1.342.103	548.829		243.085	2.134.017	
Canada	*	330.841			90.091	420.932	
China		20.200.000	12.600.000	600.000	5.100.000	38.500.000	
Croatia	*	33.400	10.000	100	100	43.600	
Czech. Rep.		170.000	55.000	4.000	60.000	289.000	
Denmark		30.800	47.100			77.900	
Finland		14.500	32.100		12.500	59.100	
France		504.400	761.200		62.800	1.328.400	
Germany		2.369.675	1.529.672	30.436	190.623	4.120.406	
United Kingdom		139.800	198.500	1.100	48.000	387.400	
Hungary		23.400	63.000	10	5.700	92.110	
India		7.410.000	1.180.000	50.000	880.000	9.520.000	
Italy		694.100	374.600		62.000	1.130.700	
Japan		2.022.900	1.703.800	43.100	157.000	3.926.800	
Korea		1.082.900	708.300	4.000	164.000	1.959.200	
Mexico		815.500	375.800		330.790	1.522.090	
Mongolia							
Netherlands							
Norway		11.300	21.200		1.200	33.700	
Pakistan		100.000	10.300		30.700	141.000	
Poland		485.300	162.200	11.700	49.900	709.100	
Portugal		39.800	90.000		8.100	137.900	
Romania		24.186	3.925	690	12.012	40.813	
Russia	*	2.982.000			756.000	3.738.000	
Serbia	*	24.368	10.140		8.991	43.499	
Slovakia							
Slovenia	**	80.496	34.234	6.107	32.188	153.025	
South Africa		145.000	163.200		90.600	398.800	
Spain		348.200	637.400	7.500	72.600	1.065.700	
Sweden		242.000			19.200	261.200	
Switzerland		12.200	24.700		1.200	38.100	
Taiwan		523.086	213.438		85.548	822.072	
Thailand	**	72.400	28.800	29.500	29.800	160.500	
Turkey		675.000	630.000	15.000	150.000	1.470.000	
Ukraine	**	400.000	120.000	30.000	580.000	1.130.000	
United States		3.328.124	3.115.418	51.374	1.493.743	7.988.659	

Source: Modern Casting, data can differ from CAEF Co 7

\* 2014 data

na= not available

\*\* 2013 data

\*\*\* data from print version Dec 2016

**Table 38**

World Production 2015 selected countries - Non-ferrous metal castings in t

			Copper	Aluminum	Magnesium	Zinc	Others	Total
Austria				140.700				286.300
Belgium				878				72.478
Bosnia/Herzegovina				12.265	A			48.425
Brazil			21.749	153.949	4.916	1.266		2.315.897
Canada	*		14.237	216.189				651.358
China			750.000	6.100.000			250.000	45.600.000
Croatia	*		183	22.075		30	20	65.908
Czech. Rep.			21.000	95.000				405.000
Denmark			1.055	3.086			207	82.248
Finland			3.903	2.240		86		65.329
France			18.344	316.931		18.083	2.533	1.684.291
Germany			79.403	1.071.975	15.235	54.661	2	5.341.682
United Kingdom			8.832	110.000	3.400	7.800	1.000	518.432
Hungary			1.796	106.495	378	3.543	169	204.491
India				1.250.000	A			10.770.000
Italy			63.752	760.521	7.294	68.254	630	2.031.151
Japan			78.000	418.500			981.600	5.404.900
Korea			26.800	623.600			13.400	2.623.000
Mexico			217.200	735.300		85.600		2.560.190
Mongolia								0
Netherlands								0
Norway				7.221	A			40.921
Pakistan			10.200	10.300				161.500
Poland			6.950	334.600		7.540	3.860	1.062.050
Portugal			14.152	29.150		2.135		183.337
Romania			2.600	80.470	5.000	100	70	129.053
Russia	*			462.000	A			4.200.000
Serbia	*		2.092	9.760	1	96	9	55.457
Slovakia								0
Slovenia	**		754	37.244	441	6.889		198.353
South Africa			7.000	24.000		500		430.300
Spain			10.876	125.652		8.771	711	1.211.710
Sweden				62.600	A			323.800
Switzerland			2.068	14.922		1.094		56.184
Taiwan			36.782	335.992				1.194.846
Thailand	**		26.100	105.400		24.400		316.400
Turkey			20.000	325.000		35.000		1.850.000
Ukraine	**		60.000	280.000	15.000	25.000	50.000	1.560.000
United States			255.354	1.622.999	146.456	324.174	50.630	10.388.272

Source: Modern Casting, data can differ from CAEF Co 7

\* 2014 data

\*\* 2013 data

\*\*\* data from print version Dec 2016

na= not available

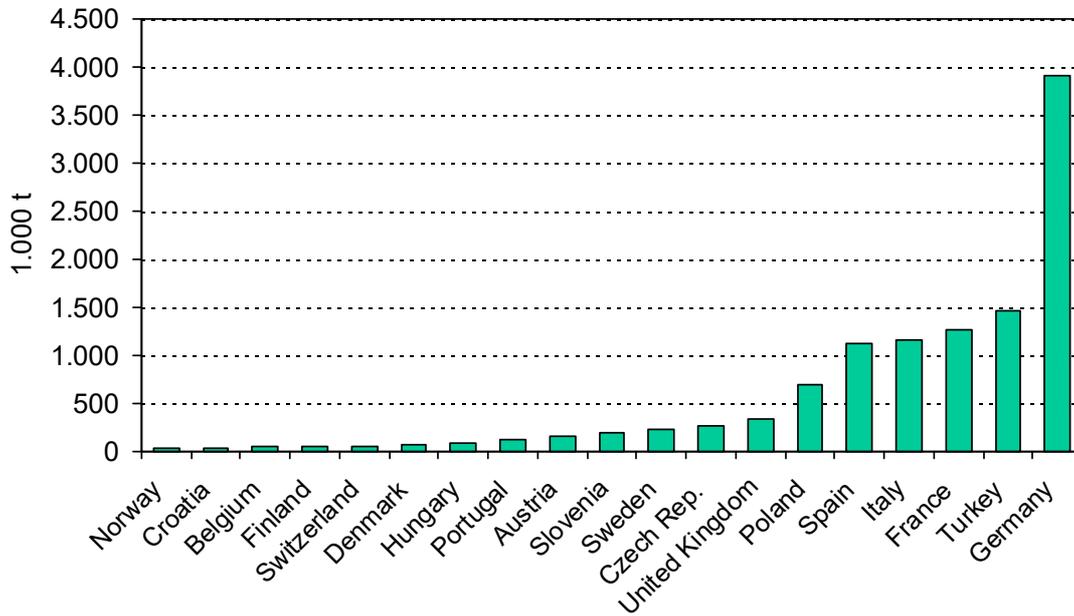
A) All Nonferrous

B) All Diecasting

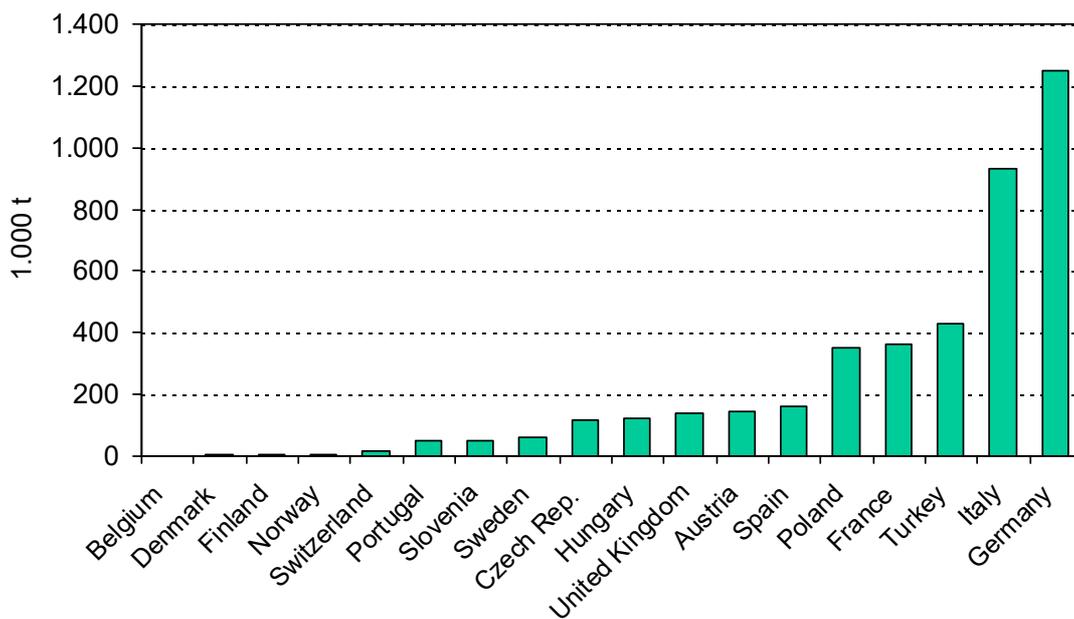
## **GRAPHS**



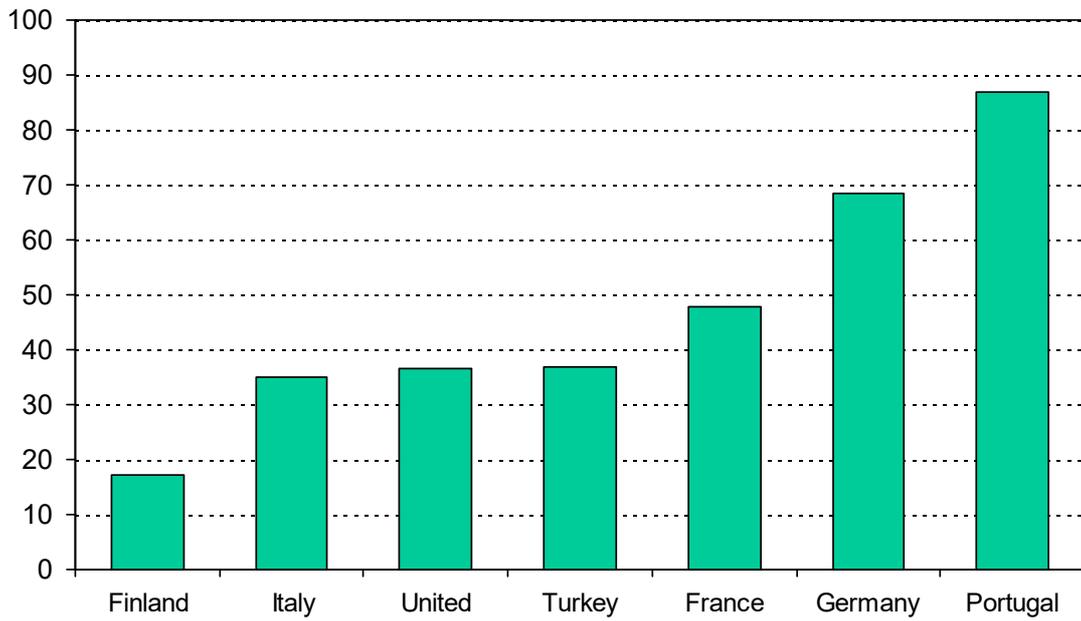
### Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2016



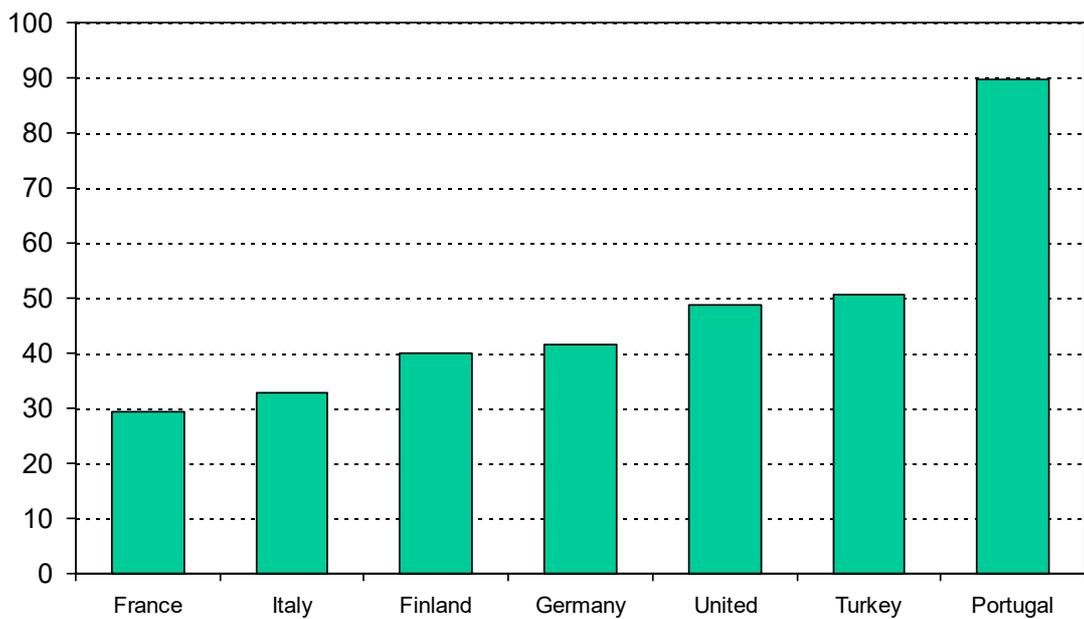
### Production of Non-Ferrous Metal Castings in the European Foundry Industry 2016



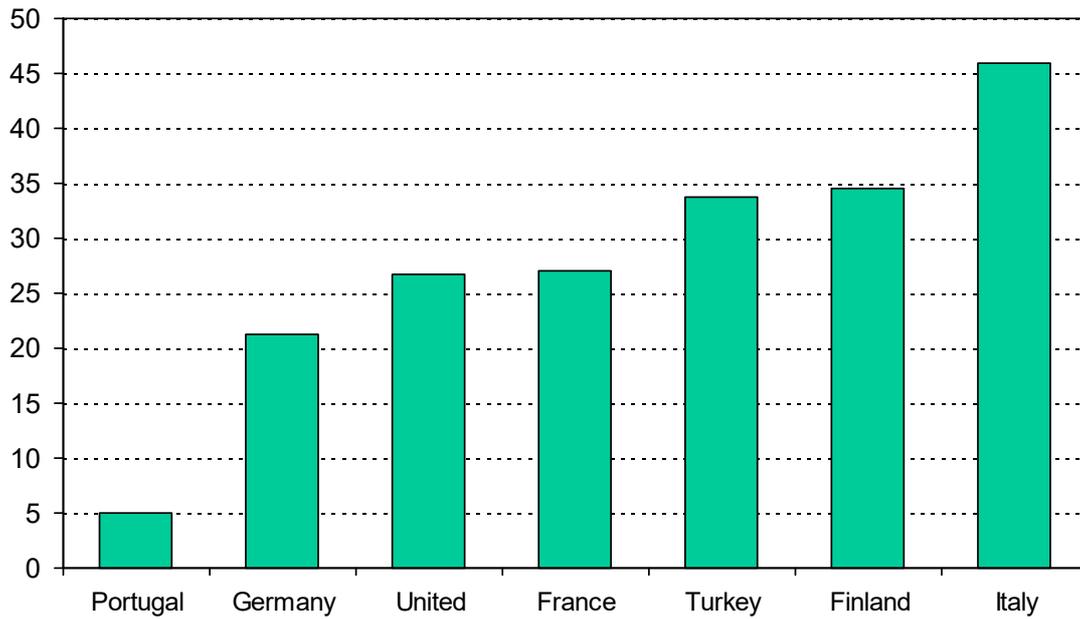
### Iron Castings for the Vehicle Industry National Production Share in Percentage 2016



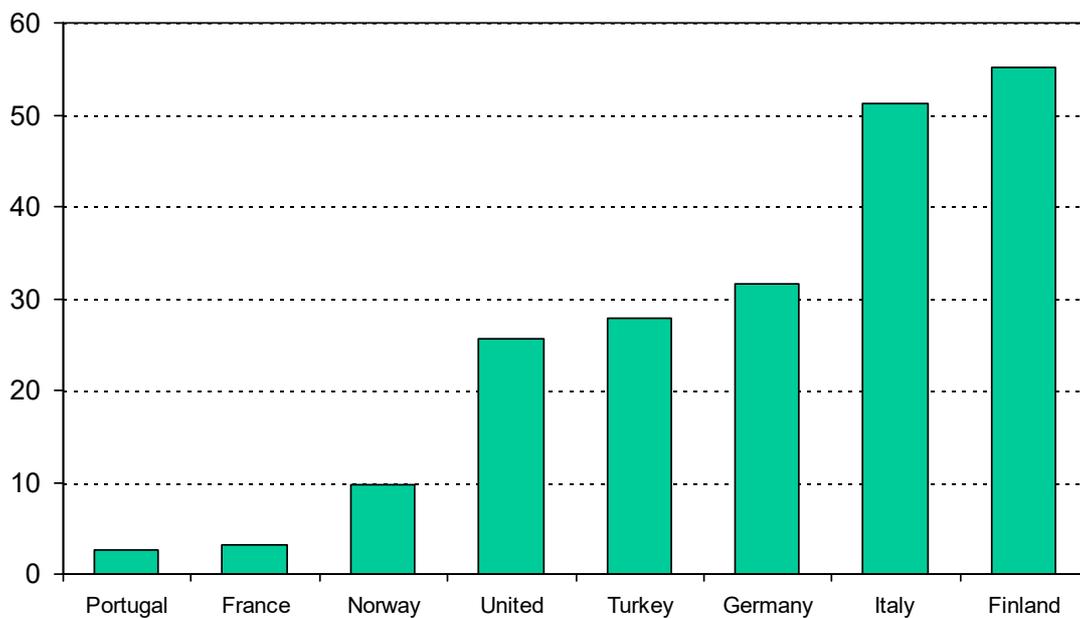
### Ductile Iron Castings for the Vehicle Industry National Production Share in Percentage 2016



**Iron Castings for Engineering Plant and Machinery  
National Production Share in Percentage 2016**

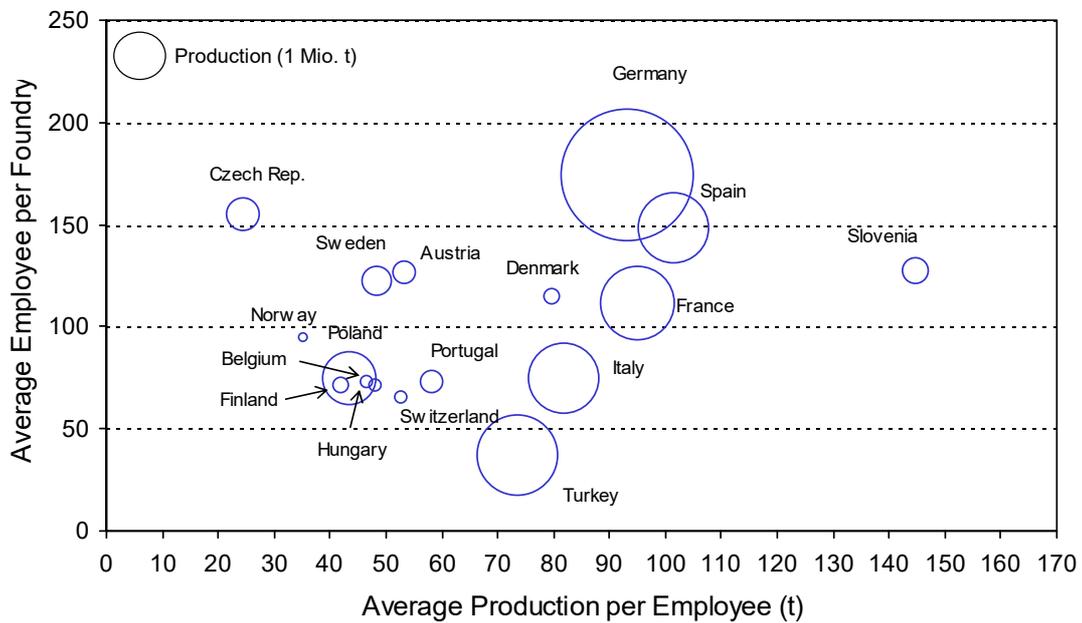


**Ductile Iron Castings for Engineering Plant and Machinery  
National Production Share in Percentage 2016**



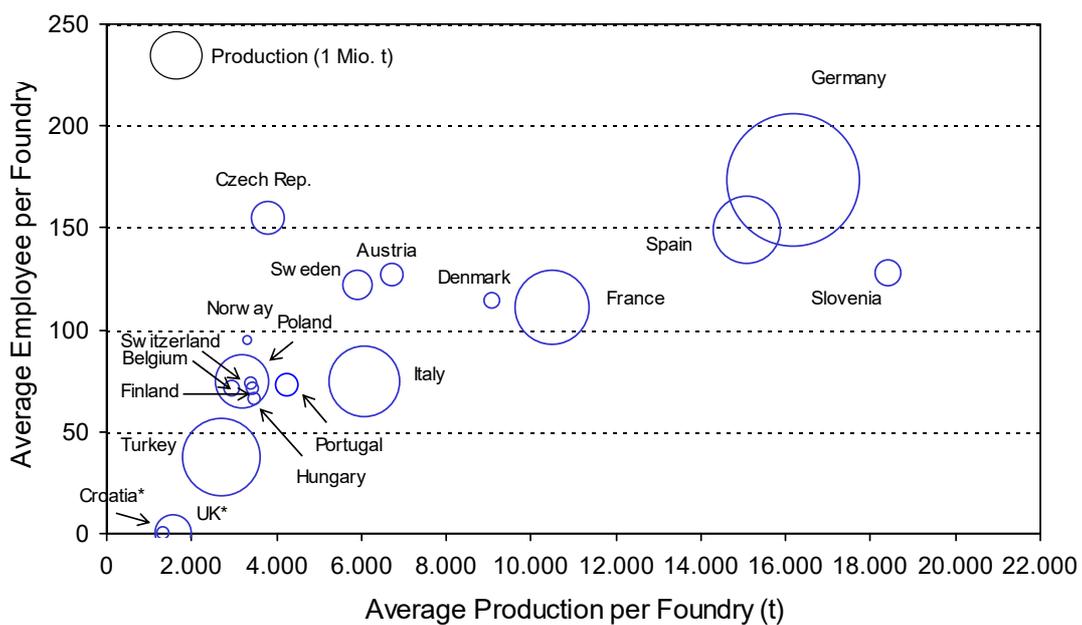
## Average Production per Employee - Iron, Steel and Malleable Iron Castings

### Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2016



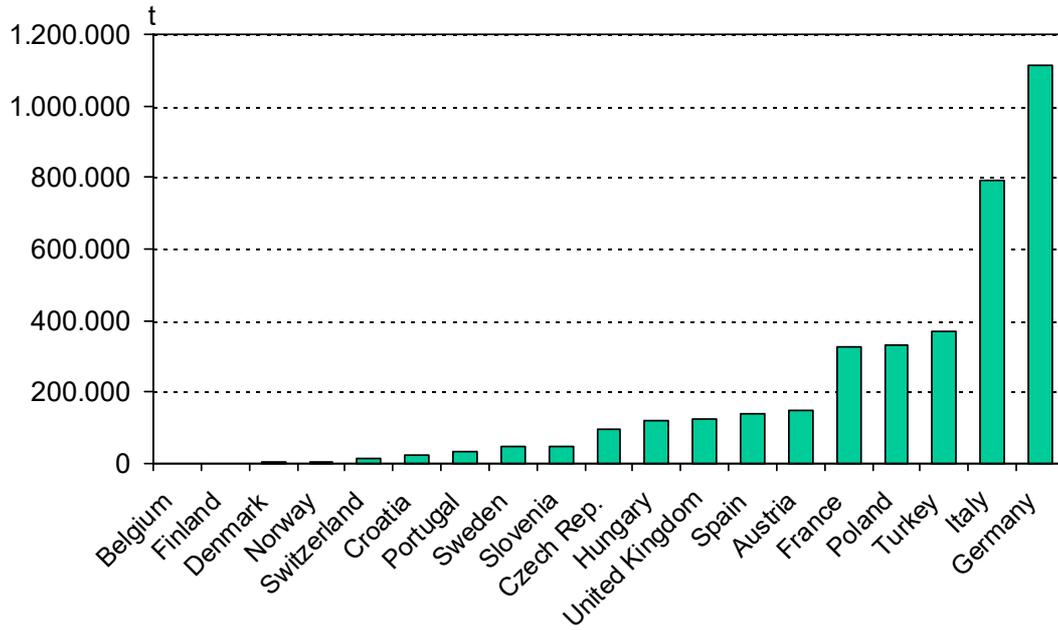
## Average Production per Foundry - Iron, Steel and Malleable Iron Castings

### Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2016

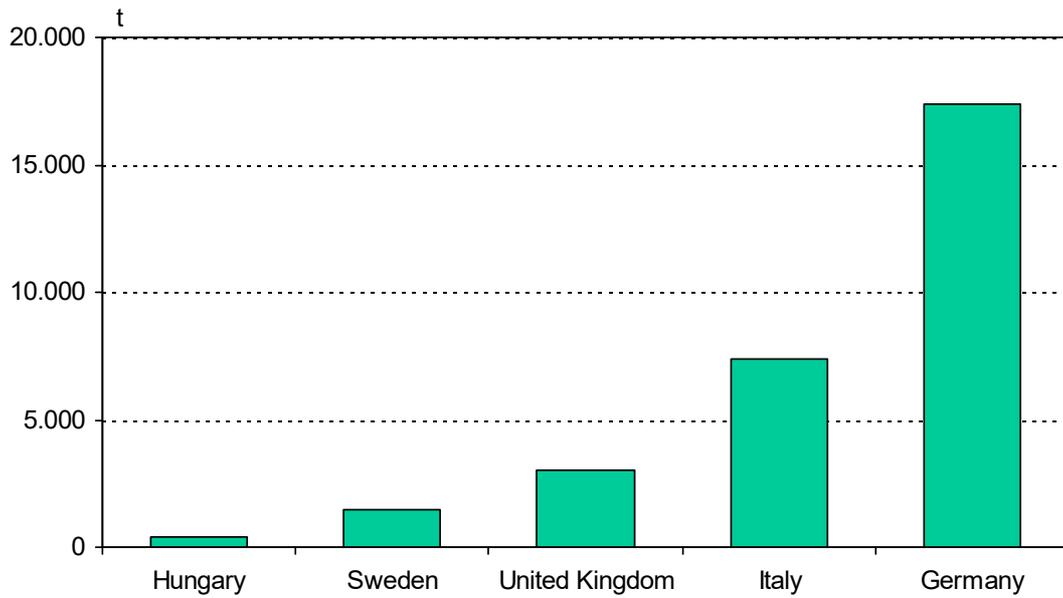


\*) number of employees not available

### Production of Light and Ultralight Castings in the European Foundry Industry 2016

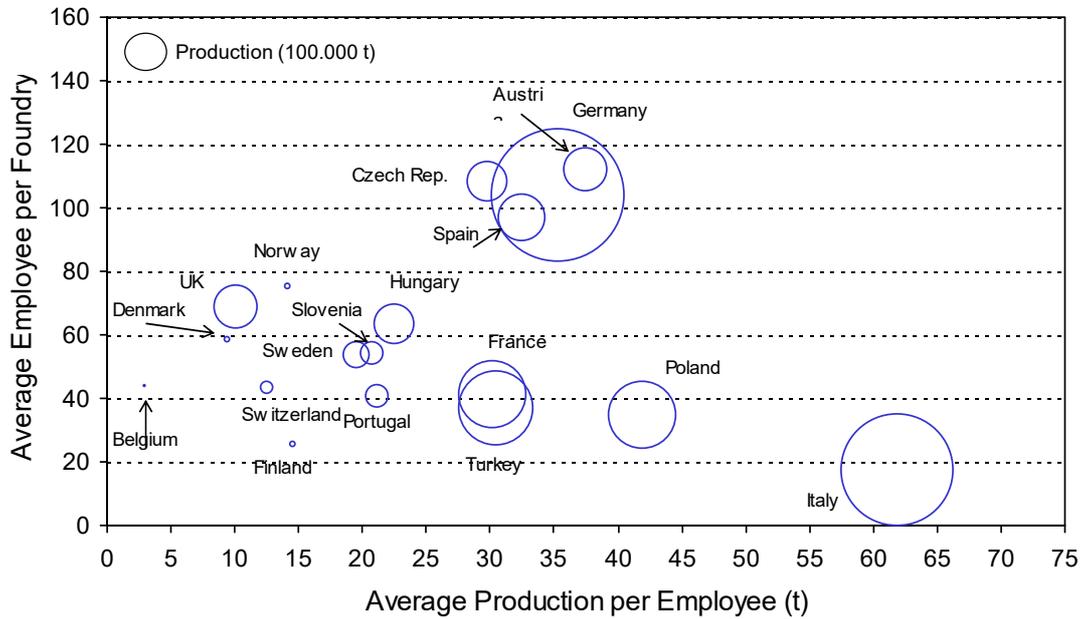


### Major Producers of Magnesium Castings in the European Foundry Industry 2016



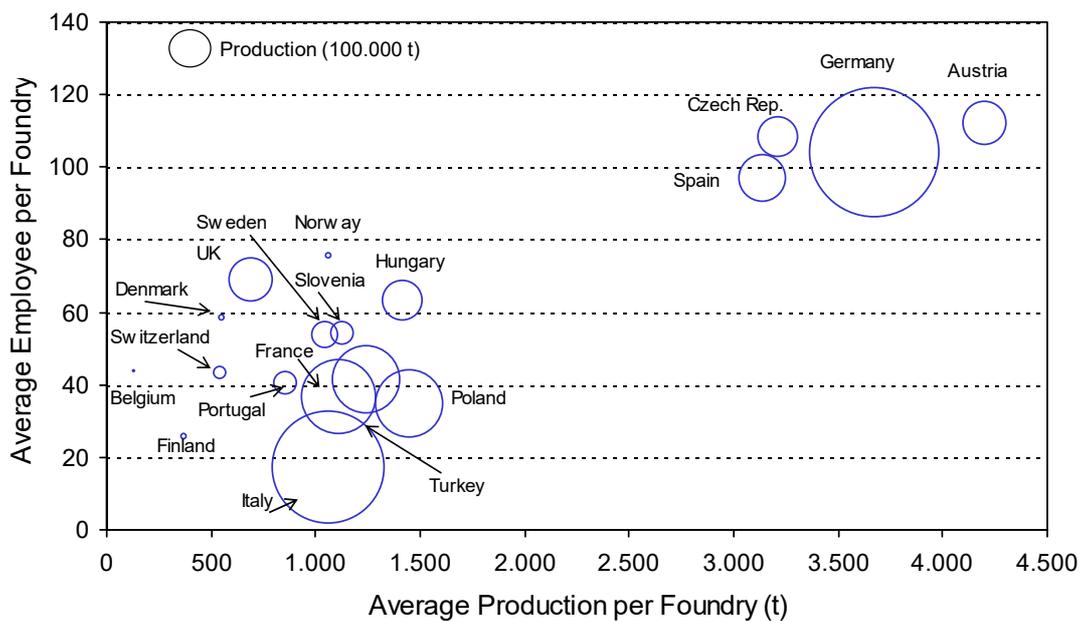
## Average Production per Employee – Non-Ferrous Metal Castings

### Production of Non-Ferrous Metal Castings in the European Foundry Industry 2016



## Average Production per Foundry – Non-Ferrous Metal Castings

### Production of Non-Ferrous Metal Castings in the European Foundry Industry 2016



# CAEF - The European Foundry Association

Commission No. 7

c/o Bundesverband der Deutschen Gießerei-Industrie

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