
CAEF
The European
Foundry Association
2019

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Preface

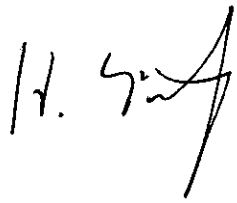
Once again, the CAEF - The European Foundry Association - Commission for economics & statistics has compiled a statistical annual entitled "The European Foundry Industry 2019" from national reports and statistical material gathered from its member countries. The main tables were supplemented by information 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 the Commission for economics & statistics 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, September 2020

CAEF - The European Foundry Association





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TOTAL SURVEY

The European Foundry Industry in 2019

The Economy and the Casting Customer Industries

The Macro-economic Situation at the end of the year 2019

The economy in the euro area continued to grow moderately during the year 2019. E.g. real GDP increased by 0.1% in Q4 2019. All in all, GDP in the euro area increased by 0.9%. The euro area slowed more than expected as a combination of factors, including weakening consumer and business sentiment; delays associated with the introduction of new fuel emission standards for diesel-powered vehicles in Germany and fiscal policy uncertainty. Growing concerns about a no-deal Brexit also likely weighed on investment spending within the euro area. Private consumption grew at a pace of 1.3% in 2018. Monthly inflation rate in Eurozone was 0.31% in December 2019. That is 0.64 more than it was in November 2019 and 0.36 more than in December 2018. At the same time, 2019 year to date inflation rate is 1.33% and year over year inflation rate is 1.33%. The unemployment rate at the euro area level declined from 7.8% in December 2018 to 7.4% in December 2019.

Forecast 2020/2021

		Gross Domestic Product (2)		**Consumer Prices** (2)		**Unemployment Rate** (2)	
		Growth Rate in%		Growth Rate in%		In%	
Country	**Weighting** (1)	**2020**	**2021**	**2020**	**2021**	**2020**	**2021**
Austria	1,2	-7,0	4,5	0,4	1,7	5,5	5,0
Belgium	1,4	-6,9	4,6	0,3	1,1	7,3	6,8
Bulgaria	0,2	-4,0	6,0	1,0	1,9	8,0	4,5
Croatia	0,2	-9,0	4,9	1,3	1,2	11,5	8,0
Czech Republic	0,7	-6,5	7,5	2,1	2,0	7,5	6,0
Denmark	0,9	-6,5	6,0	0,7	1,2	6,5	6,0
Finland	0,7	-6,0	3,1	0,9	1,7	8,3	8,4
France	7,2	-7,2	4,5	0,3	0,7	10,4	10,4
Germany	10,2	-7,0	5,2	0,3	1,2	3,9	3,5
Hungary	0,4	-3,1	4,2	3,3	3,2	5,4	4,0
Italy	5,3	-9,1	4,8	0,2	0,7	12,7	10,5
Lithuania	0,1	-8,1	8,2	-0,3	1,7	8,9	8,1
The Netherlands	2,4	-7,5	3,0	0,5	1,2	6,5	5,0
Norway	1,1	-6,3	2,9	2,4	2,2	13,0	7,0
Poland	1,6	-4,6	4,2	3,2	2,6	9,9	8,0
Portugal	0,6	-8,0	5,0	-0,2	1,4	13,9	8,7
Slovenia	0,1	-8,0	5,4	0,4	1,4	9,0	6,0
Spain	3,7	-8,0	4,3	-0,3	0,7	20,8	17,5
Sweden	1,4	-6,8	5,2	0,5	1,5	10,1	8,9
Switzerland	1,9	-6,0	3,8	-0,4	0,6	2,7	2,6
Turkey	2,0	-5,0	5,0	12,0	12,0	17,2	15,6
United Kingdom	56,8	-6,5	4,0	1,2	1,5	4,8	4,4
CAEF	**100,0**	**-6,8**	**4,3**	**1,1**	**1,6**	**6,8**	**6,0**

(1) Source: Worldbank GDP 2019, (2) Source: IMF World Economic Outlook April 2020

The Economic Situation in the Major Casting Customer Industries

The chief client sectors of the foundry industry

Vehicle construction

2019 was a challenging year for the international automotive markets. The European passenger car market grew just like the demand in Brazil, but in the US the sold number of light vehicles was down on the previous year. China, Japan, and India showed weak development, just as the Russian market.

In Europe, a total of 15.8 million passenger cars were newly registered in 2019, around 1% more than in the previous year. The markets in Germany and France expanded by 5% and 2%. Italy's markets stagnated. The United Kingdom and Spain recorded a fall of 2% and 5%. About two thirds of the European markets ended the year with a positive result, one third had a negative outcome. The numbers for passenger car sales in Europe were close to 1.3 million units at the end of the year, making it a rise of 21%.

The light vehicle market in the US was down by 1%, ending the year with nearly 17.0 million sold vehicles. Since 2014 it is the first time the US market had missed the 17-million mark. Passenger car sales fell by 11%, while sales in the light truck segment rose by 3%, that accounts for 72% percent of the market.

The Chinese passenger car market lost almost 10% in 2019. This means 21.0 million new vehicles after a weak year 2018 what makes it the second contraction in recent decades. China's weaker overall economic growth is reflected disproportionately in the car market.

The Indian car market fell to a total of 3.0 million units, making it a 13% decrease to 2018. In December demand was 1% lower than in 2018.

The Japanese market totaled a 4.3 million units sold in 2019 and therefore remained 2% below the previous year's result. December sales were 11% below the numbers for December 2018.

After two strong years, the Russian light vehicle market fell by 2% to nearly 1.8 million units. Although the overall rise in numbers, in December 2019, a 2 % rise compared to the year before was recorded.

The Brazilian market grew strong. 2.7 million add 8% to the sales numbers of 2018. In December, the increase even came to 12% and finishes the third year of growth in succession.

Mechanical engineering

According to estimates by VDMA economists, in 2019, sales of machinery will increase by a nominal 2% to almost 2.67 trillion euros. Still Asia remained the largest manufacturing region with 1.37 trillion euros and an increase by 2%. The EU and Europe both reached growth rates of about 1% each. Although Europe produced way less that Asia, they produced more than twice as much as the US. However, the US industry increased its turnover by almost 7%.

Germany is the third-largest machinery producer since 2013. In 2019 the record figure of 2018 was missed by 1%. It still accounted for around 11% of worldwide sales.

China again increased its sales by 2% on the previous year. Japan even scored an increase of 5%. Italy can only record 1% growth in 2019. The five largest machine producers (China, USA, Germany, Japan, Italy) together account for 72% of global machine sales.

Building industry

In 2019, the 19 Euroconstruct countries increased their volume by 36.5 billion euros to over 1.6 trillion. This shows an increase by 2.3%. 2017 was the best year for the construction industry. But the dynamic of growth slowed down. However, the growth rates were higher than the GDP of the considered countries. The forecasts for 2020 and 2021 were negative but the corona pandemic exceeded the forecasts already with the first two quarters. The home construction sector grew at least 9% in the years of 2016 and 2017. But 2019 was a better year than expected with 1.9%. Especially non-home construction and civil engineering contributed 0.9 and 0.5 % to the growth.

The forecasts before the corona pandemic struck the entire economy were already prognosing slowed down growth. The pandemic exceeded the forecast of course. Outlook were estimating growth of 0.5% (down from forecast of 4.5%) for 2020.

Civil engineering is a side factor in the construction, but especially in countries like Hungary and Ireland the estimated growth ought to be between 10 and 16.6% for the years of 2019 to 2021. In general, the numbers in civil engineering are better because of the improved public financial situation since 2011. The massive need for modernisation in public infrastructure will most likely lead to a constant growth in the sector of civil engineering.

The non-residential building construction sector expanded by 5.7% in the last three years. Reasons for the good growth were large companies' wins, reasonable economic development, and good finance structures. A bigger growth was forecasted for the coming three years in countries like Ireland, Hungary, Poland, and the Netherlands.

Steel industry

Global crude steel production reached 1,869 million tonnes in 2019, which makes is 3% higher than the production in 2018. The European Union, Central and South America, Japan, and the NAFTA region recorded a decrease in total production, the CIS region stagnated, and only China increased its production volume, pushing the global production to a positive development.

Asia produced 1,343.8 Mt of crude steel in 2018, an increase of 5,7% compared to 2018. China still produces more than half of the world's crude steel and uses more than half of the world's production as well. The growth in volume was over 70 Mt, being 8.3% more than 2018. Russia overtook South Korea as number five in total production, but both countries decreased in volume over the whole year. Of all the bigger producers of crude steel, only China, India and the US increased their volume.

The EU produced 158.8 Mt of crude steel in 2019, a decrease of 5.5% compared to 2018. Germany produced 39.7 Mt, a decrease of 6.3%. Italy came to a total of 23.2 Mt, a negative development of 5.3% to the year before. France made 16th place with a production of 14.4 Mt, a decrease of 6.5%. Right behind France is Spain, producing 13.6 Mt and losing 4.9 % in comparison to 2018.

Crude steel production in North America was 119.1 Mt in 2019, 0.5% lower than in 2017. The US produced 87.8 Mt of crude steel, up by 1.4% on 2018.

The CIS countries produced 100.7 Mt, a decrease of 0.6 %. Russia produced 71.9 Mt of crude steel in 2018, down by 0.3 % on 2018. Ukraine produced 20.8 Mt of crude steel in 2019, a decrease of 1.4% compared to 2018.

Annual crude steel production for South America was 41.8 Mt in 2019, a decrease of 7.3% on 2018. Brazil produced 32.2 Mt in 2019, down by 9.0% compared to 2018.

The Middle East produced 44.2 Mt of crude steel in 2019, an increase of 16.3% on 2018. Iran produced 25.6 Mt in 2018, up 4.5% on 2018.

Turkey's crude steel production for 2019 was 33.7 Mt, down by 9.6% on 2018.

The Foundry Industry

In 2019, the iron and steel foundries of the CAEF member states produced 11.5 million (m.) tons of castings. Compared to the year before, this corresponds to a 6.0% decrease in production weight. (For Bulgaria and Croatia, a growth rate of 6.0% compared to the average plus was calculated because of partly missing data.) The six countries that dominate the industry in terms of weight, namely Germany, Turkey, France, Spain, Italy, and Poland, account for 84.7% of the production of ferrous metal castings, almost the same share as in 2018. The production decreased in most countries compared to the previous year. The exceptions are Norway, Slovenia, Turkey, and the United Kingdom.

In 2019, non-ferrous metal foundries in the CAEF member states booked a production decrease of 2.4% to roundabout 4.4 m. tons. (For Croatia, a production decrease of 3.0% 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 went down for Germany by 2.6% and by 4.9% for Italy. Together, these two countries account for 48.2% of the total volume of non-ferrous metal castings produced in the CAEF member states. In the reporting year of 2019 the following countries booked positively growth rates: Poland, Slovenia, Spain, and Turkey.

The number of employees in iron and steel foundries increased in Belgium, Portugal, and Spain. In Norway and Turkey, the employment was stable. All other countries logged in a decreasing number of employees.

In 2019 the non-ferrous metal sector was dominated by negative employment trends. A positive development was logged in for Italy. In Belgium, the Czech Republic, Norway, Poland, and Turkey the employment was stable.
In Hungary, Italy, Slovenia, Spain, and Turkey new foundries have started their business. In Germany, Sweden, Switzerland, and UK foundries were closed.

The share of cast iron with lamellar graphite in the output total of iron and steel castings was 49.2%, a slightly smaller share than in the four years before. Correspondingly, the share of ductile cast iron was slightly higher (43.9%). The steel sector logged a share of 6.7%.

The production of castings made of non-ferrous metal alloys is still dominated by light metals. The share was unbroken 87.7%. Furthermore, the share of copper alloys holds the level of round about 6.1%. Therefore, not surprisingly, the share of components made of zinc alloys was nearly stable (5.4%).

From the data available it appears that the export quota of the iron and steel foundries decreased slightly from 40% last year to 39.5 in 2019. Calculation base is the foreign trade report of nine member countries. Germany is still the country that dominates the export trade in castings with a volume of more than 1.5 million tons (minus 7.0%). The second place in volume, the tenth year in a row, was logged for Turkey: Turkey reported an export volume of almost 1.1 million tons (plus 6.1%). Spain logged in a volume of 0.75 million tons (stable) and is placed the third place the fifth year in a row. The fourth place is booked for Italy (488,400 tons, minus 6.3%). Exports by France increased by 3.4% (448,000 tons).

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 3.8%, in doing so the weight of castings fell by 6.0%.

From the data that is available on the production value of the non-ferrous metal sector a year-on-year comparison is not possible. It appears that the weight of castings produced was 3% lower.

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

The Situation in the Casting Material Sectors

Iron

At 5.7 million tons, the output of the CAEF member states was down by 7.5%. Missing data for Bulgaria was calculated with the average growth rate of available data from the other nations. A growing production was logged for Slovenia, Spain, and Turkey. The production was stable in Norway and UK. All other countries had to deal with a negative growth rate for the year 2019. 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 (83.5%), Germany (69.3%) and Turkey (37.6%) respectively. For the mechanical engineering in industry the highest shares in the output were posted for 2019 by Italy (47.8%), Turkey (34.7%), and Finland (26.3%).

The number of persons employed in iron foundries (incl. ductile cast iron) increased in Portugal and Spain and was stable in Poland and Turkey. In Finland, Italy, and Switzerland the employment decreased.

Ductile Cast Iron

The producers of ductile cast iron reported a decrease of output by 5.4% to 5.0 million tons. Missing data for Bulgaria was calculated with the average growth rate of available data from the other nations.

France and Turkey logged an upturn in production. In Norway, Slovenia, and UK the production level was stable. All other countries reported a decreasing production.

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 since 2016. Nodular iron components are mainly produced in Germany, Turkey, France, Spain, and Italy.

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 87.7%, Turkey at 44.4%, and Germany at 38.7%. The mechanical engineering industry holds the highest shares in output in Finland (67.0%), Italy at 57.5%, and Germany at 32.7%. Unfortunately, it is impossible to present the share of the building industry.

Steel

In the year 2019 the output of steel castings decreased by 0.7% to 780,800 tons. Missing data for Bulgaria was calculated with the average growth rate of available data from the other nations. Turkey, the leading producer since 2018, logged a stable production volume compared to the year before. For Germany, second in line, the production decreased by 3.4%. For Belgium, the Czech Republic, France, Hungary, and Portugal a decreased production was reported as well. Production in Austria, Poland, and UK remained stable. Finland, Italy, Spain, Sweden, and Switzerland increased their steel production.

In those member countries for which data for a year-on-year comparison was available, the value of the output of steel casting components increased by 8.8%.

The number of persons employed in steel foundries was stable in Poland and Turkey. In Italy and Spain, the number of employees increased, whereas the number of persons employed decreased in Finland, Portugal, and Switzerland.

Non-ferrous metal castings

The output of non-ferrous metal casting components in the CAEF member countries decreased by 2.4% to 4.4 million tons. Missing data for Croatia was 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 share of the first three countries slightly increased from 60.7% to 61.4% in 2019. In Poland, Slovenia, Spain, and Turkey an increasing production volume was logged. Norway, Portugal, and UK reported a stable production volume. All other countries had registered negative growth rates.

Traditionally, the production of non-ferrous metal castings is dominated by light metals. The motor vehicle industry is the foremost customer. In the year 2019 the output of light metal castings (aluminium and magnesium) decreased by 2.2% compared to 2018, reaching nearly 3.9 million tons. Missing data for Bulgaria and Croatia were calculated with the average growth rate of available data from the other nations. Together, Germany and Italy, the two major producers, account for 47.8% of the light-metal castings. The production for these leading countries went down by 2.6% for Germany and by 5.4% for Italy. Poland, Slovenia, Spain, and Turkey reported a positive development. Norway, Sweden, and UK logged an unchanged production volume. Among the light metal alloys, magnesium plays a subordinate role in terms of output weight. Germany is the major producer with 15,500 tons followed by Italy (7,100 tons) and the United Kingdom (2,600 tons). Austria (no data available) and Sweden are additional important players.

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 2019 the level decreased by 3.1%. The reported volume in 2019 reached a level of almost 265,000 tons. Because of the missing data of some countries it is difficult to estimate the real market volume. For Finland, Portugal, Slovenia, Spain, and Switzerland a growth rate for production was logged. UK reported a stable production volume. All other countries achieved a production decrease.

The output of zinc castings fell by 1.2% with a volume of nearly 243,800 tons. Missing data for Bulgaria, Croatia, Finland, 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 69.9% in output total. A stable production was logged for Poland and UK. An increase in production was reported for Italy, Portugal, and Slovenia. All other countries reported decreasing production volume in 2019.

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, gtai, Euroconstruct, Worldsteel, CAEF

REPORTS OF THE COUNTRIES

Global economic situation

Review 2019 – Outlook 2020

In our present situation we cannot resort to the figures of the WIFO business survey we normally use, because they date in part from the time before crisis measures were taken. There are few sentiment indicators for the manufacturing industry. This is why the Association of Metal Technology Industries has chosen a different approach surveying companies directly.

The heterogeneous impact on the branch as a whole is partly due to the sectoral distribution. Automotive suppliers and foundries are extremely affected with a production of just under one third of the previous volume. Of course, the results of the foundry industry should be interpreted with caution, as we are speaking of a small number of companies. Still the trend is correct and the response rate among foundries was very high. About 50% of the companies see themselves in a range between 60% and 99% with a skewed distribution towards the higher level. According to available data, plant engineering fares best with an utilization of capacities of 70%; one in 5 companies works at 100% or above of the normal level. In the metal technology industry acc. to extrapolations 90 companies (7.4%) have closed their production temporarily. One in twelve companies works to capacity (extrapolation from 100 companies). As feared by many, next month will be even harder on our companies. Even if half of them expect the situation to stay stable, only one in seven companies expects an improvement. It is interesting that the construction related sector (27% expect an improvement) and automotive suppliers (33%, but parting from a very low level) are more optimistic. The vast majority of plant engineering enterprises do not expect any change of the situation during the next 4 weeks. Unlike 2008/09, when during the financial crisis approx. 16% of the companies of the metal technology industry applied for short-time work, their share today amounts to more than 80%. This is due to the suddenness of the crisis and the simplified conditions for short-time work. 59% of the companies have already submitted their application, more than 60% of them are still waiting for the approval. Applications are evenly distributed among the different sectors; the highest percentage was submitted by automotive suppliers with more than 90%. There are no branches with a significantly lower percentage; mechanical engineering has the lowest share (just under 80%). The extent of short-time work in the companies has reached a a record level: 43% respond that they have applied for short-time work for more than 90% of their employees. More than 70% submitted an application for 70-100% of their staff. This means that not only most of the enterprises have taken to the short-time model, but they also use it for a large share of their workers. This survey did not enquire for the number of reduced working hours in order to avoid a overload. However, according to available agreements, reductions are mostly of 90%. The decline in sales reported by almost 90% of the companies was to be expected but it is intriguing that more than half of the enterprises are facing production difficulties because of interrupted supply chains. At the beginning, when only China was affected, this was an issue for a minority only, but in the meantime this has come to affect more companies. This is a problem which in this form had been inexistent during the last years. Very dangerous are also the liquidity shortages, reported by one third of the manufacturers. It is therefore all the more important to apply for interim aid and to be able to count on efficient government assistance and support by the banking sector. Currently, "only" 27% of the companies lay of their staff. Currently, with exception of short-time work arrangements (applied for by more than 80% of our companies), enterprises resort mainly to supports related to their liquidity, such as tax deferrals (58%) and loan guarantees (40%). In this context it is essential to see that also the industrial sector, almost as a whole, depends on state support. If we consider that 80% of our members are on short-time work, there remain almost no manufacturers that can do without supporting measures. Of course, the question is put in rather simplified terms and at present it is impossible or at least very difficult to offer an impact assessment. However, the replies to this question confirm what was already expected due to the massive decline in production. There is a clear trend to perceive the current crisis as more severe than the financial crisis. There still remains a relatively large share of respondents (roughly one third) who have no definite answer so far. It is undeniable that the suddenness of the crash is far worse than the situation in 2008/09. On the other hand, the Covid-19 crisis was triggered by an external shock and so far has not turned into a structural crisis. Of course, there is a risk that second-round effects could lead to a structural crisis. But there is hope that the upswing might be as sudden as the downturn. In plant engineering almost 60% of the companies believe that the situation is worse than in 2008/09, whereas in mechanical engineering their share is only 36%. More than one fourth of the machine manufacturers thinks that the financial crisis was worse; this branch has the least dramatic view of the current Covid-

19 crisis as compared to 2008/09. For a narrow majority of automotive suppliers the current situation is worse than 2008/09. It is not totally clear whether the crisis-related data are contained in full in the PMI of Bank Austria. However, the upward trend registered in February confirms our assumption that the industry was just ready to overcome recession and that the COVID-19 outbreak in China still had no major impact. Production expectations collapsed totally, to an index of 30. If a new outbreak of the virus can be avoided and business is reactivated gradually, Bank Austria expects a recovery in the second half of the year and a total production decline of "only" 7%.

Source: Sector outlook, April 2020. Association of Metal Technology Industries

Situation of the foundry industry

According to our own survey, production, sales and employment declined in 2019. Total production amounted to about 303,287 tons in 2019, i.e. 7.4% less than in 2018. Total sales of the branch dropped by 9.4% with regard to 2018 to a volume of about 1.41 billion €.

Iron castings registered in 2019 a total production volume of 158,514 tons (a decline of 3.4%). Sales figures rose by 1.1% to about 432 million €.

The production volume of ductile cast iron amounted to 104,730 tons, i.e. a decline of 4.6 % over the volume of 2018.

Steel castings increased to 11,444 tons, almost exactly the level of 2018.

Production of grey castings fell by 1.5% compared to 2018 and reached a volume of 42,340 tons.

Non-iron castings registered a production decline of 11.4%; sales fell by 13.3%.

Employment
In 2019 the branch provided employment to a total of 6.933 persons (employees and workers), i.e. a decline of 4.8% over 2018.
The number of industrial apprentices trained in professions related to our branch (foundry technology and metal foundrymen) declined with regard to 2018.

Incoming orders
All in all, our companies were much affected by the current economic situation in 2019.

Investment plans
Investment activities remain on a high level.

Personnel cost
Minimum wage rises according to the collective wage agreement amount in the different employment groups to 2.6 % - 2.8 %.

Supply of commodities and energy
In 2019 commodity prices fluctuated and decreased significantly towards the end of the year.

However, prices of energy, electricity and gas registered a sudden increase in Austria.

Cost development
As there were no inquiries in this context, it was decided in 2019 to discontinue this evaluation.

Outlook 2020
It is difficult to foresee the trend for 2020, which was also treated in the first paragraph. 2020/21 will be challenging years for the branch and basically everything depends on the behaviour of the automotive industry. It will take time until the branch will reach again the previous level and a stable outlook.

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1. Macroeconomic developments

2019
Growth of GDP reached 1,4%.

Belgium's **exports** has been suffering from the deteriorating business cycle across the world. Belgian export volume growth of goods and services, which had already slowed markedly in 2018, fell further in 2019, to 0,9%.

Strong economic activity, low interest rates and improved internal financing capacity (profitability) supported **business investment**. They rose by 3%.

The private **consumption** growth slowed to 1,1%, the weakest figure in the last five years. Uncertain economic conditions may have prompted some caution on the part of households, while their purchasing power grew by 2,5%.

Higher household purchasing power, coupled with continued low mortgage rates, were the main factor boosting households' **housing investment** by 5,9%.

2020
Economic growth in Belgium is set to be severely hit by the COVID-19 outbreak in 2020.

The lockdown measures in place since mid-March are expected to decrease private consumption significantly It is projected to fall by almost 7%. However, thanks to, among other factors, the system of temporary unemployment, the purchasing power of household is expected remain unchanged compared to 2019.

Exports growth is projected to largely mirror the trend in export market growth. After dropping markedly in the second quarter of this year, they are expected to gradually pick up thereafter. For the whole year, exports are forecasted to drop by 11,9%.

Falling demand, strong supply chain disruptions and high uncertainty are expected to lead to a decrease of over 15% in business investment.

Inflation

Inflation is forecast to fall from 1,2% in 2019 to 0,3% in 2020, mainly driven by lower energy prices.

Labour market

Despite widespread recourse to the short-term unemployment scheme to avoid job losses during the lockdown period, the unemployment rate is set to rise from 5,4% in 2019 to 7% in 2020.

2. The situation in the major casting customer industries

	2012/ 2011	2013/ 2012	2014/ 2013	2015/ 2014	2016/ 2015	2017/ 2016	2018/ 2017	2019/ 2018
Mechanical engineering	**4,0**	**-1,2**	**0,2**	**-0,2**	**3,0**	**2,5**	**1,2**	**-0,5**
Metal product	**-2,2**	**-0,9**	**1,0**	**-1,9**	**2,3**	**4**	**2.3**	**1,5**
Automobile	**-5,9**	**-7,1**	**0,8**	**-10**	**-0,5**	**-0,5**	**-6**	**6**

Last year, the activity in mechanical engineering decreased by 0,5% with very irregular figures from one quarter to the other. The demand for the product of the sector (mostly investment goods for enterprises) suffered from the degradation of the general economic climate.

The growth in the metal product industry remained positive, but it was the lowest of the last five years. The sector suffered from a slowdown in demand from industrial sectors but remained supported by the high level of activity in the construction sector.

In automobile, sub-contractors for car makers on international markets suffered from a decrease of activity of about 15% while the activity of producers of commercial vehicles decreased by 4%. This has been more than compensated by the increase in production of the new models in our car assembly plants and their subcontractors.

3. The foundry industry

The production of the Belgian foundry industry dropped sharply in 2019. With about 62.133 tons, the level was 22% below the production of 2018. It is a fourth year of negative evolution and for a second year, this decline was generalized in the different types of casting productions.

Iron casting

In iron casting, the biggest sub-sector of the Belgian foundry industry, the production decreased by 23% to 53.809 tons. The year on year evolution was negative during all four quarters of the year.

Steel casting

At 6.605 tons, steel casting production declined by 11,4% compared with 2018. The fall was limited in the first quarter but turned strongly negative during the 2nd and 3rd period. The last quarter of the year was also unfavourable, but with a less pronounced decrease.

Non-ferrous casting

With 1.719 tons in 2019, the production in the non-ferrous casting was 21,5% below its level of 2018. Here as well, the evolution was negative during the 4 quarters of the year.

4. Cost development

4.1 Energy

Electricity: According to Eurostat statistics, Belgian electricity market prices for industrial users decreased in 2019 (before VAT). During the 2nd half of the year, prices (before taxes) for consumers between 2000 and 20000 Mwh were 3,7% higher than during the second half of 2018. For consumers

between 20000 and 70000 MWH, the (before VAT) price increase reached 3,6%. Prices before VAT remain in Belgium 8,4% lower than in the EU and 7,8% lower than in the euro area.

Gas: Belgian market price for industrial consumer of natural gas also decreased in 2019. The decrease of 9,6% in the 2nd semester compared with the 2nd semester 2018 was more marked than in EU -2,8%) and the euro area (+3,9%). The difference in prices remains high : -25,1% compared with the EU and -26,0% compared with the euro area.

4.2 Wagecost

Average wage in 2019 was 2,4% higher than in 2018. This growth is due to the automatic indexation in July 2018 of +1,44% and in July 2019 of +1,95%. There was also an increase outside indexation of 1,10% in July 2019.
For 2020, the automatic indexation was 1,01% in July. This should result in an average increase of labour cost of about 2,1% compared with 2019.

5. Outlook for the coming months

For the coming months, latest business surveys in the foundry industry produced very negative signals.

This is the case for the assessment of the order book: in june 2020, all the foundries regarded their orders as being “lower than normal for the period of the year”. In january and February, they were only about 25% to assess their order as too low.

Furthermore, about 2/3 of the foundries expect a further decrease of the demand for their product in the 3 coming months. This is another sign that the business climate of the sector is deeply depressed and that no improvement is to be expected in the short term.

The assessment of capacity utilization has been deteriorating during the last quarters. It is now at about 69,7%, below its long term average (75%).

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Foundry production

Foundry production in 2019 was like "on the swing." The decline in production at the end of 2018 continued in early 2019. In the spring months the production was fulfilled but during the summer there was a recurrent decline. Autumn did not bring the volumes of orders that foundries would need. Although the production was catching up at the end of the year, the economic result for a number of companies was in the red. Total production was therefore lower in 2019 than in the previous year. The beginning of 2020 was very "cold" and the expectations of companies did not materialize. In March, the COVID-19 pandemic began, completely paralyzing the foundry industry.

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.

Table the production

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Malleable cast iron	4068	3145	6951	4307	3722	4100	4000	3800	3760	3500	1500
GJS	60106	52412	67025	58058	53193	53352	55000	48000	51850	56000	50000
GJL	203238	153344	197666	179394	169456	169654	170000	158000	175450	180500	165000
Steel	97366	57888	94013	94929	76380	64606	60000	61000	62650	62000	52000
Fe metals total	**364778**	**266789**	**365655**	**336688**	**302751**	**291712**	**289000**	**270800**	**293710**	**302000**	**268500**
Light metals	52896	65369	80049	77457	88125	88826	95000	98000	100953	105000	96000
Other non-ferrous metals	5498	12227	14241	14506	17482	20034	21000	21000	20650	22000	20000
Non-ferrous metals total	**58394**	**77596**	**94290**	**91963**	**105607**	**108860**	**116000**	**119000**	**121603**	**127000**	**116000**
Total	**423172**	**344385**	**459945**	**428651**	**408358**	**400572**	**405000**	**389800**	**415313**	**429000**	**384500**

After a healthy 5% year-on-year growth in production in the period 2012 to mid-2018, 2019 continued to fall sharply in orders starting at the end of 2018. Despite the fulfilment of production capacities in spring and autumn, comparable production volumes did not accumulate cumulatively as in the previous year. There was no major revival during the year in which many foundries had hoped. The outlook for orders for ferrous castings was no longer than one and a half months. Existing customers reduced volumes, new projects were difficult to find with an uncertain future. In total, approximately 385,000 tons of castings were produced in the Czech Republic. Production volumes are therefore lower than in the previous year. The foundries optimised production in proportion to orders. Despite the lack of orders there was an aim to maintain a key skilled workforce. Labour productivity is determined by the pieces of orders. For ferrous castings, where seriality is low, it is difficult to find ways to streamline and saves. Foundries are looking for optimization in information technology and software control of individual items. Another way to profitability of foundries is the sale of machined castings or whole components. However, the cost of investment and service personnel is high, and not everyone can afford it.

The total production of Fe castings in 2019 was about 269 thousand tons of castings. The production of cast iron, both GJL and GJS, is comparable to 2010. The year-on-year decrease of production was 11 %. This decline also reflected the stagnant engineering. Composition of orders does not allow to introduce automation in bulk. Low seriality continues to go against productivity. Outputs are influenced by the composition of workers, the profit is dissolved in wages, investments are hardly received. Foundries have stabilized the order volumes according to the existing composition of workers. Small investments are made to help productivity increase, time and energy savings. The advantage have foundries with higher seriality of orders where investments in special purpose equipment have a faster return. The current orders of both GJL and GJS castings are very strongly affected by the COVID crisis,

which has manifested itself in its entirety. Due to the low number od orders the delivery dates are kept. Limited mobility has stopped the possibility of finding new projects.
After a stable period up to 2016, the volumes of steel casting production decreased slowly. Total production in 2019 was 52 thousand tons, which is the least in the history of the Czech Republic. Interest in "carbon steel" which is replaced by GJS continues to decline. The remaining production of steel castings is based on alloyed and special steels. The low productivity of steel plants is given by the low seriality of orders. High input prices, metallurgical complexity and emphasis on the quality of alloyed steels drive the prices of these castings up. Not everyone is able to accept prices and is looking for adequate substitutions. For small pieces one of the ways is 3D printing of metals. This trend will continue in the coming years. The production of steel castings is specific only to a certain segment of the market that is willing to accept the price.

In case of non-ferrous metal castings, the growth of die-cast castings from Al alloys stopped. The total production in 2019 was about 96 thousand tons. The main driver of orders is the automotive industry. Production volumes increased slightly at purpose-built foundries (Škoda auto, Ronal). Commercial foundries have adapted to the agreed volumes from the end of 2018, in the second half of 2019 there was a decrease in orders. Cumulatively the production volumes are comparable to 2015. High productivity relies on modern technologies with the mass use of robots. It's the only way to succeed in the pressure of competition on casting prices.

The production of copper alloy castings has not seen any changes and it continues to reach about 20 thousand tons. Power engineering continues to be the main customer. The current order volumes correspond to the production possibilities of foundries. Labour productivity is low and relies on the skill of qualified personnel.

The total production of the Czech foundry industry in 2019 was lower compared to 2018. The total production of 384,500 tons of castings means a decrease of about 11 % compared to the previous year. The expected recovery did not occur, rather the opposite. At the end of the year, there was a further decline in the outlook for new orders and the production began to decline even in early 2020. By the end of the year, the entire foundry industry had seen this approximately 8% decrease. In 2018/2019 there was a 15% increase in workers' wages. This significant increase in the cost of companies has weakened their competitiveness. Despite the wage increase it is not possible to find new young employees and the age average of foundry employees continues to grow. The year 2020 was very strongly influenced by the COVID-19 crisis, which totally paralyzed our foundry industry. This crisis has put not only our foundries in an unenviable position. This situation most affected suppliers in the automotive industry, i.e. pressure foundries of Al alloys. Companies are waiting for the emergency to be lifted and are calling for the lifting of restrictions and the opening of business premises as soon as possible. The year 2020 will be difficult for many foundries, we will see what steps the Government of the Czech Republic will take to save the Czech industry, which historically includes foundry industry too.

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1. ECONOMIC BACKGROUND

1.1 The Finnish Technology Industry as a whole

The turnover of technology industry companies in Finland grew by 6 per cent in 2019 from 2018. Turnover was up in all main sectors except metals industry. In 2019, the turnover in Finland amounted to EUR 83 billion. The effects of global economic uncertainty and weakening demand remain apparent in Finnish technology industries. The rise in the value of technology industry companies' new orders in the fourth quarter is almost exclusively attributable to very large ship orders. Without these, the value of new orders would have remained more or less unchanged from the previous quarter. The number of requests for tender received by technology industry companies dropped further. 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 15 per cent higher than in the preceding quarter and 17 per cent higher than in the corresponding period in 2018. At the end of December, the value of order books was slightly higher than at the end of September and 9 per cent higher than in December 2018. It is important to note that shipyards' share of the total value of books is exceptionally large. The strengthening of the ship building industry drives broad-based growth in many sectors. The number of personnel employed by technology industry companies in Finland was up slightly more than 3 per cent from the 2018 average. The average number of personnel employed was 319,000, approximately 10,000 more than in 2018. Technology industry companies' recruitments also took a downward turn towards the end of the year. They recruited a total of 40,500 new employees in 2019. In 2018, total recruitments came to 50,000.

1.2 Mechanical Engineering in Finland

The turnover of mechanical engineering companies (machinery, metal products and vehicles) in Finland increased by approximately 3 per cent in 2019 from 2018. In 2019, their turnover in Finland amounted to EUR 32.8 billion. The value of new orders in mechanical engineering was up 21 percent from the previous quarter in the October-December period. Year-on-year, the value of new orders increased by 7 per cent in the last quarter. The increase in the value of new orders towards the end of 2019 is almost exclusively attributable to very large ship orders. Without these, the value of order books would have dropped notably from the previous quarter. Differences between individual companies have widened notably also in this sector. At the end of December, the value of order books remained at the same level as at the end of September and 5 per cent higher than in December 2018. Shipyards' share of the total value of order books is exceptionally large. The strengthening of the ship building industry drives broad-based growth in many sectors.

The number of personnel employed by mechanical engineering companies in Finland grew by approximately 2 per cent from the 2018 average. The industry employed some 134,200 people, up 2,900 from 2018.

1.3 Metals Industry in Finland

The turnover of metals industry companies (steel products, non-ferrous metals, **castings** and metallic minerals) in Finland decreased by approximately 5 per cent in 2019 from 2018. In 2019, their turnover in Finland amounted to EUR 10.6 billion. The total production of steel products, non-ferrous metals, **castings** and metallic minerals in Finland in the January-November period decreased by as much as 10 per cent year-on-year.

The number of personnel employed by metals industry companies in Finland decreased by approximately 0.5 per cent from the 2018 average. The industry employed some 15,800 people, approximately 100 less than in 2018.

2. FOUNDRY INDUSTRY IN FINLAND

2.1 Foundry industry as a whole

In the year 2019 the total production of castings in Finland decreased about 10 % in 2019 from 2018. The production of iron and steel castings was 57.843 tons which is 10 % less compared to year 2018.

Iron and nodular iron casting production decreased about 13 %, but steel casting production increased about 3 %. Metal castings production was 5.308 tons, which is about 4 % less than the previous year. The value of the casting production of Finnish foundries was 229 m€, which is 14 % less compared to year 2018. The foundry industry employed 1,645 people, 131 less than in 2018.

2.2 Grey cast iron sector in Finland

Overview of the Finnish grey cast iron production, year 2019:

	2018	2019	%
• Number of GJL foundries	11	11	
• GJL production	18.390 t	18.161 t	- 1 %
• Value of the GJL production	37,73 m€	34,35 m€	- 9 %
• Export of GJL castings	3.599 t	3.905 t	+ 9 %
• Employees in iron foundries	800	724	- 10 %

2.3 Ductile cast iron sector in Finland

Overview of the Finnish ductile cast iron production, year 2019:

	2018	2019	%
• Number of GJS foundries	11	11	
• GJS production	36.161 t	29.285 t	- 19 %
• Value of the GJS production	89,21 m€	71,54 m€	- 20 %
• Export of GJS castings	14.893 t	8.957 t	- 40 %
• Employees in iron foundries	800	724	- 10 %

2.4 Steel castings sector in Finland

Overview of the Finnish steel casting production, year 2019:

	2018	2019	%
• Number of steel foundries	7	7	
• Steel casting production	10.094 t	10.397 t	+ 3 %
• Value of the GS production	76,08 m€	71,85 m€	- 6 %
• Export of GS castings	2.945 t	1.597 t	- 46 %
• Employees in GS foundries	563	540	- 4 %

2.5 Non-ferrous casting sector in Finland

Overview of the Finnish non-ferrous casting production, year 2019:

	2018	2019	%
• Number of non-ferrous foundries	14	14	
• non-ferrous production	5.526 t	5.308 t	- 4 %
• Value of the non-ferrous production	62,10 m€	51,00 m€	- 18 %
• Export of non-ferrous castings	2.591 t	1.657 t	- 36 %
• Employees in non-ferrous foundries	413	381	- 8 %

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Macroeconomic developments

	% in 2018	% in 2019	% in 2020 (expected)
GDP	+1.6	+1.3	-7.5
Inflation	+1.9	+1.1	+0.1
Unemployment rate	.8.8	8.1	10.2
Industrial production	+1	+0.3	-10

The growth of the French economy grew by + 1.3% in 2019. At the same time, GDP increased by + 0.6% for Germany and + 1.2% for the Euro zone. The increase is limited to + 0.2% for the Italian economy.

The evolution of the global context, in particular the slowdown in the German economy combined with trade tensions between the major partner countries has weighed on the activity of French industry. The increase in industrial production is limited to + 0.3%. The unemployment rate fell to 8.1% at the end of 2019 against + 8.8% at the end of 2018.

The Coronavirus health crisis hit the French economy hard while the global economy was already slowing at the end of 2019. French GDP contracted sharply in the first quarter of 2020. The cessation of activity linked to the two months of lockdown resulted in a significant loss of activity for businesses. The hypothesis adopted by the forecasting institutes currently corresponds to a fall in GDP between -7% and - 8% in France in 2020.

In this macroeconomic context, the unemployment rate is rising again and industrial production is in free fall.

Situation of the foundry industries

After business growth in 2018 (+ 1.7%), production and billings fell in 2019, by - 4.7% and - 5.1% respectively.

The slowdown in the French and European, and even global, economy, as well as the weakening of demand from the main customer markets in France weighed on the activity trend of the foundry industries. Automobile production fell significantly in 2019, this sector being the main outlet for the French foundry (about 41% of the total outlet in 2019). Building and roads is the second client sector for the foundry, the share of this sector having increased compared to the previous year. Construction has a good activity in 2019 according to the FFB (around 29% of the market). As for French mechanics, this market representing 23% of the total outlet: this sector recorded an increase of + 1.7% in turnover in 2019. The weakness of the German market has greatly limited the increase in total exports. This slowdown, recorded both in France and internationally, has resulted in a decline in activity for the foundry industries. The monthly survey carried out with a representative panel of the foundry industries showed that the fall in production and turnover was regular throughout 2019. This decrease affects both the foundry of ferrous metals and the foundry of non-ferrous metals.

The activity of the foundry industries, all sectors combined, decreased:

- Total production fell by - 4.7%% (in tonnes)

- Total billings also fell by - 5.1%

In total, ferrous and non-ferrous metal foundries produced 1.696 million tonnes in 2019 compared to 1.781 million tonnes in 2018.

The total production value of the foundry industries is estimated to reach 5.141 billion euros in 2019.

Evolution of employment

The workforce in the French foundry industry fell slightly in line with production trends, down -1% from 2018.

The number of employees is estimated at 29,724 people at the end of December 2019.

The number of companies in the foundry sector remained at 380 in 2019 (<10 people included).

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The German Economy and the Casting Customer Industries

Macroeconomic developments

The economic situation in Germany was characterised by slight economic growth in 2019.
According to first calculations of the Federal Statistical Office (Destatis), the price-adjusted gross domestic product (GDP) was 0.6% higher in 2019 than in the previous year. The German economy thus has grown for the tenth year in a row. This has been the longest period of growth in united Germany. However, growth lost momentum in 2019. In the previous two years, the price-adjusted GDP grew much more strongly (by 2.5% in 2017 and by 1.5% in 2018). Compared with the average of the last ten years (+1.3%), the German economic growth in 2019 was lower.

Growth in 2019 was mainly supported by consumption expenditure. Household final consumption expenditure rose by a price-adjusted 1.6% on the previous year, government final consumption expenditure by 2.5%. This means that the increase in household and government final consumption expenditure was larger than in the previous two years (household final consumption expenditure +1.3% year on year both in 2017 and in 2018; government final consumption expenditure +2.4% in 2017 and +1.4% in 2018, year on year).
Gross fixed capital formation increased substantially, too. Gross fixed capital formation in construction was up a price-adjusted 3.8% on a year earlier. Particularly strong increases were recorded for civil engineering and housing construction. Gross fixed capital formation in other fixed assets (+2.7%), which include research and development, was also much higher than a year earlier. Gross fixed capital formation in machinery and equipment, however, increased less strongly (+0.4%). Total price-adjusted gross capital formation, which covers gross fixed capital formation and changes in inventories (including acquisitions less disposals of valuables), fell by 1.7% in 2019 year on year. Reasons for the marked reduction of inventories are low industrial output and higher exports.

German exports continued to increase on an annual average in 2019, though at a slower pace than in the previous years. In price-adjusted terms, German exports of goods and services were up 0.9% on 2018. The increase in price-adjusted imports (+1.9%) was larger.

On the production side of the GDP, there were two different economic trends in 2019. On the one hand, the service sector and the construction industry recorded mainly high growth rates. On the other hand, industry (not including construction) saw an economic slump. Consequently, total price-adjusted gross value added rose by just 0.5% in 2019 on the previous year.

The highest growth rate was recorded by the construction industry (+4.0%). There were above-average increases also in the service sector, that is, in information and communication and in financial and insurance activities (+2.9% each). Sharp drops were however recorded in many parts of industry. The output in industry (not including construction), which accounts for just over a quarter of the total economy, was down by 3.6%. Especially the low output in the automotive industry contributed to the decrease.

The economic performance in Germany on an annual average in 2019 was achieved for the first time by more than 45 million persons in employment whose place of employment was in Germany. According to first calculations, 45.3 million people were in employment, that is roughly 400,000 more than in 2018. This 0.9% increase was mainly due to a rise in employment subject to social insurance. Higher labour force participation and the immigration of foreign workers more than offset age-related demographic effects and emigration from Germany, as had been the case in the preceding years.

According to provisional calculations, general government budgets achieved a surplus in 2019 for the eighth time in a row. It amounted to 49.8 billion euros, which was not quite as much as the record surplus of 62.4 billion euros in 2018. Central government accounted for the largest share of the surplus (19.2 billion euros), followed by state government (13.3 billion euros), social security funds (10.7 billion euros) and local government (6.6 billion euros). Measured as a percentage of nominal GDP, this was a 1.5% surplus ratio of general government for 2019.

Short term outlook (Results of the July 2020 Ifo Business Survey):

Sentiment among German companies has improved further. The ifo Business Climate Index rose from 86.3 points (seasonally adjusted) in June to 90.5 points in July. This is the third rise in a row. Companies were notably more satisfied with their current business situation. They are also carefully optimistic about the coming months. The German economy is recovering step by step.

In *manufacturing*, the business climate once again improved considerably. Industrial companies' assessment of their current situation is no longer quite as poor as in previous months. Companies also expect business to grow again in the coming months. Capacity utilization increased from 70.4% to 74.9%, but it is still far below its long-term average of 83.5%.

In the *service sector*, the Business Climate Index rose strongly and is now in positive territory. Service providers were distinctly more satisfied with their current situation. Their expectations for the coming months also saw a significant improvement.

The upswing continued in *trade*, too. Companies adjusted their assessments of the current situation and their expectations for the coming months markedly upward. Business improved, especially in retail.

In *construction*, the business climate continued to improve. Construction companies were more satisfied with their current situation. Their expectations were also less pessimistic.

The situation in the major casting customer industries

In 2019 the German *passenger car market* grew by 5 percent to a total of 3.6 million new registrations. The last time the market recorded a greater annual volume was in 2009 (3.8 million cars).
Production and exports fell owing to the weaker demand around the world. The German passenger car manufacturers built almost 4.7 million passenger cars, which is a decrease of 9%. The OEMs exported nearly 3.5 million passenger cars to customers all over the world during the entire last year.
The OEMs exported 213,400 cars from Germany in December (-14%). During the entire last year nearly 3.5 million passenger cars (-13%) were supplied to customers all over the world. Hence, 74.6% of all passenger cars built in Germany were exported. Accumulated foreign orders over the year lost nearly 2%.
New registrations of *commercial vehicles* increased by 6% to 409,800 units in 2019, thus setting a new record. Sales of light commercial vehicles up to 6 tons rose by 7% in 2019 to reach 311,900 units – also a new record. The German Association of the Automotive Industry (VDA) expects a decrease of 3% for 2020. Therefore, in 2019 the volume of the segment will shrink, which is due to the special circumstances of COVID-19. The market for commercial vehicles over 6 tons exceeded the 2018 figure. A total of 91,420 heavy trucks were newly registered (+3%). But in 2020 the growth is expected to decrease by 12%.
The demand for *buses* in 2019 showed a decrease over the previous year. In total, 6,440 buses were newly registered (-4%). In 2019, sales of trailers increased by 4%and 318,000 trailers were newly registered. Nevertheless, within this group demand for semi-trailers shrank and decreased by 6% to 38,300 units.

In 2019, the German *mechanical engineering industry* was unable to match the previous two years of growth. Political upheavals, uncertain investors, and the far-reaching structural change in the automotive industry as an important customer sector did not leave Germany's most employment-intensive key industry unaffected. Nevertheless, the number of employees reached a new record level - an important prerequisite for the ability of companies to act and innovate in times of technological change. The production of machinery and equipment in Germany in 2019 was 2.8% below the previous year's level in real terms. While order backlogs and high capacity utilisation had a supportive effect in the first quarter, this effect faded over the course of the year and the rates of change turned negative. In the fourth quarter, the decline finally amounted to 6%. The production value last year was thus estimated at 224 billion euros.

In 2019, the German mechanical engineering industry exported goods worth a total of 180 billion euros. Not price-adjusted, machinery exports in 2019 thus barely stagnated, while price-adjusted they were 1.5% below the previous year's figure. Machinery exports to EU countries in 2019 remained at the previous year's level (85.9 billion euros). With a 47.8% share of German machinery exports, the EU single market remains the flagship of German machinery exports. The USA expanded its position as the most important single market (up 4.3% to 20.1 billion euros), while German machinery exports to China, the number two, shrank by 1.1% to 18.8 billion euros.

In 2019, the output of *crude steel* in Germany was registered with a volume of 34.9 million tons, 12.0% lower than in 2018. The World Steel Association (worldsteel) forecasts that the worldwide steel demand will contract by 6.4%, dropping to 1,654 million tons due to the COVID-19 crisis. In 2021 steel demand is expected to recover to 1,717 million tons, an increase of 3.8% over 2020. For the EU in 2020, the World Steel Association predicts a minus of 15.8% (133.1 million tons).

In 2019, the *total construction output* in the Euroconstruct (EC-19) area grew by 2.7% compared to 2018. New construction (including new residential-, non-residential- and new civil engineering buildings) has been driving the market for several years, and increased by 3.9% last year, while renovations have been growing steady around 2%.

Developments in the foundry industry

In 2019, Germany´s iron and steel foundries received orders for around 3.4 million tons of castings. Compared to 2018, this marks a decrease of 16.7%. Orders from the biggest customer industry, motor vehicle engineering, were 12.0% lower than the year before (1.99 million tons). At 750,000 tons, the volume of orders from the mechanical-engineering industry went down by 30.0% compared to the previous year. Circa 0.7 million tons of parts for miscellaneous applications were ordered, a level that is 12.2% lower than in the preceding year.

Germany´s foundries focused on non-ferrous components received an order volume of 1.15 million tons. The demand went down by 6.0% compared to 2018. With approximately 79% of incoming orders the vehicle industry is dominating the non-ferrous sector. The nominal demand dropped by 3.5% (913,000 tons). The foundries related to mechanical engineering received orders with a volume of 8.200 tons (-15.0%). Nearly 228,000 tons of miscellaneous parts were ordered, which is a decrease of 14.8%.
We should bear in mind, that there is a lack of definition between engineering and miscellaneous applications, e.g. electrical engineering. This applies for all casted materials.

In 2019, the weight of castings produced by Germany´s iron and steel foundries amounted to 3.8 million tons. Compared to 2018 this corresponds to a 10.6% decrease. By looking at the two major customer industries, casting production for the motor vehicle industry declined by 10.5% to 2.1 million tons, while production for the mechanical engineering sector fell by 15.5% to 0.930 million tons. The output of castings for miscellaneous functions (including rolls, moulds and castings for buildings as well as pipes and fittings) reached a volume of 785,000 tons, 4.5% less than the previous year.

Non-ferrous foundries registered a production decrease of 2.6%, correlating with a volume of 1.15 million tons of castings. While more than 80% were produced for the vehicle industry (919,400 tons), this output dropped by 2.3%. The casting of non-ferrous components for all other customer industries fell by 3.9% and therefore had a volume of almost 226,600 tons.

In 2019, 34.2% of the total production volume was exported directly. All in all, 1.69 million tons were sold to costumers abroad, representing a 7.0% decrease.

By the end of 2019, orders in stock equaled a weight of more than 1.43 million tons of ferrous castings, 14.1% lower than at the end of 2018. The non-ferrous back orders had a volume of approximately 240,300 tons (-15.2%).

Capacity utilisation in the iron (grey and nodular) foundry industry amounted to 84.6% in 2019. In comparison to 2018, this means a decrease of 6.2%. Steel foundries have reported a capacity utilisation of 81.0%, 0.9% less than in 2018. Capacity utilisation in the non-ferrous foundry industry is calculated as 79.9% in 2019 (minus 7.8%). Capacity utilisation in ferrous-, steel and non-ferrous foundries cannot be compared.

The employment situation

As of December 2019, Germany´s foundries (ferrous and non-ferrous) employed circa 75,200 persons, 4.6% less than at the end of 2018. This figure corresponds with 382 foundries (survey cut-off at <50 employees per company).

At the end of 2019, 562 foundries (ferrous and non-ferrous, no cut-off) were operating in Germany.

Raw materials and energy

Main characteristic of several raw materials and energy sources is that both, supply and demand, are highly price inelastic. In other words, neither available supply nor demand depends on the given price, since production is based only on merits of what is needed. This becomes particularly pronounced in the case of scrap, one of our industry's most crucial resources.

No one "produces" scrap. Scrap incurs rather as "unavoidable" remnant of other industrial activities. The metalworking businesses even strive, independent of the price, to minimize scrap accrual.

On the other side stands the demand, having virtually no substitution opportunities. If 25 tons are needed to fulfill an order in time, they will be purchased "no matter the costs".

To balance out supply and demand under the aforementioned circumstances, high price fluctuations are the consequence. Already smallest diversions in offered supply or demanded quantity result in rising or falling prices, due to a shortage on one of the two sides. Additionally, speculations at the metals exchanges have a co-amplifying effect.

For the year 2019, the various scrap metal prices must be noted: The development was similar. While the prices in 2017 and 2018 experienced considerable fluctuations and significant price development, the dynamics in 2019 remained moderate. Prices remained very stable, but a slight decline in averages was observed in the second half of the year.

Metallic input materials

Generally, raw materials account for about 25% of prime costs. Hence, they have the second largest importance after personnel costs. In this respect, reliable documentation and observation of developments and forecasting with regard to planning, control and quotation calculation are very helpful.

Lower price fluctuation compared to previous years facilitates planning in many respects. Nonetheless, no foundry can "absorb" major price changes since production can virtually not be delayed. The costs of raw materials can thus only be calculated separately and on a daily basis. After all, price increases of raw materials of only 10% results in additional 2.5% prime costs. In many cases, this alone would completely erode the often meager return on sales in our industry. Fortunately, this risk was much lower in 2019 than in previous years.

Commodity prices are subject to pronounced economic fluctuations. As far as the current economic cycle before Corona is concerned, prices reached their lowest point at the turn of the year 2015/2016. Since then, they have been trending much firmer. The depreciation of the Euro by 5% in 2018 had, among other factors, caused prices to rise by about 9% to 17%. In contrast, aluminium prices fell slightly by around 7% in 2019. The prices for copper, on the other hand, remained almost unchanged or rose slightly by around 3%, depending on the alloy. Zinc, on the other hand, had a slight peak in the first quarter of 2019, but by December was almost back at the level at the beginning of the year. In the magnesium sector, not only did production figures decline, but the drop in demand in the casting sector was also reflected in almost 6% lower prices for AS31. For the prices to be paid in Germany, the further development of the Euro to external value is of fundamental importance.

Payroll costs

The share of personnel costs in the cost of goods sold has risen to just over 30% on average.

Various factors have an influence on the level of personnel costs: in particular, the agreements of the collective bargaining partners should be mentioned. These agreements were particularly high for the years 2018 and 2019, especially as the past year was not particularly successful for many foundries. Although only about half of the companies are still bound by collective agreements, the shortage of skilled workers is leading to a shortage of qualified personnel with a corresponding increase in wage expectations. Furthermore, the additional costs (from social security) imposed by law must be mentioned above all. Finally, sickness-related absences, the number of public holidays, overtime, and shift bonuses as well as voluntary employer benefits have an impact on the annual development of personnel costs. Of all these factors, only some are known and published. For others, assumptions must be made. They are disclosed in the brochure "Key business figures for the foundry industry". Where there are different regulations in individual federal states, the conditions in North Rhine-Westphalia are the basis.

As far as the year 2019 is concerned, the employees receive a one-off payment:
- 27.5% of the average monthly wage, cost effect of approx. 2.29% p.a.
- Collective agreement additional pay of € 400.00, cost effect of approx. 1.11% p.a.

At the same time in 2019
- the unemployment insurance contribution is reduced from 3.00% to 2.50%
- the additional contribution to health insurance, amounting to 0.90%, was reintroduced, and
- the contribution to nursing care insurance increased from 2.55% to 3.05%.

In all three effects the employer has an equal (half) effect.

This means that (based on a benchmark analysis) the collective agreement increase of approx. 3.4% and changes in social security contribution rates, which are reflected in total increases of 0.45%, result in an increase in personnel costs of 3.9% (rounded up) for 2019.

With personnel costs accounting for 30% of cost price, a 3.9% increase in personnel costs results in a 1.17% rise in cost price in 2019. If the change in personnel costs is applied to production costs (i.e. cost price excluding raw material costs) at a rate of around 41%, these costs will have risen by 1.60% in 2019.

For 2020, a solidarity pact was concluded in response to the corona pandemic and no collectively agreed increases were made. In addition, the extensive use of short-time working will have an impact on personnel costs.

Energy

Measured against the peak prices for (crude) oil in summer 2014, prices in 2019 remained below this level. After two years of increases, the price has hardly decreased (around 2%). On a US dollar basis, the price is almost 12% lower than in 2014. Since crude oil is traded in US dollars and the exchange rate has only slightly decreased, the price of crude oil has also remained very stable in 2019.

The prices for electricity are primarily subject to the individual company conditions. The time and duration of the conclusion of the contract have a considerable influence not only on the level but also on the development of electricity costs, in addition to the purchase quantity, the grid fees and agreed peak loads. The slight drop in the EEG levy in 2019 could not offset the increases in the volume of electricity purchased, as the network fees also rose by an average of 2% nationwide. However, it should be noted that the fluctuations varied greatly between the major grid operators and the respective regions. For example, the range is between -7% in Saarland and +18% in Bremen. At the same time, the electricity price reported by the Federal Statistical Office has risen by 3%, which illustrates this German national trend.

After showing a significant increase in the price of coke in December 2018 of around 12% compared to November 2018, the first quarter of 2019 was still characterized by high sales. This situation then eased for the cupola foundries throughout the year, with the average price in December around 10% lower than in the same month last year.

According to figures from the Federal Statistical Office, gas prices in 2019 were down by as much as 7% compared to 2018.

Depending on the ratio of the various energy sources used, energy costs will have fallen by 7% or risen by a maximum of 3% in 2019. Foundries melting in a crucible with gas or coke are likely to have experienced a relief. Conversely, foundries using electricity as melting energy have had to bear the biggest increases. At the same time, it should be mentioned that hardly any foundry will use a melting medium but will usually use a combination of liquid or gaseous fuels and electrical energy.

The energy costs have an average share of 13% of the production costs if all melting aggregates and materials are considered. The Fuel Emission Trading Act (BEHG), which will come into force in 2021, will show how much the share of energy costs in production costs will increase.

Miscellaneous

In 2017 there were significant price increases for some foundry-specific input materials (e.g. furan resin and blasting abrasives), which in 2019 had in some cases developed significantly downwards. As many input materials are often only used by a few companies, it was not possible to reflect these changes in the cost table; both the share in the production costs and the exact changes would have to be determined and entered in the individual case.

Summary

On the basis of our model calculations, it was shown that the developments outlined above had a relatively stable effect on cost prices in 2019. Once again, increases in wage and salary costs and electricity costs had a price-driving effect. One ray of hope was certainly the easing of the situation with the core input material furan resin. As in many years, the biggest cost increases had to be absorbed by foundries with labor-intensive processes that produce hand-molded castings with electrical melting energy.

If the costs for raw materials are excluded and only the increase in manufacturing costs is considered, a cost increase of around 1.5% can be assumed for a fictitious statistical average foundry in 2019.

The Situation in the Material Sectors

Grey cast iron

Throughout 2019, production decreased by 10.0% to 2.193 million tons. The output of motor vehicle components fell by 8.3% to more than 1.519 million tons. The volume of casted parts for mechanical engineering decreased by 19.0% to 416,800 tons. Other grey iron components (including moulds and railway parts, fittings, and components for the steel industry) reached an output volume of 256,900 tons (-2.0%).

Iron foundries received orders for approximately 1.243 million tons of castings from the motor vehicle industry, which is a 13.0% decrease. The demand of the mechanical engineering industry reached a volume of 334,000 tons. Thereby, the orders fell by 32.7%. Orders for parts for miscellaneous applications made of cast iron reached a volume of 189,100 tons, 14.5% less than in the preceding year.

At the end of December 2019, the order backlog amounted to more than 766,600 tons, 11.5% lower compared to the end of December 2018.

Ductile cast iron (nodular and malleable)

At 1.43 million tons, the production of ductile iron castings was decreased by 10% compared to the year before. A separate calculation of nodular and malleable castings is not possible, because of the low volume of malleable castings. Nonetheless, malleable castings have their specific markets. The output of motor vehicle components fell by 16.2% to 554,500 tons. The volume of casted parts for mechanical engineering fell by 12.9% to 469,300 tons. Other components reached an output volume of 409,800 tons (-5.9%).

At the ductile iron sector, the volume of incoming orders reached 1.5 million tons (-15.8%). Ductile iron foundries received orders for more than 737,000 tons of castings from the motor vehicle industry, which is a decrease of 10.6%. With minus 28.1% compared to the order volume received the year before, the demand of the mechanical engineering industry reached a volume of 374,300 tons. Orders for parts for miscellaneous applications made of ductile cast iron reached almost a volume of 388,500 tons, 11.1% less than in the preceding year.

At the end of December 2019, the order backlog amounted to 606,000 tons, 17.2% less compared to the end of December 2018.

Steel

Throughout 2019, production of steel castings fell by 3.4% (178,500 tons). The output of motor vehicle components increased by 1.7% to 13,500 tons. The volume of casted parts for mechanical engineering fell by 1.4% to 47,000 tons. Other components reached an output volume of 117,800 tons (-4.7%).

At 164,700 tons, the volume of orders received by the producers of steel castings in 2019 was decreased by 14.2% compared to the year before. Steel foundries received orders for 15,100 tons of castings from the motor vehicle industry, an upturn of 4.6%. The demand of the mechanical engineering industry reached a volume of 39,700 tons (-24.4%). Orders for parts for miscellaneous applications made of steel castings reached nearly a volume of 109,900 tons, 12.1% less than in the preceding year.

At the end of December 2019, the order backlog amounted to 60,500 tons. The order cushion was 14.6% lower compared to the end of December 2018.

Non-ferrous Metal Castings

In 2019 the production of aluminium castings decreased by 2.3% (996,100 tons). For the magnesium sector the production reached a level of more than 15,500 tons (-15%). The output of copper castings fell by 2.6%. The level was more than 77,200 tons. Nearly 57,200 tons of zinc castings were produced, marking a decrease of 3.4%.

Aluminium foundries received orders for 1.005 million tons (-3.6%). 89.9% of the demand (903,200 tons) came from the vehicle industry. Down by 13.7% compared to the order volume received the year before, the demand of magnesium castings reached a volume of 15,100 tons. Orders for parts made of copper castings reached a volume of 73,400 tons, 21.4% lower than the year before. Foundries producing casted parts from zinc logged an order level of almost 55,900 tons (-19.6%).

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

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Short report of the Hungarian foundry industry 2019

The basically export orientated Hungarian foundries have had a relative steady market position during the last years. But after 6 years the production of Hungarian foundry industry in 2019 showed an average decrease to the former years. The real reducing is -13% - according to the comparison of years, 2019 and 2018. It was more than natural that the figures for 2020 was created on a moderate but still optimistic basis again.

The producing of the first half of 2019 in the Hungarian foundry industry was significantly not different to the formers year one. From the 3. quarter of the year (even the 4. one) has showed already that the increasing is stopped, and a slow decreasing has started in all segments of the Hungarian foundry business – see the next table of the last three years' data of the Hungarian casting productions.

Hungarian casting productions, 2017 - 2019; Value in tons

Denomination	2017	2018	2019	2019/2018
Grey iron casting	24 210	21 616	18 016	
Nodular iron castings	37 783	38 468	36 408	
Compacted graphite iron castings	16 740	26 969	19 210	
Alloyed iron castings	389	401	378	
Malleable iron castings	10	7	3	
Total iron castings	**79 132**	**87 452**	**74 015**	-15%
Unalloyed steel castings	2 216	1 361	1 419	
Alloyed steel castings	911	1 452	763	
Total steel castings	**3 127**	**2 813**	**2 182**	-22%
Aluminium gravity die castings	61 328	57 410	49 234	
Aluminium pressure die castings	61 450	78 962	73 058	
Aluminium sand castings	124	146	133	
Total aluminium castings	**123 902**	**136 518**	**122 425**	-11%
Bronze castings	417	230	181	
Brass castings	1 305	475	302	
Zinc castings	1 717	1 610	763	
Other heavy metal castings	76	93	48	
Total heavy metal castings incl. investment cast.	**3 515**	**2 408**	**1 294**	-46%
Magnesium castings	327	273	250	
TOTAL	**210 003**	**228 462**	**200 166**	-13%
Investment casting all together in total	753	762	766	

Year after year we have prepared detailed information about the different sectors of the Hungarian economy, even the foundry industry. It was made a similar report this year too but after the first stage of the pandemic situation all the written details became essential, let say unsubstantial…

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Macroeconomic developments

GDP slowed last year, posting a growth of 0.3 per cent. **Investment** increased considerably less than in 2018, held back by the uncertainty that spread among firms following the slowdown in the global economy and the persistent protectionist tensions. **Household consumption** was affected by the slow growth in disposable income.

Against a backdrop of a significant weakening in world trade, Italian firms have largely retained their market shares. This was reflected in a widening in the current account surplus, driven among other things by the improvement in the tourism balance; Italy's net international investment position was close to balance at the end of 2019.

As regards the geographical breakdown, economic activity grew in Northern Italy while remaining at the same levels as the previous year in the Centre and in the South.

Employment continued to rise, albeit at a slower pace than in 2018. Its growth, which was stronger in the first half of the year, subsequently faltered, reflecting the cyclical weakening. The **unemployment** rate declined to 10.0 per cent on average in 2019.

The **fiscal policy** stimulus, as measured by the cyclically adjusted change in the primary surplus, was slightly restrictive, after being expansionary for the previous five years.

Since the end of February, the spread of the COVID-19 epidemic has had a strongly negative impact on economic activity. **GDP** fell by around 4.7 per cent in the first quarter; according to the estimates, the reduction appears to have been more pronounced in the Northern regions. The contraction in GDP seems mainly attributable to the sharp drop in household spending. Since March, **foreign trade and international tourist flows** have been affected by the fall in global demand and the suspension of 'non-essential' productions decreed by the Government to counter the spread of the epidemic. The available indicators signal a significant drop in GDP for the second quarter as well, which will likely be reflected in a sharp fall for this year as a whole.

The public health emergency has led to a reduction in the number of people in employment since March, above all among fixed-term **employees**; there was a reduction of 0.4 per cent for the first quarter as a whole, compared with the last quarter of 2019. The fall in jobs was in part mitigated by the freezing of layoffs for financial reasons and the boosting of the wage supplementation scheme. The deterioration in **labour market** conditions may be more pronounced in the spring months, especially in the fixed-term employment segment.

Inflation was very subdued in the first quarter, and was barely positive in April. Both the inflation expectations recorded in the euro-area financial markets and Italian firms' intentions regarding their own prices for the next 12 months were revised downwards.

The **outlook for the public finances** has been drastically changed by the public health emergency. According to the official forecasts, the deficit-to-GDP ratio for 2020 and 2021 is expected to be higher by 8 and 4 percentage points respectively, compared with the figures planned during the last budget session; the debt-to-GDP ratio is expected to increase by more than 20 percentage points this year, to 155.7 per cent, and to diminish in 2021 thanks to the economic recovery.

A return to growth for the Italian economy in the next ten years is possible provided there are adequate increases in labour market participation and in employment, in investment, and in productivity.

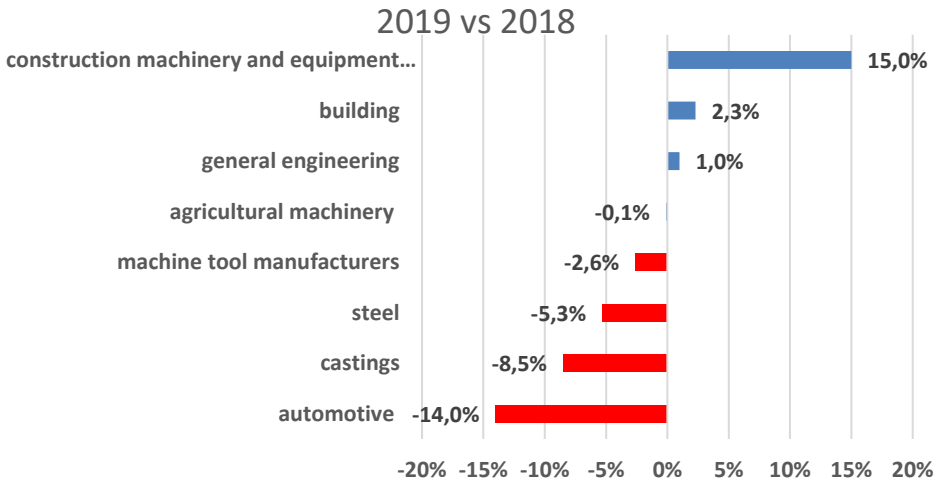
The situation in the major casting customer industries

In 2019 the situation of the most important customers was not good. With the exception of construction machinery and equipment and agricultural machinery, all other industries closed with a negative sign:

- automotive: -14%
- crude steel: -5%.
- machine tool, robot and automation industry: -2.6%
- agricultural machinery (flat)
- weak growth for general engineering +1% and building sector +2%
- strong growth for construction machinery and equipment industry: +15%

In the first quarter of the 2020, with the exception of building, the others industries had double-digit declines, exception made for general engineering: -8%.

- automotive: -24%
- crude steel: -16%.
- machine tool, robot and automation industry: -11%
- agricultural machinery: -20%
- construction machinery and equipment industry: -14%



According to figures from ANFIA (the Italian Association of the Automotive Industry), in 2019 the total number of vehicles made in Italy was **915,305 units**, a fall of **-14%** compared to 2018 (**-7%** in 2018). This comprised **542,007** passenger cars (**-19%** on 2018), **312,377 light vehicles** (**-4%**), **60,294 trucks** (**-6%**) and **627 buses** (**+67%**).

The year 2019 marked the end of the positive trend, started in 2014 by the Italian **machine tool, robot and automation industry**. Nevertheless, the registered decrease is very moderate and shows how the values of the main economic indicators are returning to normal levels, after the exploit supported by the measures of Industry/Enterprise 4.0. The slowdown will continue in 2020. There has been a strong fall of the index regarding the orders collected by Italian machine tool manufacturers in the first quarter 2020, in which an 11% decrease was registered in comparison with the same period of the previous year. This is reported in the last survey carried out by the Economic Studies Department & Business Culture of UCIMU-SISTEMI PER PRODURRE, the Italian machine tools, robots and automation systems manufacturers' association.

The overall outcome is affected by the collapse of the orders collected by the manufacturers in the domestic market, down by 41.3% compared with the period January-March 2019.

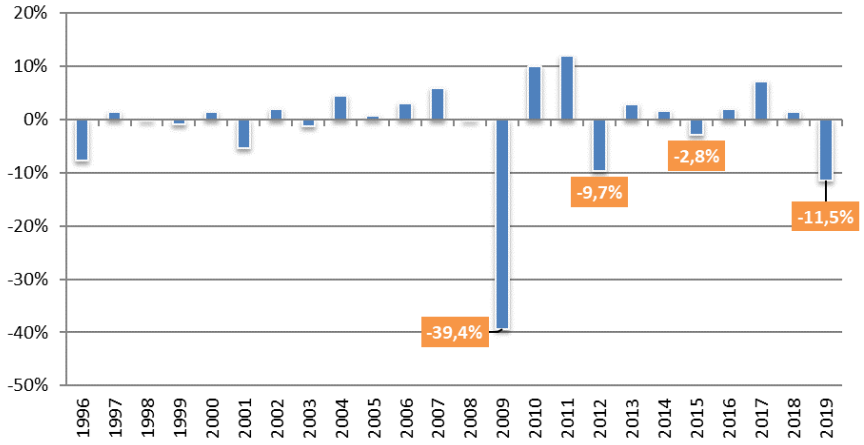
In the 2019, the **output of crude steel** in Italy was registered with a volume of 24 million tons, -5.3% lower than in 2018. The Italian Steel Association (Federacciai) forecast a menus in steel production from -10% to -15% for the current year.

A weak growth for **general engineering** +1% and **building sector** +2%. The residential building sector grew by 1.9% in 2019. Public building investments increased by 2.9%. Other sectors were stable (+0.4%). All in all, the volume of the building industry increased by 2.3% in 2019.

Developments in the foundry industry

In 2019, production activity in the ferrous metals foundry industry was marked by a strong downward trend, which gradually worsened before reaching its most critical point at the end of the year.
Over the course of the year, production of **ferrous castings** showed a decline of **-11.5%** compared to 2018, when the sector registered **growth** of **1.5%**. It comes after a cycle of partial recovery, interrupted only by the 2015 fall of **-2.8%**.
This represents the first double-digit decline since the 2012 collapse, when the drop in production almost hit **10%**.
Overall production volumes were just above **1.11 million tons.**

Trend in % variations in volume (ferrous castings in tons)



Source: CSA analysis of ISTAT data and Assofond sample surveys

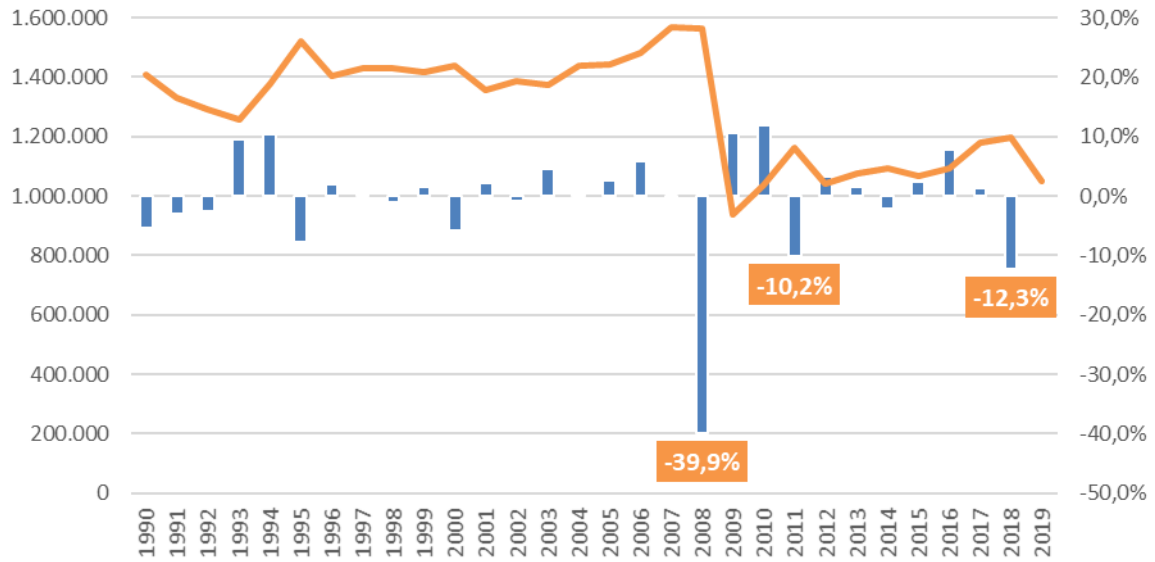
But behind the overall picture of decline in activity, in reality there lies a broad variation in performance across categories.
Looking at the main categories, the decline can be traced back to **iron castings** (down **-12.3%**), which accounts for more than **94%** of the ferrous sector with 1.049.067 tons its performance has inevitably had a large effect on the overall result.
Much more encouraging results emerged from the **steel castings** and **investment castings** categories, where trends that differ from the overall picture are not difficult to find.
In terms of **steel castings**, the figures show uneven progress over the course of 2019 – this is especially apparent when the various production specializations are compared. Overall, however, the year finished on a positive note, marked by growth of **+5.2%.** This is a significant result, especially given that it comes after a particularly challenging three years (2015-2017) for this category, which saw volume declines of **-13%**, **-8%** and **-5%** respectively over the period.
Investment castings saw a similarly positive trend, with an **increase** in volume terms of **+5.5%**.

In 2019, presales to foreign markets also slipped into negative territory
The decline in demand from abroad hit **exports of ferrous castings**, which in volume terms fell **-6%** in 2019. That was in contrast to an increase the previous year of **+10%.** Here, too, the steepest decline was in the last quarter of the year, with a fall of **-14%** compared to the same period in 2018.
In terms of the most significant destinations for Italian ferrous castings, the markets that registered the biggest shifts were the **EU-28**, with a fall of **-8%** – in particular, **Germany** and **France**, with declines of **-11%** and **-10%** respectively.
Overall, the EU-28 was the destination for 65% of Italian ferrous castings, with Germany and France accounting for **17%** and **12%**.

Further afield, despite heightened tensions over tariffs and the ensuing sharp slowdown in global trade, the **United States** – surprisingly – was a significant market. Exports to the country grew by **+5%**, which meant that it accounted for **18%** of the total volume – a full two percentage points more than in 2018.
Imports too showed a marked decrease: from **+7%** in 2018 to **-5.8%** in 2019, with the familiar end-of-year collapse.
The results of foreign trade were notably more positive in terms of value. In fact, in this area, **imports** fell by just **half a percentage point** with **exports** decreasing by a modest **-1.2%**.

Cast Iron foundries: worst result since 2009 crash
Following a year of very modest growth in 2018 (**+1.3%**), 2019 saw the production of iron castings undergo a significant collapse in terms of volumes.
At first, signs of a slowdown in the first part of the year seemed limited mainly to foundries producing cast iron for the automotive industry; however, as early as the second third of the year the negative trend gained momentum and struck – albeit at different levels of severity – all the main markets for iron castings (mechanical engineering, industrial vehicles, earth-moving equipment, agricultural machinery, machine tools and construction).
The double-digit fall in orders from the German market – above all from the automotive industry, but also in machine tools, drive systems and from mechanical engineering in general – had a huge impact on production levels in this category. In particular, the final three months of the year had a significant effect on 2019 as a whole.
At the close of the year, Italian national production of iron castings showed a decline of **-12.3%** compared to 2018 – the final volume of **1.049.067 metric tons** was the worst result since 2009 (during the global financial crisis), and 2012, when there was a fall of around **-10%**.

Production of iron castings
(right axis: % var. in trends; left axis: volumes in tons)



Source: CSA analysis of ISTAT data and Assofond sample surveys

Large falls in all main markets: mechanical engineering, transport, construction and steelmaking
The challenges facing its target markets were reflected – and occasionally magnified – in the production of iron castings.

Over half of the volumes of iron castings made in Italy are destined for the **mechanical engineering industry**, which comprises machine tools, agricultural machinery and earth-moving equipment, as well as various other products.

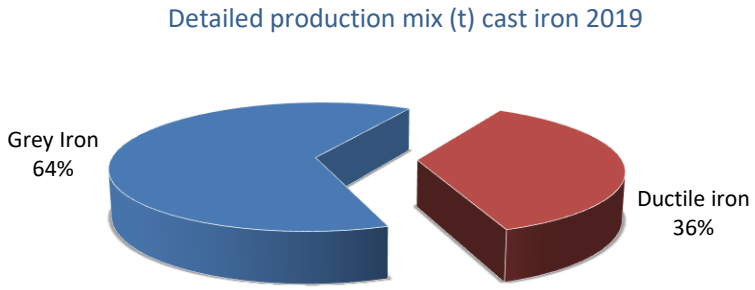
In 2019, the production of castings for this category, around **528,000 tons,** saw a decline of more than **60,000** tons – a drop of **-10.3%** compared to 2018. In terms of the detailed production breakdown, this category accounted for **319,000** tons of **grey iron** (**-11.2%** compared to 2018) and **209,000 tons** of **ductile iron** (malleable and spheroidal), with a decrease compared to the previous year of **-8.9%**.

Meanwhile, there was a sharp fall in the volumes produced by **foundries serving the automotive industry,** which felt the effects of the significant European slowdown, and in particular, the strong headwinds in the German car market – as well as the global crisis, compounded by issues in the domestic market.
According to figures from ANFIA (the Italian Association of the Automotive Industry), in 2019 the total number of vehicles made in Italy was **915,305 units**, a fall of **-14%** compared to 2018 (**-7%** in 2018). This comprised **542,007** passenger cars (**-19%** on 2018), **312,377 light vehicles** (**-4%**), **60,294 trucks** (**-6%**) and **627 buses** (**+67%**).
In 2019, the **transport** industry was the destination for around **339,000 tons** of iron castings, or **32%** of the total output. This comprised **223,000 tons** of **grey iron** (**-13.4%**) and **116,000** tons of **ductile iron** (**-11.4%**). This production category closed the year down **-12.7%**.
Globally, the picture for the automotive industry gradually worsened over the course of 2019, with increasingly concerning and widespread recessionary trends in the final part of the year.
Despite being one of the few areas of the economy to have enjoyed a positive 2019 and showing only limited signs of the severity of the 10-year crisis, the **construction** industry was unable to give much of a boost to the production of iron castings. Production destined for the industry actually took a further step backwards, with a drop of over **12,000 tons** – a decline of **-14%** compared to 2018.
Production output closed at just over **75,000 tons**.

The most significant production areas in this category are manhole covers, grilles, drain covers and hatches. These products have seen aggressive competition – first from countries in eastern Europe in the 1990s, and later from Asia, which has led to the large scale downsizing of Italian firms, who have been reduced to very low numbers. Last year's volumes account for **7%** of total iron castings – a third of what the typical figure would have been 20 years ago.
The performance of **castings for the steelmaking industry** also enjoyed mixed fortunes in 2019: the production of **ingot moulds** fell by **-8%** compared to 2018, losing by some distance the ground it had made up the previous year, while **cylinders** made a small gain **(+2.8%)**. Overall, **33,000 tons** of castings were produced for the steelmaking industry and the average result saw a fall of two percentage points against the one point gained in 2018.
Finally, the contribution of the remaining category, **"other castings"**, which accounts for **7%** of the total, saw a big decline (**-25%**).

Developments in cast iron category mix
2019 brought confirmation of the contribution of the two sub-categories of cast iron in the production mix (grey iron, at **64%** of the total, and ductile iron, at **36%**). The slowdown hit both sub-categories, with the production of grey iron castings affected most, falling almost **14** percentage points, against a decline of **-10%** in ductile iron volumes.

Production (t.)	2019	% variation on 2018
Grey iron	662,138	-13.7%
Ductile iron	387,330	-9.6%



Steel foundries: previous year's positive trend continues (+5.2%), but significant differences across firms and target markets

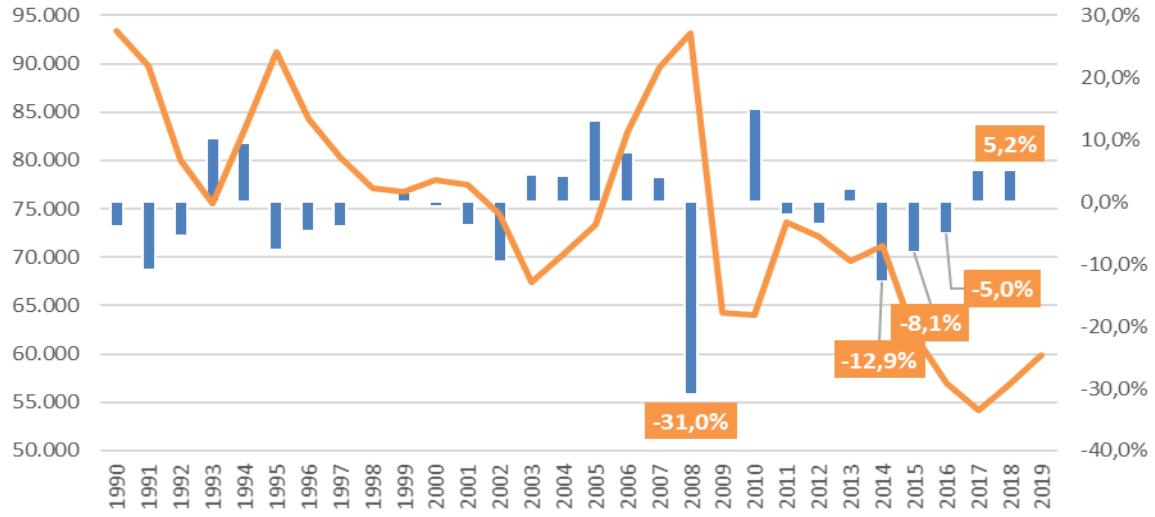
2019 is not an easy year to interpret when it comes to production data for **steel castings** due to a very marked fragmentation of the results that determine the average. In general, though, the picture is a broadly positive one with **growth** of **+5.2%** and output just shy of **60,000 tons**. In absolute terms, the category enjoyed growth of almost **3,000 tons** compared to the previous year.

The 2019 result is particularly satisfying for two reasons. Firstly, because it was achieved against the backdrop of a marked contraction in the other categories of ferrous castings and, secondly, because it comes after a three-year period (2015-2017), which was especially challenging, leading to declines in volumes of **-13%**, **-8%** and **-5%** respectively.

The category felt the effects of the collapse in the transport industry but benefited from investments in the oil and gas supply chain, which saw greater demand for turbines, compressors and other equipment. The mechanical engineering and steelmaking industries also made positive contributions. However, demand for castings for quarries, mines and building and earth-moving equipment was more disappointing.

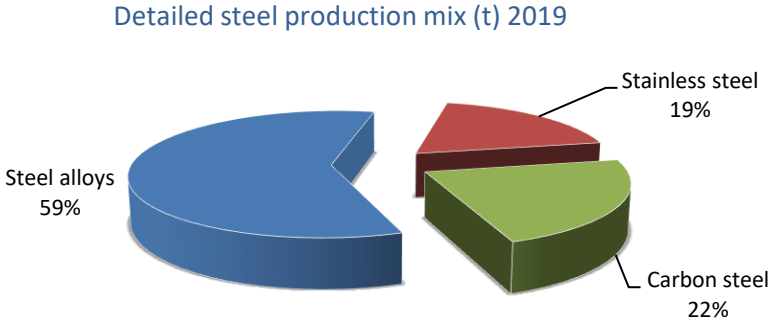
Production of steel castings

(right axis: % var. in trends; left axis: volumes in tons)



Source: CSA analysis of ISTAT data and Assofond sample surveys

Difference in development between steel types: alloys flat, inox positive, double-digit growth for carbon



A highly fragmented picture emerges from the production result broken down by steel type.
Last year, **carbon steels** showed a very impressive ability to grow (**+22.5%**), which meant the segment registered around **13,000 tons** and increased its contribution to the total steel castings category by a full three percentage points (**22%** compared to **19%** in 2018).
Stainless steel also displayed a trend towards growth (up **+5.2%**), which took its volumes above **11,000 tons** and maintained its share of the total at **19%**.
Finally, volumes of **steel alloys** lost percentage points, despite maintaining the same production levels as 2018 of around **35,000 tons**. Its share was taken by carbon steels, and this sub-category now contributes **59%** of the total, compared to **62%** in 2018.

The extraordinary growth in the production of steel castings for the mechanical engineering industry (**+22%**) gave a significant boost to the overall result of the category.
The foundries that supply the industry produced **10,528 tons** of castings, equivalent to **18%** of the total.
All production grouped under "mechanical engineering" saw significant expansion with double-digit rates of growth, albeit at different levels:

- castings for compressors and pumps (**+10%**),
- castings for steam and wind turbines (**+24%**)
- castings for the petrochemical industry (**+20%**)
- castings for valves (**+25%**)

Finally, castings for the electrical engineering industry closed 2019 at broadly the same level compared to the previous year.

Output at foundries producing castings for the mining industry, which includes castings for mining equipment, quarries and worksites, showed a downward trend of **-7%** compared to 2018.
Following a positive cycle in the transport industry and the beneficial effect on steel foundries, in 2019 the results of the contraction were reflected in the production of castings, which fell by **-5%** with a spike of **-10%** in applications for the automotive industry. The overall result for this industry was in part balanced out by the positive trend in production for other "motor industries" – marine and railway applications grew by **+11%** and **+5%** respectively.
The production of steel castings for the steel industry is deeply influenced by new investments in equipment for the steelmaking industries. In 2019, the output for this category was the same of the previous year **(1,306 tons at -0.2%).**
Castings for the construction industry go directly towards use in the building of public works. After years of worrying decline, 2019 production in this area saw a positive result, with growth of **+5.2%**, taking production levels above **11,000 tons**.

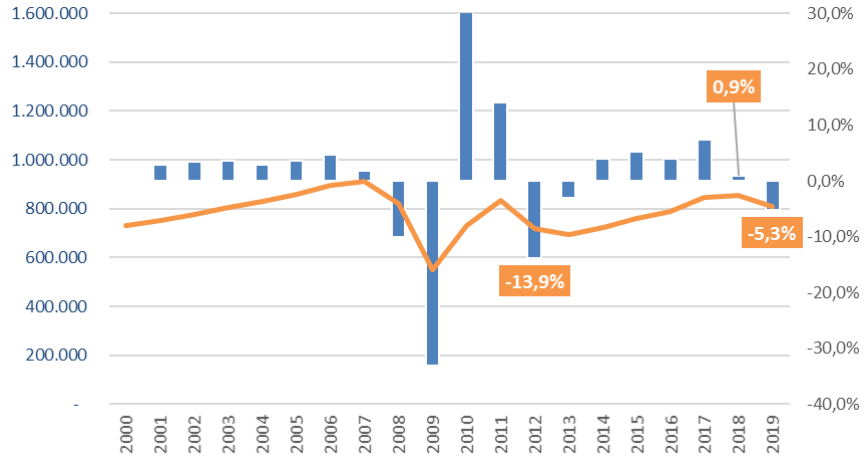
Investment castings: development in line with steel castings
In the category of ferrous castings, investment castings made using lost wax technology, together with steel castings, kept pace more effectively in 2019 than in 2018. An improving trend in volume terms showed growth of **+5.5%**, boosting overall output to **1,854 tons.**

By any measure – employee numbers, production or turnover – the Italian investment casting industry has a very high concentration of supply.
It also displays high levels of differentiation in production of ferrous and non-ferrous castings and superalloys. In terms of the mix of alloys produced, steel alloys maintain pole position relative to superalloys and non-ferrous alloy castings, and account for the largest share of production among firms that operate in this category.
As for target markets, the most significant contribution to growth came from the aerospace industry.

Automotive industry collapse in 2019 leads to 50,000 ton fall in castings for non-ferrous metal foundries
After four consistently positive years followed by a stable 2018, **non-ferrous castings** output ended 2019 with a fresh decline of **-4.9%**. The resulting loss of around **50,000 tons** drove output below the all-important threshold of one million tons per year (**959,000 tons**).
The category suffered the twin effects of a worsening in the economic climate for German car making and the fallout from trade disputes. The latter was not limited to the US and China, but spilled over into the EU and caused a significant downscaling in exports of non-ferrous castings, which are thought to account for between 50% and 60% of overall production.
The setback affected all non-ferrous metals, albeit to differing extents. The most significant contribution to the overall result, however, came from the production of aluminium castings, which accounts for **85%** of non-ferrous metals: it saw a drop of **-5.3%** compared to the previous year. The only segment to perform worse than aluminium was magnesium, with a decline of **-12%**.

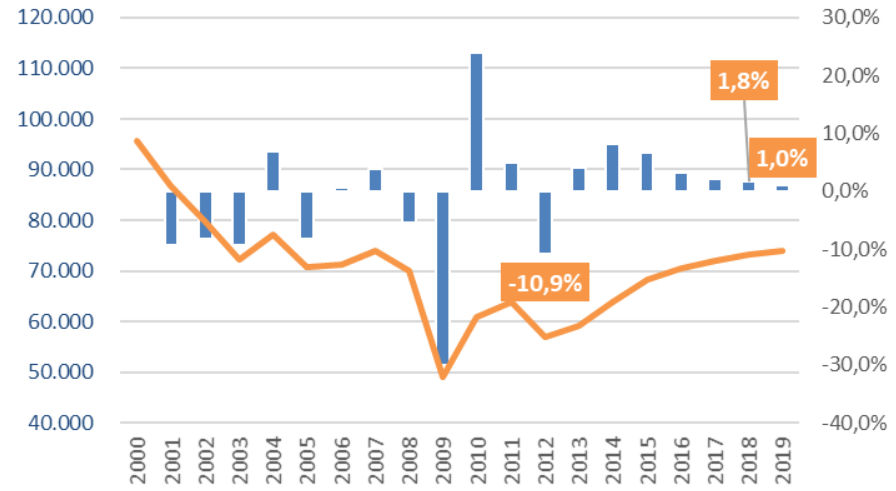
Aluminium castings
In 2019, the production of aluminium castings fell to 810,647 tons. Compared to 2018, the average annual rate of decline was -5.3%. The percentage share of aluminium for total non-ferrous castings over the past 20 years has risen by 68% to the current figure of 84%.

(right axis: % var. in trends; left axis: volumes in tons)



Zinc castings
Among non-ferrous alloys, 2019 was particularly significant for the development of the production of **zinc** alloys from die-casting (**+1%**, with volumes equivalent to **74,036 tons**). This data should be viewed with a great deal of optimism; not only is it the one positive result, it also comes after the severe challenges that have beset the segment over the past 15 years – from the slowdown in domestic demand to the widespread delocalisation to Eastern Europe and Asia by many of the industries it serves. Competition from companies in these countries is particularly apparent in large-scale production. Consequently, as a reaction to the economic challenges facing the segment, many Italian zamak foundries have implemented bold strategies in recent years that focus on medium-scale production, taking great pains to meet the more bespoke requirements of customers – and not only those related to the technical elements of casting. A number of companies' operating models are designed to provide another layer of service to the customer, and no longer simply supply a raw part, but rather finished products that are chrome-plated, painted and assembled.

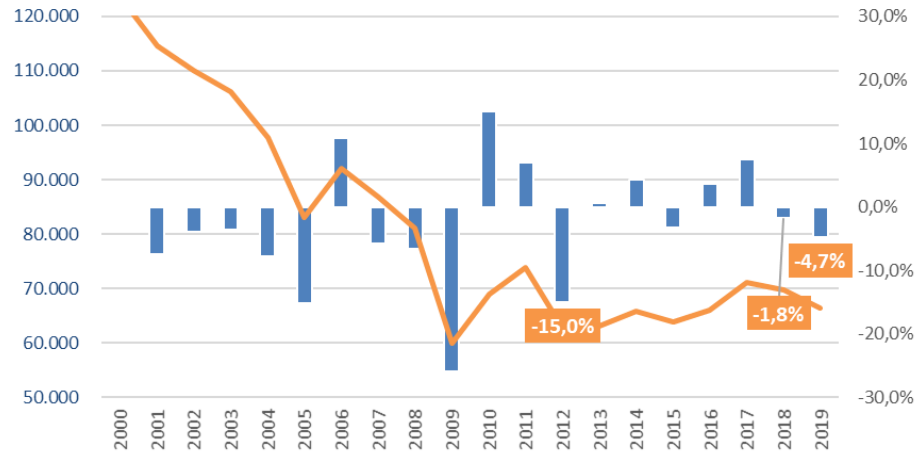
(right axis: % var. in trends; left axis: volumes in tons)



Brass, bronze and copper castings

Copper-based metals also underwent a decline in 2019. Overall production of brass, bronze and copper castings fell by **66,438 tons** (**-4.7%**). However, production in this segment – considered overall – has halved over the past 15 years, seeing a decline of around 60,000 tons. The issues that continue to influence the outlook for the segment include those common to other metals (high levels of competition from developing countries). Nevertheless, in the case of brass and bronze, they seem to have had a greater impact.

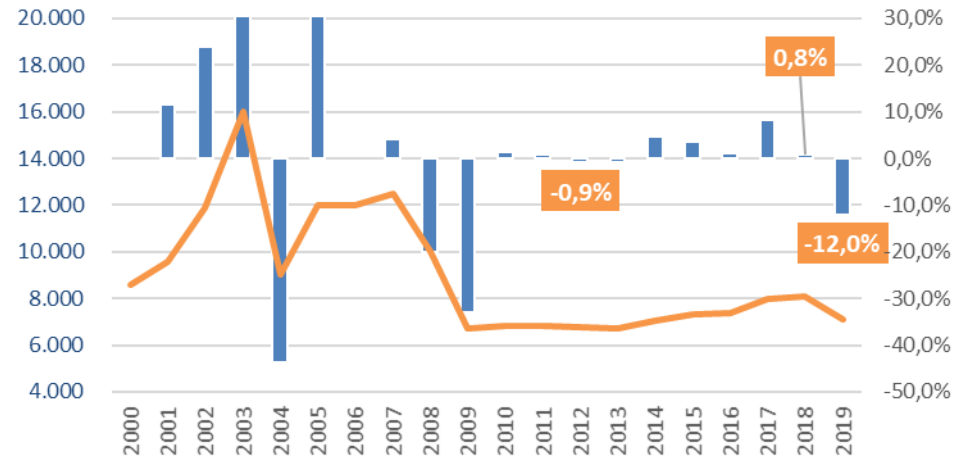
(right axis: % var. in trends; left axis: volumes in tons)



Magnesium castings

As noted elsewhere, the increased delocalised of production on the part of companies making magnesium die-castings has led to a reduction in overall volumes. These have now been stable for several years at around 7,000 tons (**7,097 tons** in 2019 with a decline, in double digits this time, of **-12%** compared to 2018). This segment also suffered last year from the negative impact caused by the slowdown in the automotive sector.

(right axis: % var. in trends; left axis: volumes in tons)



Main markets

2019 confirmed the by-now familiar breakdown of non-ferrous castings sales to the five principal industries that make up the category's customer base. Ranked in order of importance: transport industry (**55%**), construction (**14%**), consumer durable goods (**8%**), electrical engineering (**11%**) and mechanical engineering (**9%**).

The Italian market for non-ferrous castings displays a very strong bent towards the transport industry, or more accurately the automotive industry, which accounted for **55%** of overall production in 2019, equivalent to **521,637 tons** – a downward trend of **-10%**, or a fall of more than **58,000 tons**. The industry's share fell by two percentage points compared to 2018.

The ability of the construction industry, the second largest market for non-ferrous castings, to make up the ground is in consistent decline. Its share of the total was **14%** in 2019, broadly in line with the previous year's result. Last year, volumes for the industry hit **137,454 tons**, a small increase of **+1%**.

The use of non-ferrous castings in the production of electrical engineering applications displayed a good rate of growth in 2019 (**+8.8%**), which meant volumes reached **104,197 tons**. This was mainly due to the effect of greater foreign demand, allowing foundries operating in this segment to grow export volumes.

2019 was not a positive year in terms of non-ferrous casting applications for the mechanical engineering industry. The production of castings for this industry fell by **5** percentage points, with a volume of **83,736 tons**.

Cost developments input materials

In 2019 the "**Raw Material Extra Charge**", used for inflation of the cost of ferrous foundry castings concerning the main raw material (pig iron and scrap) developed on data based respectively from the Italian market of raw materials. The value, expressed in euro/t, is related to different kind of metallic materials:

- Grey cast iron: Average Year 2019 /Average Year 2018 = **-7%**
- Ductile cast iron: Average Year 2019 /Average Year 2018 = **-7%**
- Steel castings: Average Year 2019 /Average Year 2018 = **-9%**

Regarding to the total **direct cost of raw materials** not considered in "Raw Material Extra Charge", as well as the cost of energy and of the auxiliary materials that are necessary to obtain the foundry casting, Italian Foundries in 2019 applied the "Direct Transformation Input" index. It is related to different kind of furnace.

- **DTI** for Foundries using electrical furnaces: Average Year 2019 /Average Year 2018 = **-1%**
- **DTI** for Foundries using cupola furnaces: Average Year 2019 /Average Year 2018 = **-1%**

Outlook 2020
If the Covid emergency does not worsen in the next months for Italian foundry production for 2020 it is expected a decline from **-20%** to **-30%**.
In the first quarter of the current year the total castings production (ferrous and non ferrous metals) declined by -17% compared to the same period in 2019: iron (-33%) and non ferrous (-16%).

In January-April we saw a larger declines of production: -29% (-42% iron castings and -32% non ferrous castings).

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The standstill in the Norwegian economy due to the coronavirus pandemic is unprecedented. The current slump is likely to persist for several years to come.

The outlook for the Norwegian economy has changed completely in just a short time. In the last economic report published by Statistics Norway in December 2019, it was assumed that the Norwegian economy would remain approximately cyclically neutral in the years ahead.

The coronavirus pandemic has meant that the Norwegian economy is now experiencing a downturn that is likely to last for several years to come. A highly expansive fiscal policy, lower interest rates, the weakest krone exchange rate on record and falling real wages are dampening the effects on the labour market.

Norway is likely to see an economic recovery before our trading partners due to Norway's greater scope for manoeuvrability in fiscal and monetary policy and the depreciation of the krone against most currencies.

In our calculations, we have assumed that the most extreme restrictions aimed at reducing the spread of infection will be gradually eased in the second quarter, which is slightly earlier than many of our trading partners. However, there is a great deal of uncertainty about the future course of infection, and some infection prevention measures may need to be continued for much longer than we have anticipated. In such a scenario, the downturn in the economy is likely to be both more severe and last for longer than described in this report.

Below is a summary of Statistics Norway's report and the main features of the projections.

Major downturn in the global economy

Our international projection path has been adjusted downward considerably since the last report due to the spread of the coronavirus. However, growth is expected to pick up again towards the end of 2020 and the start of 2021, but our trading partners will remain significantly below the trend growth at the end of the projection period.

Norwegian economy comes to an abrupt standstill

The decline is due to the outbreak of the coronavirus and the subsequent restrictions aimed at reducing the spread of infection worldwide. At the end of March, mainland Norway's GDP is estimated to be around 14 per cent lower than at the start of the month.[1] Activity in market-oriented businesses and public administration has declined significantly. Closed kindergartens and the cancellation or reduction of a number of healthcare services have led to a decrease in public administration activity. In the market-oriented businesses, the decline is particularly pronounced in certain service industries, such as accommodation and food service and culture and entertainment.

There is great uncertainty about the further development of the Norwegian economy. We assume that the most extreme measures to prevent the spread of infection will gradually be eased during the second quarter, but that some of the measures will continue for longer. Even if the restrictions are gradually lifted, their repercussions and the downturn in the global economy are likely to keep the Norwegian economy in an economic downturn for almost the entire projection period, up to 2023.

Dramatic increase in registered unemployment

Between 10 March and 24 March, the Norwegian Labour and Welfare Administration's registered unemployment (100% unemployed) figure increased from around 65 000 to approximately 290 000, where it has remained as of 21 April. On 21 April, this corresponded to 10.2 per cent of the labour force. In these statistics, those who have been laid off full time are counted as unemployed. We assume that many of those who are now laid off will be re-employed when the restrictions are reduced. The Labour Force Survey (LFS) records those who have been laid off full time for less than three months as employed. This means that unemployment as measured by the LFS, which is what we forecast, will be

significantly lower than the figures from the Norwegian Labour and Welfare Administration in the coming months.

Thereafter, the LFS figures will increase, since those who have been laid off for three months or more will be counted as unemployed, and new people entering the labour market will not be able to find work. The potentially large growth in young unemployed people is likely to be offset to some extent by an increase in those choosing instead to continue their education, as has been the case in previous economic downturns. According to our calculations, unemployment measured by the LFS will rise to approximately 6 per cent as an annual average in 2020 and then decrease somewhat until 2023. The level of unemployment measured by the LFS is the highest and most persistent we have witnessed since the banking crisis in the early 1990s.

Record-low wage growth expected in the years ahead

The front-runner industries model governs the development in average annual salaries. As a result of the coronavirus pandemic, this year's wage settlement (a main settlement) has been postponed until 3 August. The deadline for the Federation of Norwegian Industries and the United Federation of Trade Unions reaching agreement is 21 August.

The fall in demand among our trading partners has put intense pressure on the profitability of many internationally exposed industries. A weaker krone and lower energy prices may help to ease the situation for some businesses, but this is little consolation for companies whose demand has disappeared completely. Historically, the front-runner industries model, which is based on wage growth being adapted to what the internationally exposed industries can withstand, has served as a cushion against the downturn in the Norwegian economy. We assume that the front-runner industries model will also play this role in the current economic downturn. Nominal wage growth is expected to be 2 per cent in 2020 and 1.6 per cent in 2021. This means that real wages will be reduced in 2021. In 2022 and 2023, wage growth is expected to pick up to some extent.

Record-high increase in structural non-oil public deficit

The Government and the Storting have introduced several financial measures to offset the repercussions of the coronavirus. The Ministry of Finance estimates that the measures adopted so far, as well as the effect of lower activity in the economy, will weaken the budget by NOK 200 billion in 2020. In total, this represents 7 per cent of Norway's mainland GDP. The sum of the current measures provides a stimulus of just under 5 percentage points to the Norwegian economy, as measured by the budget indicator. In comparison, the fiscal policy strategy during the financial crisis in 2009 was intended to provide a budget impetus of 2.4 percentage points. The fiscal rule dictates that, over time, the use of oil revenues should constitute 3 per cent of the Government Pension Fund Global but that considerable emphasis should be placed on smoothing out fluctuations in the economy in order to ensure good capacity utilisation and low unemployment. After remaining at just under 3 per cent for several years, the structural non-oil public deficit is expected to be around 4 per cent in 2020 as a result of the financial packages introduced. If new crisis packages are launched, or the existing arrangements are extended, the deficit could be significantly higher than 4 per cent in 2020. We assume that the structural non-oil public deficit will return to around 3 per cent over the next few years, but this estimate is subject to considerable uncertainty.

Lower petroleum investments

Norwegian measures to reduce the spread of infection are having a direct impact on petroleum investments on the Norwegian continental shelf. The pandemic is also indirectly impacting on investments due to the sharp fall in oil prices. The measures have led to lower investment activity on the Norwegian continental shelf since early March. Virtually all activity not dependent on production in the field has been halted in order to minimise the risk of infection. It is likely that the progress of some ongoing developments will be slower than planned, both due to infection control measures and the need to postpone costs. Lower oil prices are likely to result in some investment activity being delayed until next year. We estimate that petroleum investments will be reduced by around 9 per cent in 2020 and around 12 per cent in 2021. This factor alone will push down mainland GDP growth by 0.3 percentage

points on average over these two years. In 2022 and 2023, petroleum investments are expected to pick up again in line with a moderate upturn in oil prices.

Business investment expected to see a marked fall in 2020

Investment trends are highly sensitive to reduced demand, and according to our calculations, business investment will fall by around 20 per cent in 2020. Manufacturing investment is expected to fall even more. Even before the outbreak of the coronavirus, reduced manufacturing investment was expected this year as a result of the completion of several projects in the oil refining, chemical and pharmaceutical industries in 2019. Only slightly reduced investments are expected in power supply. Service investment is also expected to be lower. According to our calculations, business investment will recover somewhat, but will continue to be about 10 per cent lower in 2023 than in 2019.

Slowdown in the housing market has begun

The monthly house price statistics from Real Estate Norway show high seasonally adjusted house price growth in January and February this year of 0.9 and 0.5 per cent respectively. In March, this trend was reversed as house prices fell by as much as 1.4 per cent. This is the most dramatic fall in house prices in a single month since the financial crisis in 2008. The price fall in March this year was broadly based on the nationwide situation, with the strongest decline in Oslo and Trondheim. The housing market also showed subdued activity in March this year, as the number of homes sold and put on the market was around 14.5 per cent less than in the corresponding month last year. Meanwhile, sales of new homes were down 47 per cent in March this year compared to March last year, according to the Norwegian Home Builders' Association.

It therefore appears that the outbreak of coronavirus and the infection control measures implemented by the authorities affected both the housing prices and the activity in the housing market in March. Although mortgage rates are at a record low, prospects for modest income growth and general uncertainty about the future economic development are likely to lead to continued falling house prices through much of 2020, before a gradual recovery. House prices at the end of 2023 are expected to be about 5 per cent higher than at the start of 2020. This weak development is also likely to mean that housing investment will fall this year and next. According to our calculations, housing investment will account for just under 6 per cent of Norway's mainland GDP in 2023, which is around the average for the last 20 years.

Major fall in household consumption

Household consumption in some goods and service categories has come to a complete standstill. When some of the restrictions introduced on 12 March are eased at the end of April, parts of the service consumption will pick up again. The ban on staying overnight at holiday cabins outside owners' municipality of residence has also been lifted, but the public are still being encouraged to avoid unnecessary travel. This may lead to the normalisation of some consumption, but nowhere near the level at this time last year.

Many people have experienced a large loss of income due to the economic crisis. This in turn will lead to weaker consumption development in 2020, even if the authorities' efforts to fight the virus prove to be successful. Conversely, some households will not have experienced such a fall in income, and these are likely to boost the recovery in consumption. Overall, we estimate that consumption will fall by around 10 per cent in 2020 and that there will be a significant recovery in consumption in the years ahead.

Record-low krone

The import-weighted exchange rate was weakened considerably in March from its already weak level, but about half of the depreciation has subsequently been reversed. We expect the krone exchange rate to remain at the current level going forward.

Key policy interest rate to remain at record low for some time

Norges Bank reduced its key policy interest rate twice in March, by a total of 1.25 percentage points, bringing it down to 0.25 per cent. Norges Bank explained that the latest interest rate cut was to reduce corporate borrowing costs on existing and new loans during the crisis. The expansive effect of the interest rate cuts is not expected to be seen until after the situation has normalised. Since then, the Storting has agreed a temporary grant scheme for businesses experiencing a large drop in turnover, which is aimed at covering part of their unavoidable costs, including net interest expense. The scheme means that Norges Bank's interest rate cuts will have less significance for the business sector, as some of the interest costs of the hardest hit companies will be covered regardless. When the infection control measures start to ease off, activity in the economy will pick up. In our projections, the current interest rate level is regarded as appropriate for the economic situation that is expected when the measures to stop the spread of the virus are lifted. We assume that the key policy interest rate will remain at around 0.25 per cent throughout 2021 and then gradually increase. In 2023, the key policy interest rate is expected to be around 0.75 per cent.

Inflation expected to be higher in the years ahead

The weaker krone is pushing up the imported inflation this year, but is also affecting inflation in the longer term due to lags in cost developments and pricing. The impact of the krone depreciation on Norwegian import prices is mitigated by the falling external inflation and by the fact that some import demand will, over time, shift towards countries that have improved their competitiveness in relation to Norway. Low energy prices in the current year will help to reduce price increases, both directly and indirectly. For 2020, we expect CPI growth of 1.2 per cent and 2.8 per cent growth in the CPI-ATE. Growth measured by the CPI is then expected to rise to around 2.0 per cent in 2023.

[1] See Bougroug and Sletten (2020). Nåsituasjonen i norsk økonomi. Statistics Norway. Documents 2020/17.

	2015	2016	2017	2018	2019	2020 E
GDP	2,0	1,1	2,3	1,3	1,2	-4,0
GDP Mainland Norway	1,4	0,9	2,0	2,2	2,3	-5,5
Unemployment rate (level)	4,5	4,7	4,2	3,8	3,7	6,3
Consumer prices (CPI)	2,1	3,6	1,8	2,7	2,2	1,2
Wages pr standard man year	2,8	1,8	2,3	2,8	3,5	2,0

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Main macroeconomic indicators in Poland in 2019

- A growth in sold industrial production amounted to 4.0%.
- In the manufacturing section, production grew by 4.2%.
- Construction and assembly production grew by 2.6%.
- Consumer Price Index was higher by 2.3%.
- The number of registered unemployed amounted to 866.4 thousand (down by 10.6%).
- Registered unemployment rate amounted to 5.2%.
- The Monetary Policy Council did not change the interest rates.
- The Polish currency weakened against the US dollar and euro.

Foundry industry in Poland

In Poland there are almost 400 foundries (including small craft enterprises with small production and employment). According to the statistical data, 60% of them are independent foundries and the remaining 40% are the departments of larger companies in which the casting department supplies the castings to their final products.

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.

The main customers of Polish foundries are following industries:

- Automotive – 62%
- Building – 10%
- Machines – 9%
- Railway – 4%
- Steel works – 4%
- Agriculture – 2%
- Mining – 2%
- Energy – 2%
- Other – 5%

The share of exports in total castings production in 2019 was at the level of 60%.

The production of castings in 2019, including ferrous and non-ferrous alloys reached 1 011 500 tonnes (estimated data).

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 2019 it amounted to 45%.

Ductile iron castings account for 15,5% of total castings. 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 2019 the share of steel castings amounted to 5% of the total cast production.

Non-ferrous metal castings accounted for 36% of total cast production in 2019. In the last decade, the production of non-ferrous metal castings has shown an uptrend.

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General Economy

The external environment of the Portuguese economy has been generally favorable in 2019. The global economy has continued to expand at a solid pace against a background of continuing favorable financial and labor market conditions and relatively high levels of confidence of economic agents in the major advanced economies

According to the latest results of the INE (National Statistical Institute) in 2019, Gross Domestic Product (GDP) registered a real growth of +2,2%, in relation to the previous year (+2,1% in 2018 and +2,1% in 2017).

Exports of goods and services were the component of overall demand that contributed the most to the recovery of the Portuguese economy that began in 2013. In 2019, with a total export value of 93,5 billion euros (58,2 billion euros in goods and 35,3 billion euros in services), represents growth of 5,6% over the previous year of 2018.

The employment situation

In 2019, the active population in Portugal amounted to 5,252.6 thousand people, corresponding to an activity rate (15 and over) of 59.3%, 0.2 percentage points higher (p.p.) than in the previous year. The employed population was estimated at 4,913.1 thousand people, having increased by 46.4 thousand people (1.0%) compared to 2018. The unemployment rate achieved in 2019 was 6,9% of the active population.

In the foundry area, the demand for specialized technicians, operators and maintenance staff is increasing every year. Companies have difficulties in capturing talent and to keep them in their organizations.

Foundry Industry

The automotive industry keeps being the main customer market, which demands roughly 70% of the global Portuguese production of foundry goods.

The Portuguese foundry sector exports 90% of the total production (in weight) mainly to the European market.

Production

In 2019, the outcome of the Portuguese foundry industry was roughly 197 thousand tons, 140,4 thousand tons from the ferrous sector and 56,5 thousand tons from the non-ferrous sector.

The steel foundries had a decrease production for the third consecutive year. Steel and the nodular iron foundries have decreased their production too, which was reflected in a global decrease in the ferrous sector of 3,4%. The non-ferrous sector had a slight decrease in its production, around 0.04% less than 2018.

Ferrous Production

In the ferrous sector, as mentioned above, a decrease can be seen in all sub-sectors.

Non Ferrous Casting Production

In 2019, the non-ferrous metal castings production, as a whole, registered a decreased of 0.04% mainly due to the light castings. The aluminum pressure diecasting decreased its production in 1,6% comparing to the previous year. This decreased was mainly due to the automotive industry needs, since this subsector is very dependent on this industry. The zinc alloys (pressure diecasting and gravity die casting) increased the production 1,0% comparing to 2018 and the copper castings alloys increased 3,4%.

New casting plants and investments

In 2019 no new foundries were installed in Portugal, although during the year occurred several investments in the existing foundries to increase the plant output capacity.

Global investments in the non-ferrous sector during 2019 was around 25,6 M€, mainly in aluminum foundries. In 2020, the planned investments will decrease for a total amount of 13,5 M€.

Global investments in the ferrous sector during 2019 was around 15,7 M€, mainly supported by iron casting. In 2020, the planned investment will go up to 19 M€.

Industrial Cost

In 2019, the price of most raw materials on the ferrous sector was constant throughout the year.

In the non-ferrous sector, the price of raw materials reflected a decrease on aluminium, zinc and copper alloys along the year.

Electricity – in 2019 there was a decrease in the electricity cost. 2019 showed a decrease of the network access and use tariffs, and a slight decrease in the energy price both responsible for a decrease of the electricity bill for the industrial consumers. For 2020 is also expected a decrease of the electricity cost.

The gas price decreased from 2018 to 2019 due to the decrease of network access and use tariffs of natural gas. This reduction indicates a continuation of the falling trend in natural gas prices for industrial consumers in the last four years (fall of price up to 4% for the bigger consumers). In 2020 this tendency of decrease of gas price will continue.

Incoming orders

The needs of automotive sector suffered a decrease in 2019. In 2020, due to the pandemic, this decrease was very sharp. The automotive sector was the most affected, with production declines of around 30% compared to last year (data up to June 2020).

Foundry vocational training

The Portuguese Foundry Industry has its own training and vocational center, CINFU, a joint partnership with APF-The Portuguese Foundry Association and the Portuguese Institute of Employment and Vocational Training, which has once more made an outmost job training for the 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.

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Slovenian foundry industry and economic trends in 2020 and 2021

Slovenian foundry industry in 2019

In 2019 the Slovenian foundry industry had a good year. The total production was 195.609 tons it is only 1% less than 2018. Production of grey iron was 58.281 tons, ductile iron 43.867 tons, malleable iron 3200.00 tons. We had only 872 tons of Cu-alloys, 54.625 tons of aluminium alloys and 9.665 tons of Zinc. Almost 85% of production was sold abroad, the export was mostly for Germany, Austria, Italy… **All together we have 58 foundries, the number of emploided persons is 5359 workers. Income is 815 millions Euros, export is more than 85%.**
The problems in foundry industry had the same problems as the whole Europe foundry sector, so we made only a comparison that is sensible.

For the needs of outlining a revised state budget, IMAD updated its forecast of economic trends for 2020 and 2021 at the beginning of June, as stipulated by Article 11 of the Intervention Measures in the Fiscal Area Act adopted on 20 March 2020. The forecast is based on the latest data (available up to 10 June) from international institutions for Slovenia's trading partners, as well as on available data on current economic developments and the adopted economic policy measures.

The COVID-19 pandemic, in combination with strict health protection and containment measures, represents a significant negative shock to economic activity in European countries and worldwide. The strict measures to contain the spread of the coronavirus have led to a pronounced contraction in economic activity in the euro area and globally due to the shutdown of businesses in non-essential service activities and hampered activity in industry and other service activities. In order to alleviate the negative consequences of the epidemic, extensive packages of measures have been adopted at the level of countries and by the ECB and the European Commission to help businesses and citizens to bridge liquidity problems due to a loss of income and to boost economic recovery. While these measures will not prevent the decline in economic activity, they have a significant impact on its extent and are essential for restarting activity.

The prospects for economic growth in main trading partners have deteriorated strongly since mid-March, a recession of historic proportions being predicted in the majority of countries for this year due to a deep decline in activity in the second quarter. IMAD's forecast takes into account international institutions' latest forecasts for Slovenia's trading partners (published by 10 June), which mostly assume gradual economic recovery after the first wave of the epidemic is contained. At least at the beginning, it will be most intense in manufacturing, while service activities, especially those related to tourism, will be recovering more slowly. As the virus is still present and some containment measures have remained in place, we assume no rapid rebound to the pre-epidemic level in the international environment. The mitigation of possible negative consequences will continue to crucially depend on the responsiveness of economic policies, while a more lasting stabilisation of economic conditions can probably be expected only after the development and general introduction of a vaccine or an appropriate medicine.

In the Summer Forecast, we predict a 7.6% decline in GDP in 2020, which will be followed by a recovery in 2021, but in most activities value added will remain lower than before the outbreak of the epidemic. This year's decline in GDP will arise from a fall in value added in a number of sectors, which will be a consequence of a significant contraction of activity in the first half of the year, particularly in the second quarter. After the containment of the epidemic and the loosening of protection measures, economic activity is expected to recover in the second half of the year, but the recovery will be gradual and its pace uneven across sectors, as the virus is still present and some restrictions in Slovenia and trading partners remain in place. This year, value added is set to decline the most in accommodation and food service activities, arts, entertainment and recreation, personal service activities and transportation. A somewhat smaller, yet still significant, fall is expected in manufacturing. Owing to the negative external impacts and containment measures at home and abroad, we expect a significant decline in exports and imports this year. High uncertainty is also affecting investment decisions, which will be reflected in a substantial contraction of investment, particularly in machinery and equipment. Private consumption will also drop more than last year due to restricted movement and limited supply

during the epidemic and increased uncertainty, although disposable income will remain similar to that last year due to the government's support measures. Government consumption however will strengthen temporarily in crisis conditions. Under these assumptions, we could see a gradual recovery in most activities in 2021, but it will remain uneven. We also expect an increase in external trade and investment, particularly investment in construction and, with some lag, machinery and equipment, but growth will not fully substitute this year's declines. Labour market conditions will stabilise only gradually following this year's deterioration.

Uncertainty and the risks of an even sharper decline in GDP associated with possible recurrences of major outbreaks of COVID-19 remain high, but there are also some upside risks to the baseline projections. A new and more intense outbreak would lead to the reinstatement of stringent measures to contain its spread, which in turn would again strongly hamper business operations in service sectors and industry. Companies would no longer be able to carry out their activities, the number of bankruptcies would increase and greater consequences would also be felt on the labour market. If this were to happen this year, GDP would fall even more and bankruptcies and increased unemployment would also contribute to a weaker recovery. However, if a vaccine or a medicine is developed and made available soon, or if the spread of the virus is effectively and more permanently contained, activity may recover more rapidly than predicted in the baseline scenario.

The corona crisis has also brought Slovenia some new opportunities, or risks if it does not take advantage of them. The shortening of global value chains or a shift towards suppliers in closer geographical proximity, which had actually already started before the epidemic, presents an opportunity for higher economic growth in Slovenia in the medium term, as, given its welldeveloped infrastructure, high-quality workforce and EU membership, it could attract investment from Western Europe. As measures to boost the economy at the EU level encourage investment in digital and green transformation and the transition to more sustainable economic development, it is essential for a successful recovery from the crisis that Slovenia will be able to adapt accordingly (including by preparing projects for the absorption of EU funds) and use this period as much as possible for addressing developmental challenges (i.e. for training and education, research and development, acceleration of digital transformation, etc.). In view of the risk of a new wave of infections, the period after the end of (the first wave of) the epidemic should also be used to better prepare for its recurrence. By investing in people and equipment, it is necessary to strengthen the health care system and improve the system of social care and the conditions in nursing homes, which have proved to be a weak point during this crisis. It is also necessary to increase investment in R&D and in the development and production of medicines and protective equipment.

Institute of Macroeconomic Analysis and Development
Association of Metals and Nonmetals
Slovenian Foundrymen Society

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The Economy in General and Industrial and Metal Sector in Particular

The Bank of Spain estimates GDP growth for 2020, between -9% and -15.1%. Spanish GDP would fall 9% this year 2020, and would rebound 7.7% and 2.4%, in 2021 and 2022 respectively. In a second scenario, considering a gradual recovery, and with possible less virulent epidemic outbreaks, GDP would fall by 11.6% in 2020, and would grow by 9.1% and 2.1% in each of the following two years. Finally, it defines another scenario (the most pessimistic), with a very slow recovery, which would include substantial new infections spikes and new measures to restrict activity. In this case, the drop in GDP in 2020 would reach -15.1%. Spain is among the countries in the euro area with the worst growth forecasts, due to the high weight of tourism.

The IMF, in the report for June 2020, reviews the Spanish GDP in 2020, placing it at -12.8%. In 2021, the Spanish economy would rebound at a rate of 6.3%.

Industrial sector

In December 2019, the Industrial Production Index (IPI) increased 1.7% compared to the same month the previous year. The average variation in 2019 shows an increase of 0.6% compared to 0.7% in the same period of the previous year.

In December 2019, the Order Entry Index in the Industry, decreased by 0.9% compared to the same month of the previous year. In 2019, the Order Entry Index in the Industry registered a negative rate of -1.0%, (+5.9% in 2018).

In 2019, the Business Turnover Index in the Industry rose 0.4% (4% in 2018).

Metal Situation

Turnover of the metal sector grew in 2019 by 0.8%, and orders fell by -2.8%.

Industrial metal production records a rate of 1.7% in December with respect to the same month of the previous year. In the accumulated of the year, an increase of 0.9% is recorded in 2019 (1.9% in 2018).

Exports of the Metal Sector increased in December 2019 by 3.8% (compared to the same month of the previous year). On average, Exports increased by 1.1% in 2019. On the other hand, Metal imports increased 1.9% in December 2019, compared to the 3.7% fall registered in November 2019. An increase of 2% was registered for the overall year.

Labour Market

The annual variation rate of employment is 2.06% (402,300 more people). The unemployment rate stands at 13.78% in 2019. The number of unemployed in the Metal Industry registered a total of 49,725 unemployed people in the average of the year 2019, which represents a reduction of 0.2% compared to the previous year.

Foundry Sector

Iron Casting Section. Automotive Casting

In Europe in October 2019 there was perceived slowdown and pessimism. There were new projects stopped (while in June 2019 there was euphoria).

Some foundries were meeting 2019 forecast.

There were differences in perceptions. In November 2019 some were good and others not so much. Some plants with stops.

Iron Casting Section. Mechanical Molding
Orders have dropped during 2019.

In November 2019, in general, all sectors were sad (industrial, agricultural, valve, railway...).

The agricultural sector has decreased considerably during 2019.

The sewer sector is stagnant.

Iron Casting Section. Manual Molding
Pessimistic environment. The Automotive Sector is doing poorly and other sectors, in general, are also weak.

The Die and Machine Tool are loose. The trend is downward.

The Large Piece Wind Power Sector has had and has a stable demand in the medium to long term.

Uncertainty for 2020. No projects are foreseen. A drop is expected for 2020.

Stainless steel
The Paper Sector was not very good.

The Marine Sector will drop during 2020.

The Water Treatment Sector has been very strong during 2019.

The Oil & Gas Sector has decreased somewhat in the second half of the year.

Customers are increasingly demanding.

2019 has been a good year. The 1st half has been good and the 2nd more motionless.

There is uncertainty for 2020.

Steels Castings
The Railway sector was growing. It is a demanding sector with high quality requirements.

The offshore has been maintained or lowered somewhat.

In 2019 the Construction and Die sectors have been weak.

The Automotive sector has been bad.

The Tooling has been at a good level in 2019 but some decline is expected in 2020.

Uncertainty for 2020. There is a feeling of pessimism. In overall, 2019 has been similar to 2018. Most foundries have a highly diversified portfolio.

Non-ferrous
Aluminum foundries have produced similar to 2018. Production has had a slight positive evolution of + 1.7%.

For Zamak there has been a decrease in 2019 compared to 2018: - 6.6%.

Raw Materials and Auxiliaries

Analysis of the Evolution of Raw Materials Prices And Auxiliaries in 2019

Scrap prices ended 2019 with prices slightly lower than at the end of the previous year (-1.08%).

Ingot prices have evolved downwards, being at the end of 2019 slightly below than prices of a year earlier (-0.82% in the case of pig iron ingot and -1.52% in the case of nodular ingot, between December 2018 and December 2019).

FeMo has suffered a sharp fall in the last year (-18.94%), while Nickel has evolved very upward (+28.57%). The FeCr has evolved downward and ended 2019 with prices lower than those of December 2018. Ferrosilicon stone has evolved downward (-13.04%).

Graphite has had a decrease during 2019.
Sands have had an increase between 2% and 2.5% in 2019.
Shot has also increased its price during the year.
Resins on the contrary, in general, have dropped during 2019.

Energy costs: During the second half of 2019 the pool price has been very low, so the average energy costs for 2019 have been slightly lower than those for the 2018.

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Economic situation and main indicators

Sweden now has about 10.3 million inhabitants, which is a steady growth. The unemployment rate at the end of the year was 6.8% in total, slightly higher than 2018. The Swedish economy has clearly entered a stagnation, which is normal after several years of an economic boom. This stagnation is furthered strengthened by the insecurities regarding Brexit and trade conflicts.
Inflation in December 2019 amounted to about 1,7 %. The PMI index (Purchasing Managers Index) was during the first half of 2019 above 50 with indicates expansion, however from September to the end of 2019 the index was below 50, signaling a contraction.

General casting industrial structure

The number of foundries in Sweden is rather stable. Two HPDC foundries declared bankruptcy, but the production sites were taken over by two other HPDC foundries. This means that during 2019 we still had just less than 100 foundries (approximately 25 iron foundries, 11 steel foundries and some 60 metal foundries, mainly aluminum). As usual the customer side is dominated of the automotive sector, and nearly 70 % of the total production end up in the transport sector as components in trucks, light cars and construction equipment. The building of two new iron foundries, one at Scania and one at Volvo, which we mentioned in previous reports, has progressed according to plan in 2019.

Continued investments in automation have reduced the need for recruitment and the stagnation in the economy with higher unemployment figures have made it somewhat easier to recruit. The industry still has difficulties in recruiting younger and well-educated employees and further actions must be taken in order to make the industry more relevant. During 2019 a web-based distance education package for HPDC was launched as a result from a European project, see www.e-cast.eu

Production
The total foundry production has decreased with approximately 3 % between 2018 and 2019. The decrease is connected to the stagnation of the Swedish economy. This stagnation started in 2018 however was not as visible in the foundry industry at the time.

In table 1 below you can see the figures for the total production (tons).

Material	2019	2018	Diff (%)
Iron, total	216 900	225 700	-3,9
Steel	23 500	22 900	+2,8
Non-ferrous total *	65 100	67 270	-3,2
Total production, all materials	305 500	315 870	-3,2

Table 1. Total foundry production in Sweden, 2018 and 2019

* Al ~ 48 000, the rest is a mix of Cu, Zn and Mg
Regarding Al we estimate that approx. 75 % is High pressure die casting (HPDC) the rest, approx. 25 %, is a mix of Gravity casting and Sand casting.

During 2019 the Swedish foundry association along with RISE and Jönköping University presented a strategic agenda for the Swedish foundry industry in the perspective 2020 - 2035. The focus of the agenda is to realize a sustainable Swedish foundry industry. Three focus areas have been identified in order to fulfill the purpose namely: an attractive industry, advanced products and competitive and sustainable production.

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Swiss foundry industry feels the economic downturn in 2019

Last year, the 45 companies merged in the Swiss Foundry Association (SFA) produced a volume of 42,160 tonnages delivered, in total nine per cent less than in the previous year. The interbranch organisation expects stabilisation on this lower level for the current year.

Thanks to outstanding innovative developments and the typically Swiss values in terms of quality, reliability, flexibility and punctuality of delivery, the Swiss foundry industry was also able to consolidate its good position in the international competition in 2019. In the first place, growth rates were achieved through new orders from the entire transport sector, especially from the automotive and commercial vehicle industry. Increasingly complex lightweight cast parts to reduce CO_2 emissions feature among the Swiss foundry industry's specialities. There was also an increasing number of orders received relating to e-mobility and from the entire environmental and energy sectors for new sustainable developments, including for drinking water supply and sanitation. The continuing boom in the building trade at home and abroad also ensured good utilisation of production capacity.

In the first half of 2019, the order situation in the Swiss foundry industry saw a stable upward trend – with continually moderate growth rates compared to 2018 in practically every user market. In the second half of the year, though, the growth momentum slowed down markedly; in some member companies of the SFA with losses in incoming orders and utilisation of production capacity of roughly 10 to 20 per cent towards the end of last year. Altogether, in 2019 the production volume of the 45 Swiss foundry companies merged in the interbranch organisation fell by approximately nine per cent on the previous year to 42,160 tonnages delivered.

The drop in incoming orders reflects the downturn in the economy of the Swiss foundry industry's key export markets, which account for about 80 per cent of the total business volume. The significant slowdown was caused by the trade dispute between the USA and China as well as the unresolved Brexit.
In this environment of economic uncertainty in 2019, it was primarily major corporations that made increasingly fewer investments. The customers from the automotive industry hugely stepped up the pressure again for price reductions to finance the upcoming investments in the new technologies like electromobility, autonomous and connected driving. Lightweight measures have become standard and a commodity.

In addition to the global slump in business development, the falling margins due to the successively repeated strengthening of the Swiss franc against the euro also had a negative impact on the annual result.

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A. Macroeconomic Developments

2019 was the year of recovery for the Turkish economy after the negative macroeconomic developments, political tensions, geopolitical risks and the changes in the global risk perception in 2018. After three consecutive quarters of year-on-year contraction, real GDP growth resumed in the third quarter of 2019 and strengthened in the fourth, bringing 2019 growth to 0.9 percent.

The central bank cut interest rates from 24 percent in June 2019 to 9.75 percent in March 2020. This rapid monetary easing stimulated domestic demand which strengthened notably in the final stages of 2019. This development, together with the supported exports due to the currency depreciation aided the recovery in GDP.

With the government's reinforced focus on achieving high growth rates, lower borrowing rates and related regulations boosted private sector credit growth by 10 percent. On the other hand, the substantial minimum wage increase at the beginning of 2019, temporary indirect tax cuts and credit expansion by public banks accelerated private consumption, which grew 6.8 percent year-on-year.

Consequently, 6.0 percent year-on-year growth in the fourth quarter yielded a 0.9 percent economic growth in 2019. Due to the depreciation of the local currency by 13 percent, Per Capita GDP in USD kept contracted by 5.8 percent.

Households benefited from a relative reduction in the unemployment and inflation rates, especially during the last quarter, although both remained elevated nonetheless. Employment has declined through 2019, despite considerable additional job creation in public and social services and the rate dropped from 46.2 in 2018 to 45.4 percent in 2019. Seasonally adjusted data shows that the unemployment and youth unemployment rates rose 0.2 points to 13 percent and 0.5 points to 23.9 percent relatively.

Strong domestic demand boosted import growth in the last quarter which grew 29.3 percent year-on-year during this period. But looking at 2019 as a whole, exchange rate depreciation delivered competitiveness gains, thus exports grew 2.1 percent year-on-year despite a 9.1 percent decrease in imports as compared to the previous year. Manufacturing export orders from the European market have contracted, but aggregate exports have remained positive, mainly due to tourism exports. As a result of export growth outpacing that of imports, the annual export to import ratio increased from 75.3 to 84.6 percent in 2019, which was the highest ratio in a decade.

The current account deficit which had recorded a surplus in the third and fourth quarters of 2008 shifted to surplus again in the second and third quarters of 2019 before returning to a deficit in the fourth quarter. Consequently, Turkey recorded a current account surplus in 2019 for the first time in just under two decades.

Annual consumer price index inflation declined from its peak of 25 percent in October 2018 to 8.6 percent in October 2019, but it accelerated in the following months due to the higher seasonal factors and unfavorable base effects which led the annual CPI to end 2019 at 11.8 percent, down from 20.3% in 2018.

After the sharp deceleration from 8.8 percent to 1.6 percent year-on-year rise in 2018, the industrial production fell slightly by 0.7 percent year-on-year on a calendar-adjusted basis in 2019.

Except for September, the manufacturing purchasing managers' indices (PMI) stayed below the 50-threshold in 2019, which was the signal of annual contraction in the industrial production. On the other

hand, the index remained close to 50 during the last quarter, which showed the deterioration in the business conditions of Turkish manufacturing-sector was pretty limited.

Furthermore, the continuous increase in the real sector confidence index in the last quarter reflected less pessimism regarding the total amount of current orders, while firms' views on output, employment and export orders in the first quarter of 2020 were more positive. The index reached 108.7, which was 95.4 at the beginning of the year.

B. The Situation in the Major Casting Customer Industries

In 2019, total motor vehicle production decreased by 6.5 percent and domestic sales by 35 percent year-on-year. The decrease in passenger car production and market (4.3 and 20.4 percent, respectively) were the main reasons for the decline in the vehicle industry. Commercial vehicle production fell by 8.6 percent, whilst tractor production by 36.6 percent.

The export volume of the general machinery industry increased by 4.2 percent, and to some extent compensated the loss in domestic demand. The export volume grew by nearly 10.3 percent in earth-moving machinery production where a 54.4 percent contraction was observed in the domestic market. The domestic sales in the tractor market were also reported to shrink by 45 percent, while there was a significant increase of 20 percent in the export numbers. Electricity motor and generator exports recorded an increase of 25.7 percent year-on-year in 2019.

Falling demand for housing deeply impacted the construction sector. The annual drop in building permit floor area reached 52.4 percent, and the total house sales fell by 1.9 percent. The annual production and domestic sales of the cement industry declined by 21.4 and 29.4, respectively, while the export volume increased by 48.8 percent.

Steel production dropped 9.6 percent as compared to the previous year.

The installed capacity in electricity production rose 2.3 percent in 2019, where the driving force was the investments in renewable energy resources.

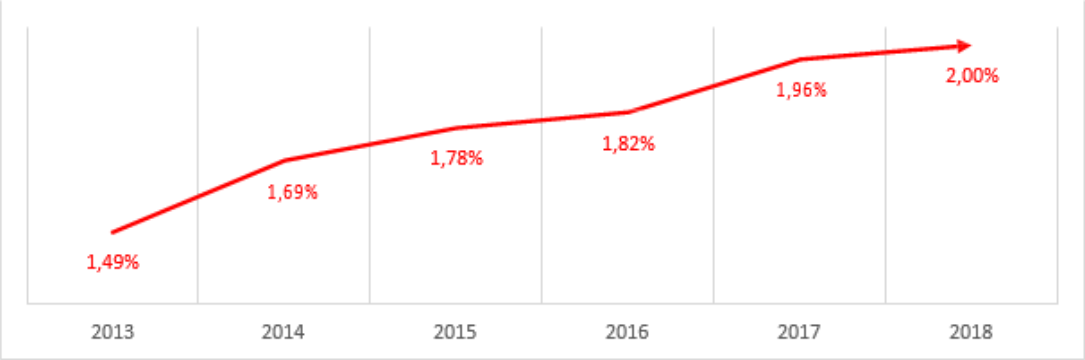
Production in the white goods sector remained stable in 2019 which recorded a negligible decline of 1.1 percent, owing to the export volume.

C. Developments in the Foundry Industry

1. Industry Overview

According to the most recent statistics (i.e. AFS's 53rd Census of World Casting Production, which was published in December 2019), in terms of total casting production volume Turkey secured its position as being Europe's 3rd biggest producer; and in terms of ferrous casting production volume as being 2nd. The Turkish foundry industry sustained its growth and increased its share in the global casting production by 34 percent in the last five years to 2 percent level (Figure 1).

Figure 1: SHARE OF TURKEY IN GLOBAL CASTING PRODUCTION

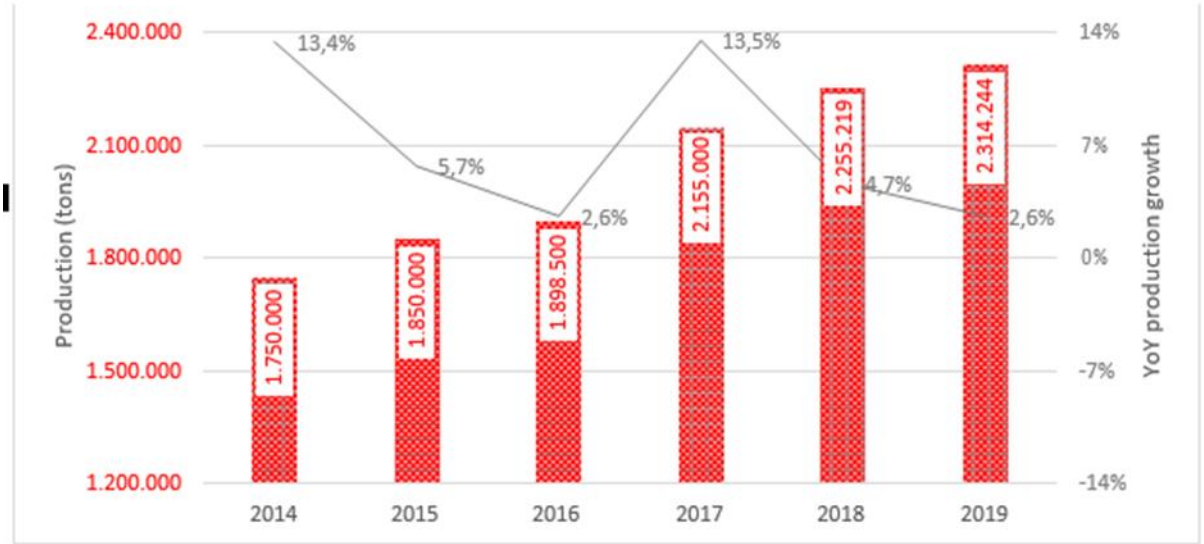


Source: AFS 53rd Census, December 2019

In 2019 the total production of the Turkish foundry industry rose 2.6 percent year-on-year to 2.31 million tons, with an export volume of 1.48 million tons.

The recession in the economic activities that started in 2018 and continued in the first half of 2019 put pressure on domestic demand. However, the significant increase in the calendar-adjusted industrial production in the last quarter enabled the losses to be minimized in general, and the increase in total metal casting production continued in 2019, owing to the increase in exports despite the worldwide recession signals and trade war tensions (Figure 2).

Figure 2: METAL CASTING PRODUCTION



Source: TÜDÖKSAD - Turkish Foundry Association

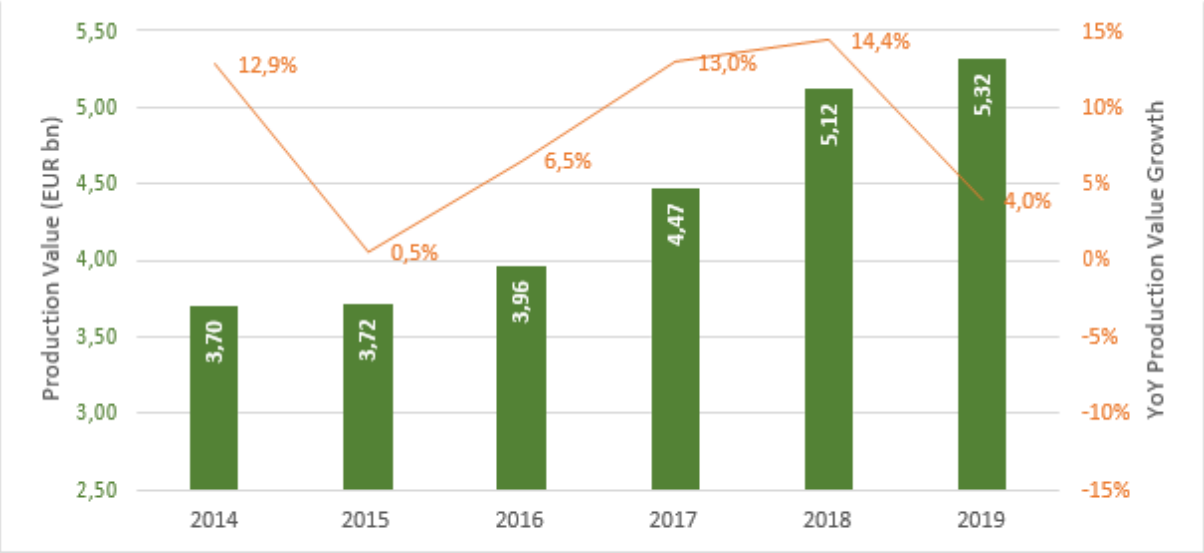
The deceleration is mainly due to the slowdown of the increase rate in nonferrous castings production, despite a stable trend in ferrous castings.

In 2019, the total production in iron foundries recorded a slight increase as compared to 2018 but in steel foundries, it remained stable. In total, ferrous castings production rose 1.9 percent to 1.74 million tons.

On the other hand, the production of non-ferrous foundries was up by 4.8 percent, which makes around 570 thousand tons of production in 2019. Nearly 90 percent of it was enrolled by aluminium foundries and the remaining was by the foundries producing other non-ferrous castings.

However, the increase in the production value of metal castings against last year continued with a loss of acceleration in growth and reached 5.32 billion Euros (Figure 3).

Figure 3: PRODUCTION VALUE OF METAL CASTINGS



Source: TÜDÖKSAD - Turkish Foundry Association

Capacity utilization in ferrous foundries rose 1.46 points year-on-year to 66.6 percent in 2019. Whereas non-ferrous foundries reported a capacity utilization of 79 percent in 2019, down from 91.3 percent in 2018.

2. Investments

In line with the volatile macroeconomic conditions in 2019, the investment amount of Turkish foundry industry declined to 102 million Euro with a significant, 41 percent decrease as compared to the previous year. A substantial part of the investments was put on hold and the actualized investments mainly aimed at increasing the productivity and maintaining automation of the processes.

D. The Situation in the Material Sectors

1. Iron Castings

After last year's sharp drop, grey iron castings grew 1.9 percent year-on-year in 2019. The annual increase in the nodular iron castings production was slightly higher, with a ratio of 2.4 percent. Consequently, the overall iron castings production volume reached 1.55 million tons with a 2.2 percent year-on-year increase. While the pressure on the domestic demand was the primary reason for this trend, the global economic situation, trade tensions and the recent developments in the automotive industry were the other key factors. Share of iron castings in total metal castings production dropped from 67.2 to 66.9 percent in Turkey.

Iron foundries in total reported a capacity utilization of 66.6 percent, which was 64.3 percent for grey iron castings and 69.2 percent for nodular castings.

2. Steel Castings

The steel castings production volume remained almost stable at 193 thousand tons in 2019 with capacity utilization of 66.6 percent.

3. Non-Ferrous Castings

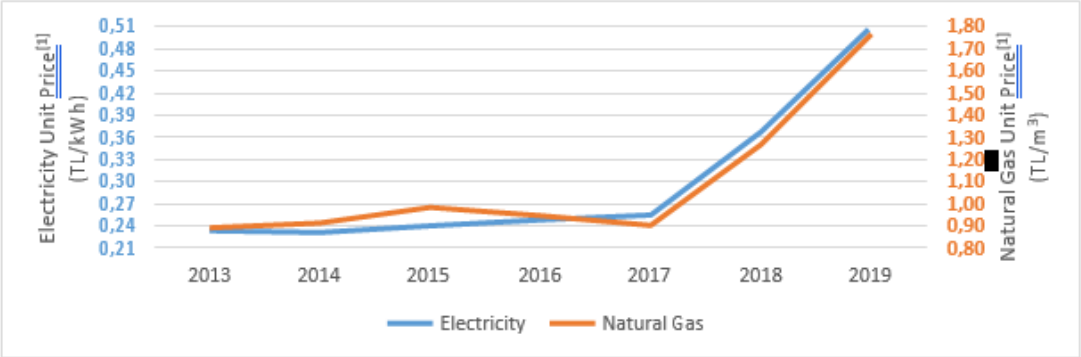
The investments in capacity increase, especially in HPDC foundries had yielded a strong growth in aluminium castings for the past couple of years. In 2019, despite a decline in the growth rate, production volume reached 504 thousand tons, registering a 6 percent growth. Capacity utilization in aluminium foundries was 80.1 percent.

Production volume of other non-ferrous foundries dropped 3.2 percent to around 70 thousand tons with a capacity utilization ratio of 65.2 percent in 2019.

E. Cost Development

Manufacturing costs of foundries are mostly based on foreign exchange rates due to the import of raw materials. As compared to the significant increases in the previous year, exchange rates were stable in 2019, and relatively lower increase rates were recorded in the TL/USD and TL/EUR YoY exchange rates, 12.9 and 10.3 percent, respectively. This upward trend, as well as the overall and casting industry domestic PPI year-on-year changes, had continued impacts on the production costs of the metal casting industry.

Figure 4: ELECTRICITY AND NATURAL GAS PRICE DEVELOPMENT



Source: Turkish Statistical Institute
[1] Average prices paid by industrial consumers for 1 kWh electricity / 1 m3 natural gas including all taxes.

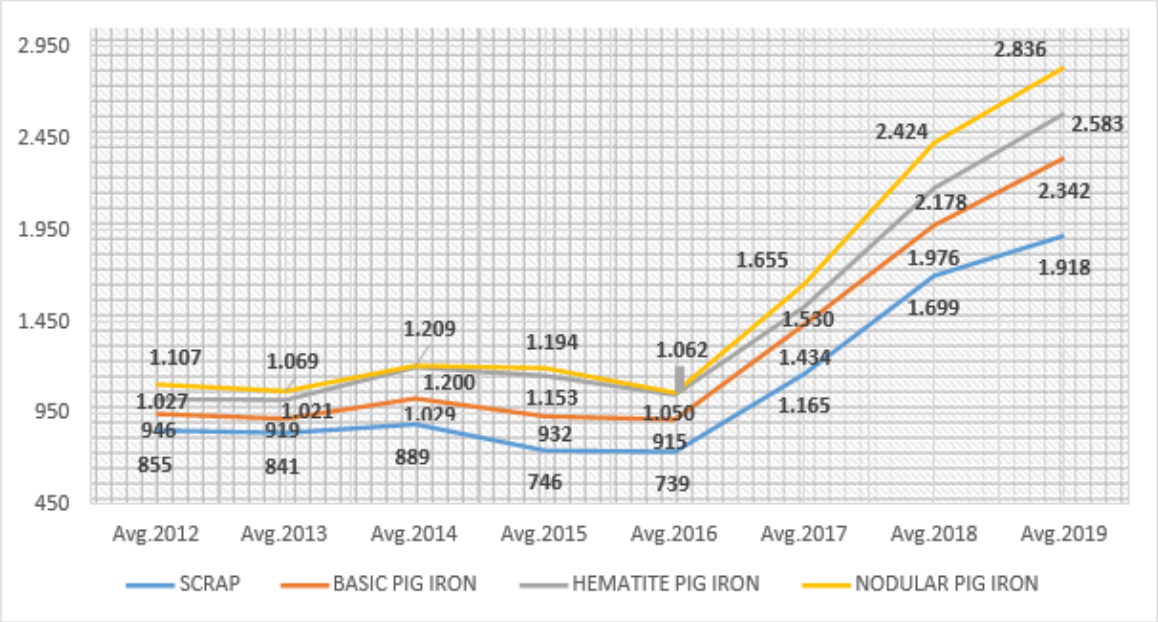
1. Energy

The sharp increase in both energy and gas prices sustained in 2019. In comparison with the previous year, the electricity and natural gas market prices for industrial facilities were up on Euro basis by 25.4 and 26.2 percent, respectively (Figure 4). The energy cost of foundries was reported to increase by 17.1% on Euro basis in 2019.

2. Raw Materials

The increase in the raw material prices sustained in 2019. More than 75 percent increase in local currency was observed in the past two years (Figure 5). Foundries reported a 17.1 percent increase in TLs and a 4.7 percent increase in Euros in total raw materials costs.

Figure 5: RAW MATERIALS PRICE DEVELOPMENT



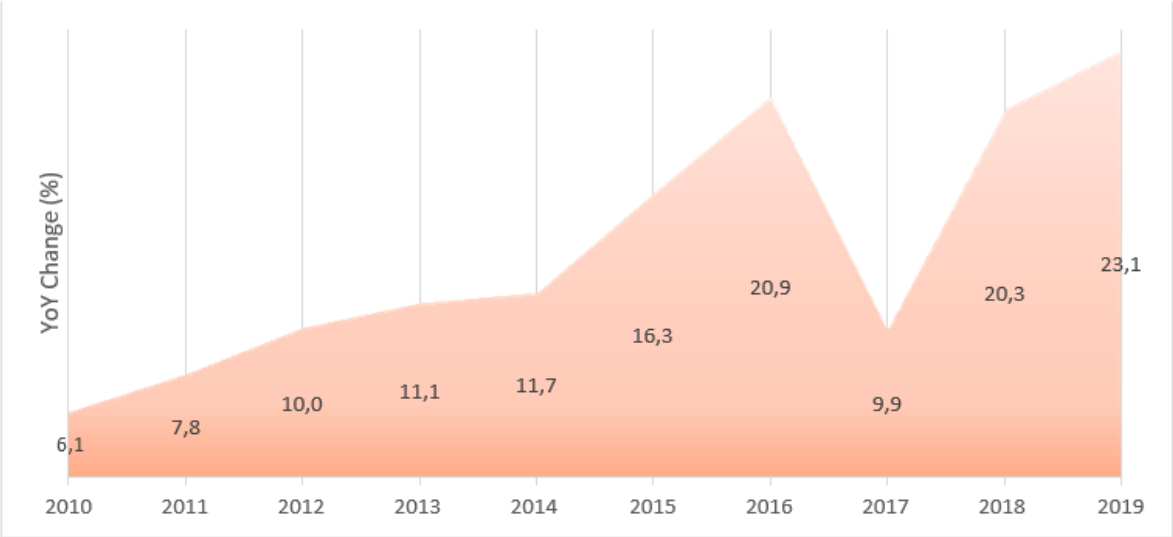
Source: TÜDÖKSAD - Turkish Foundry Association

3. Wages

The year-on-year change in the industrial production hourly labour cost index which was below 10 percent level in 2017, reached the highest level in ten years, 23.1 percent in 2019 (Figure 6). Foundries reported a 10.1 percent year-on-year increase on Euro basis in total labour costs in 2019.

Due to the renewed collective agreements between the employer and employee unions in the metals industry and the agreements to be renewed next year, the upward trend in wages is expected to continue in line with the rising wage floor and inflation bonuses.

Figure 6: HOURLY INDUSTRIAL LABOUR COST INDEX YEAR OVER YEAR CHANGE



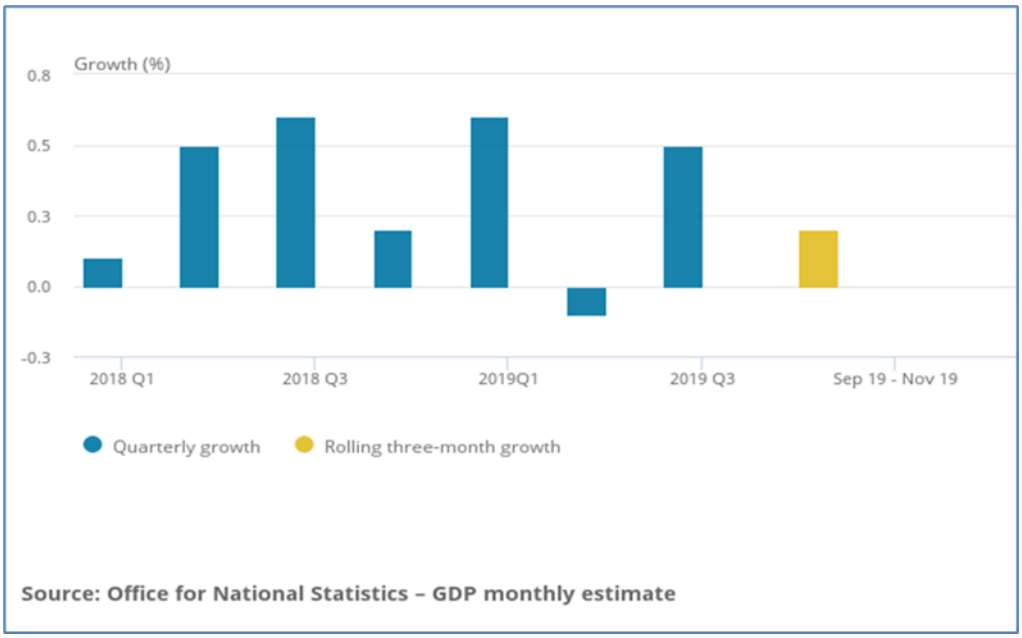
Source: Turkish Statistical Institute

Labour cost is the cost incurred by the employer concerning employment as earnings and labour cost excluding earnings. Hourly labour cost is calculated by dividing the labour cost by the number of hours worked. The annual average of seasonally and calendar adjusted indices are used for calculation (2015=100).

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Economy

UK gross domestic product (GDP) growth increased by 1.4% in 2019, compared with forecast growth of 1.2%, and growth of 1.3% during 2018. GDP was flat in Quarter 4 (Oct to Dec) 2019 (see figure below) with growth in both services and construction offset by a fall in production, which resulted in 0.0% GDP growth in the three months to December 2019. The rolling three-month growth weakened for the third month in a row in December 2019.



Source:
https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/gdpmonthlyestimateuk/december2019#uk-gross-domestic-product-gdp-was-flat-in-quarter-4-oct-to-dec-2019 (1)

In terms of the UK economy, UK manufacturing currently (2)

- employs 2.7 million people – earning an average of £32,500
- contributes 11% of GVA
- accounts for 45% of total exports – totaling £275bn
- represents 69% of business research and development (R&D)
- provides 13% of business investment.

Political Uncertainty and its Effect on Manufacturing

The UK stopped being part of the EU on the 31st January 2020 but throughout 2019 negotiations and discussions were continuing on the withdrawal agreement leading to two extensions of the original exit deadline (of 31st March 2019), a change in the Prime Minister in the early summer and a general election in December. This led to considerable uncertainty throughout the year and this is reflected in some of the UK output figures for 2019, particularly for those from the manufacturing sector.

A UK Manufacturing Review of 2019/20 (3) stated that "The past three years of navel-gazing self-indulgence by the political classes has been a severe hindrance to Britain's manufacturing base and its companies, of whatever size. Whatever one feels about the outcome of December's General Election, at least we have a Government with a majority big enough and stable enough to get its business through Parliament".

The uncertainty caused by the UK's negotiations regarding the departure from the EU can be seen from the following report which stated: "2019 was a particularly tumultuous year, as the first two quarters of the year saw stockpiling activities reach their highest level ever recorded anywhere in the G7 in anticipation of our original EU exit date of March 29th. Since then, output and order performance have suffered as a result as the early stockpiles have been gradually winding down" [4].

Even late in 2019, there was a lack of confidence in the economy as may be seen from the Purchasing Managers Index: "The weak PMI data in the closing months of 2019 pointed to one of the worst spells for the economy seen over the past decade, commensurate with GDP stagnating at best in the fourth quarter. Anecdotal evidence collected via the surveys revealed how companies blamed heightened Brexit-related uncertainty, exacerbated by political worries in the lead up to the December 12th general election, as having dampened spending by households and businesses alike" [5].

Manufacturing output also remained low (but with some notable but temporary fluctuations at certain points, driven by political decisions around Brexit) during the year.

Some sectors were affected more adversely than others, as a business survey reported, "The survey of 289 manufacturers found that output expanded in only six out of 17 manufacturing sectors. Aerospace firms enjoyed a boost along with the electronic engineering sector. But the gains were more than offset by steep falls in car production, which has suffered amid the switch to electric cars from increasingly unpopular diesel cars, which dominate the UK's output." [6].

Productivity

Productivity in the UK still reportedly lags behind that of other advanced economies and there are also regional differences in productivity levels which are now acknowledged to have contributed to investment inequities that the UK government had pledged to address during 2020. Research carried out by PCW [7] found that:

- Latest data suggest that UK output per worker lags around 10-15% behind Germany, France and Sweden, and more than 30% behind the US.
- Our analysis shows that, with the partial exception of Germany, these productivity gaps are not due to the UK having too small a manufacturing base. Instead they reflect lower average UK productivity within certain industry sectors relative to other advanced economies.
- Comparative international evidence suggests that relatively low levels of UK investment and R&D spending and a longer tail of companies and workers with relatively low productivity and skills are the main reasons for this productivity shortfall in the UK relative to other advanced economies.

Employment

Employment in the UK remained high during 2019 and fell to the lowest level for 45 years. The UK Office for National Statistics reported that the number of people out of work fell by 13k to 1.281M by October with employment at an all-time high of 76.2% [8].

Economic Outlook for 2020

At the start of the year economic growth was anticipated to be modest at between 1 and 1.5% for 2020[9] but due to the global COVID-19 pandemic, forecasts are now being revised downwards on a weekly basis and as early as April 2020 the PMI was seeing a sharp decline with collapsed demand in many sectors[10].

Foundry Industry

2019 was generally a steady year for the UK casting and foundry industry.

In the ferrous sector, the first half of the year was generally strong for most iron foundries, with some companies reporting their best year for some years. There was however some softening into the second half of the year with most foundries experiencing some reduction in orders. Capacity utilisation levels remained generally high also with continued investment in plant and equipment.

For the UK steel foundries, the first half of 2019 was generally fairly positive, with most of the foundries reporting being busy with good levels of enquiries, many of which were translating into orders. Production capacity was high and many were anticipating production levels at or above those not seen for a long time in the industry. Admittedly this was in part due to a lowering of capacity in the UK, but there were also new projects starting with customers leading to increased levels of work and lengthening lead times. By contrast the second half of 2019 was poor when compared with the first six months, with some foundries experiencing reduced melting and casting days and considering some short time working into 2020. Enquiry levels were remaining good but were not translating into orders. It was clear that there had been some stockpiling by customers earlier in the year which was now resulting in these reduced order volumes and the end of the year was marked by limited visibility from their customers about future orders and new projects. This sector was also marked by continued downward pressure on prices in part due to some remaining overcapacity.

Considering the non-ferrous sector, 2019 began well with several foundries reporting that business and production levels were at their highest, in part due to stock holding orders pre-Brexit. However, as the year progressed there was some slow-down reported by companies supplying the automotive sector with earlier and longer shutdown periods due to Brexit and the uncertainty and a slowdown across much of Europe was having a significant effect during the middle part of the year. Aside from the automotive sector, which continued to be affected by a number of issues, including declining sales in diesel vehicles, Brexit concerns and the transition towards electric vehicles, 2019 was generally been a good year for business but with some small reduction in production levels during the latter half of the year.

Investment casting foundries had benefited from a strong 2018 across all customer sectors, (with even the oil and gas sector having recovered to a degree and aerospace remaining buoyant, whilst some sectors –such as IGT and auto, including turbo-wheels - had slowed), and began 2019 with good order books. Into the summer foundries remained busy, in spite of fears that increasing orders to enable stock-holding in preparation for the UK leaving the EU at the end of March, might have contributed to a slowdown in Q2; there were new projects coming into production and orders being placed. The automotive market had slowed but the aerospace market was positive. Towards the end of the year business was reported as being steady; there had been some slowing from the earlier part of the year with the aerospace sector remaining busy with strong growth forecasts, and medical and commercial looking good, although auto and boat building had slowed, and IGT still showed little improvement. Foundries reported good order books for coming year and plenty of new design work in progress.

Employment in the Sector

Many foundries reported that finding and retaining new staff continued to be a problem and that workers from overseas, typically eastern Europe, were less inclined to come to the UK.

Several companies were taking on apprentices using the new foundry apprentice programmes – these are supported by national government funding through an industry levy charged on larger businesses. The apprentice training is then free for smaller companies with an annual wage bill of less than £3M per annum.

Foundries seeking apprentice training were able to take advantage of the National Foundry Training Centre which opened its doors in late 2018/early 2019.

Many foundries report that they struggle to find apprentices so attracting new talent into the industry remains challenging.

Closures and Consolidation

During 2019, despite the general stable situation for most foundries, some foundry closures and consolidations took place. One iron plus light alloy foundry group closed all of its three sites and a further steel foundry group went out of business leaving only one site sold and able to remain operational – work from these was transferred to other UK foundries in the main, plus one iron foundry also closed to make way for a change of business activity. A light alloy foundry consolidated by reduced from two to one manufacturing site and one diecasting facility closed.

Costs and Raw Material Prices

Foundry salaries and wages were generally stable during 2019 with only modest increases of between 1 and 2.5%.

Throughout the year business costs increased but the rate of increase reduced throughout the year, with the annual change being 3.5% at the start of the year, reducing to under 0.5% by the final quarter of 2019.

Outlook for 2020

The industry outlook for 2020 is very uncertain due the global pandemic which has affected all sectors of the economy and all the main sectors that the UK industry supplies. In the short term some companies are busy supplying parts for the medical sector, including ventilator components but this only applies to a small number of castings producers. Many car plants have taken extended closures around Easter 2020, with new car registration dropping by 97% in April 2020 compared with the April 2019 (11) and car showrooms closed. Light commercial vehicle registrations were also down over 86% in April compared with the same month the previous year (12). At the same time the aerospace sector is facing unprecedented uncertainty with companies such as Airbus warning that the industry may take up to 5 years to recover (13). The oil & gas sector is also dealing with a 20-year low in the oil price and a 14-year low for gas (14) as global demand has fallen.

At present it is estimated that output many be reduced by around 30 to 40% in the UK, but this depends on how quickly the economy is able to recover.

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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	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	155,9	154,8	156,6	164,2	158,5	4,8	-3,4
Belgium	71,6	51,5	42,9	85,2	67,6	98,6	-20,7
Bulgaria			49,8				
Croatia		42,9					
Czech Rep.	289,0 a)	270,8 a)	295,0 a)	295,5 a)	268,5 a)	0,2	-9,1
Denmark	77,9	72,8	83,5	91,5	86,9	9,6	-5,0
Finland	59,0	57,9	66,4	64,6	57,8	-2,7	-10,5
France	1.328,5	1.263,7	1.330,9	1.339,9	1.304,3	0,7	-2,7
Germany	4.120,4	3.919,0	4.184,9	4.256,2	3.804,9	1,7	-10,6
Hungary	92,1	83,4	82,3	88,3	76,2	7,3	-13,7
Italy	1.130,7 b)	1.152,4 b)	1.235,0 b)	1.253,1	1.108,9	1,5	-11,5
Norway	33,7	30,1	29,4	31,2	31,2	5,8	0,0
Poland	709,0 a)	696,0 a)	690,0 a)	690,0 a)	655,0 a)	0,0	-5,1
Portugal	137,9	140,6	144,6	145,4	140,4	0,6	-3,4
Slovenia		202,6	195,1	137,4	177,2	-29,6	28,9
Spain	1.065,6	1.116,9	1.128,7	1.135,7	1.113,3	0,6	-2,0
Sweden	261,2	230,3	236,7	248,6	240,4	5,0	-3,3
Switzerland	38,1	59,1	60,4	61,0	26,3	1,0	-56,9
Turkey	1.470,0	1.471,0	1.715,0	1.708,2	1.741,2	-0,4	1,9
United Kingdom	387,3	345,0	378,7	413,6	414,2	9,2	0,1
Total CAEF	**11.428,0**	**11.360,8**	**12.105,9**	**12.209,8**	**11.472,8**	**0,9**	**-6,0**
Romania	40,8	32,3	30,5	30,5 c)			
Russia		3.200,0	3.500,0	3.318,0 c)			
Ukraine	1.130,0			1.130,0			

a) estimated b) without investment castings c) Source: Modern Casting 2018

Table 2
Production value in Mio. € - Iron, Steel and Malleable iron castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	390,8	395,3	408,6	427,3	431,8	4,6	1,1
Belgium				165,0			
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	184,9	160,4	156,4	203,0	177,7	29,8	-12,5
France	2.584,0	2.710,0	2.767,0	2.862,0	2.769,0	3,4	-3,2
Germany a)	6.985,3	6.631,8	7.151,7	7.510,5	6.858,2	5,0	-8,7
Hungary	220,0	212,0	206,0	235,0	226,0	14,1	-3,8
Italy	2.540,0	2.447,0	2.608,5	2.055,4	1.979,0	-21,2	-3,7
Norway	76,0	56,8	65,8	36,0	36,0	-45,3	0,0
Poland							
Portugal	263,1	263,8	264,4	265,5	253,2	0,4	-4,6
Slovenia							
Spain	1.862,0	1.884,0	1.922,0	1.949,0	1.913,0	1,4	-1,8
Sweden							
Switzerland							
Turkey	1.985,5	1.961,3	2.410,2	2.486,6	2.628,2	3,2	5,7
United Kingdom		1.770,0 b)	1.800,0 b)	1.944,0 b)	1.950,0 b)	8,0	0,3
Total CAEF							

a) foundries > 50 employees, turnover b) using exchange rate 1£ -1.18€

Table 3
Number of foundries (Production units) - Iron, Steel and Malleable iron castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	27	23	23	15	15	-34,8	0,0
Belgium	16	15	15	13	13	-13,3	0,0
Bulgaria			80				
Croatia		32					
Czech Rep.	90	71	71	71	71	0,0	0,0
Denmark	8	8	8	8	8	0,0	0,0
Finland	19	18	18	16	18	-11,1	12,5
France	121	120					
Germany	248	243	240	239	232	-0,4	-2,9
Hungary	35	35	34	29	39	-14,7	34,5
Italy	174 a)	189 b)c)	191 b)c)	185 b)c)	172	-3,1	-7,0
Norway	8	9	7	5	5	-28,6	0,0
Poland	216	216	215	215	215	0,0	0,0
Portugal	31	31	31	31	31	0,0	0,0
Slovenia		11	57	13	11	-77,2	-15,4
Spain	75	74	75	75	71	0,0	-5,3
Sweden	40	39	38	38	36	0,0	-5,3
Switzerland	15	17	17	17	15	0,0	-11,8
Turkey	550	544	546	546	550	0,0	0,7
United Kingdom	217	216	212	210	207	-0,9	-1,4
Total CAEF	**1.890**	**1.911**	**1.878**	**1.726**	**1.709**		**-1,0**

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	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	3.200	2.905	2.971	2.257	2.215	-24,0	-1,9
Belgium	1.066 b)	1.066 b)	1.193	1.757	1.766	47,3	0,5
Bulgaria			4.382				
Croatia							
Czech Rep.	10.000 d)	11.000	11.000	11.000	10.500	0,0	-4,5
Denmark		914	1.095	1.079	1.047	-1,5	-3,0
Finland	1.354	1.242	1.318	1.363	1.264	3,4	-7,3
France	13.994	13.300					
Germany a)	43.969	41.844	41.774	42.019	39.675	0,6	-5,6
Hungary	2.170	1.980	1.920	3.850	3.720	100,5	-3,4
Italy	13.548 c)	14.047 e) g)	9.182 e) g)	9.248	9.040	0,7	-2,2
Norway	783	850	640				
Poland	16.200	16.000	16.000	16.000	16.000	0,0	0,0
Portugal	2.198	2.381	2.640	2.444	2.582	-7,4	5,6
Slovenia		1.400	1.418	1.135	1.110	-20,0	-2,2
Spain	10.501	10.980	11.070	10.928	11.162	-1,3	2,1
Sweden		4.746			7.000		
Switzerland	1.198	1.116	1.070	1.058	1.012	-1,1	-4,3
Turkey	22.630	20.020	20.500	20.100	20.100	-2,0	0,0
United Kingdom	9.100	15.000 f)	14.500 f)	14.600	14.150	0,7	-3,1
Total CAEF	**151.911**	**160.791**	**142.673**	**138.838**	**142.343**	**-2,7**	**2,5**

a) foundries >50 employees
b) only workmen
c) without investment casting
d) incl. non-ferrous
e) including investment casting
f) new survey, more accurate figures
g) revised data, employment statistics register

Table 5
Direct exports total in 1000 t - Iron, Steel and Malleable iron castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.	190,0						
Denmark							
Finland	20,0	23,8	25,3	21,4	14,5	-15,3	-32,6
France	620,8	471,4	451,3	433,2	448,0	-4,0	3,4
Germany	1.621,9	1.525,7	1.630,6	1.669,8	1.553,6	2,4	-7,0
Hungary	72,7	53,8	58,0	53,2	45,1	-8,2	-15,2
Italy	406,4	488,0 a)	473,7 a)	520,9	488,4	10,0	-6,3
Norway	13,9	16,8	14,8	16,1	16,1	8,8	0,0
Poland	323,7	313,6	311,9	311,9		0,0	
Portugal	125,0	121,4	136,7	137,0	128,0	0,3	-6,6
Slovenia							
Spain	638,2	681,1	704,0	746,8	746,7	6,1	0,0
Sweden		47,7					
Switzerland							
Turkey	842,5	813,5	961,5	1.024,3	1.086,6	6,5	6,1
United Kingdom							
Total CAEF	**4.875,0**	**4.556,8**	**4.767,7**	**4.934,7**	**4.527,0**	**3,5**	**-8,3**

a) revised

IRON CASTINGS

Table 6
Total production in 1000 t - Iron castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	40,6	42,4	42,9	43,0	42,3	0,2	-1,5
Belgium	28,7	26,9	26,9	69,9	55,9	160,3	-20,1
Bulgaria			30,3	29,9		-1,1	
Croatia		31,1					
Czech Rep.	170,0 a)	158,0	176,0	176,5	166,5	0,3	-5,7
Denmark	30,8	20,4	27,5	29,6	28,9	7,8	-2,6
Finland	14,5	15,3	19,5	18,4	18,2	-5,8	-1,2
France	504,4 b)	531,5	574,1	597,4	537,2	4,0	-10,1
Germany	2.369,7	2.234,9	2.421,4	2.435,6	2.192,8	0,6	-10,0
Hungary	23,4	21,7	24,6	22,0	18,4	-10,5	-16,5
Italy	694,1	714,2	755,8	767,6	667,8	1,6	-13,0
Norway	11,3	10,9	8,3	8,8	8,8	6,4	0,0
Poland	485,3 a)	484,0 a)	480,0	480,0	450,0	0,0	-6,3
Portugal	39,8	39,4	41,5	43,4	41,1	4,6	-5,3
Slovenia		139,7	195,1	106,5	130,5	-45,4	22,5
Spain	348,2	379,9	365,7	357,6	362,6	-2,2	1,4
Sweden	242,0	159,6	159,4	161,7	154,9	1,5	-4,2
Switzerland	12,2	35,4	36,5	36,7	9,3	0,6	-74,7
Turkey	675,0	650,0	720,0	603,0	614,3	-16,3	1,9
United Kingdom	139,8	125,8	138,0	144,9	144,5	5,0	-0,3
Total CAEF	**5.789,2**	**5.778,7**	**6.200,5**	**6.132,6**	**5.643,9**	**-1,1**	**-8,0**

a) estimation b) incl. malleable castings

Table 7
Production value in Mio. € - Iron castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	27,9	28,7	35,4	37,7	34,4	6,6	-9,0
France							
Germany b,c)	5.785,8	5.541,2	6.048,9	6.348,4	5.721,0	5,0	-9,9
Hungary							
Italy							
Norway	13,0	10,2	10,3	11,0	11,0	6,8	0,0
Poland							
Portugal	61,9	57,6	66,3	73,6	68,1	11,0	-7,5
Slovenia							
Spain b)	1.495,0	1.539,0	1.583,0	1.622,0	1.537,0	2,5	-5,2
Sweden							
Switzerland							
Turkey	722,0	675,0	745,2	607,3	626,0	-18,5	3,1
United Kingdom							
Total CAEF							

b) incl. nodular and malleable iron castings c) foundries >50 empl., turnover

Table 8
Production of iron castings in 1000 t / subdivided by the major customer industries

Country	Year	1 Pressure pipes and fittings	2 Drain pipes and fittings	3 Building and domestic goods	4 Ingot moulds and bottoms	5 Rolls	6 Eng. Plant and machinery	7 Vehicle industry	8 Any other iron castings	Total iron castings
Austria	2018									43,0
	2019									42,3
	in %									-1,5
Belgium	2018									69,9
	2019									55,9
	in %									-20,1
Czech Rep.	2018									176,5
	2019									166,5
	in %									-5,7
Denmark	2018									29,6
	2019									28,9
	in %									-2,6
Finland	2018		5,2			4,8	4,7	3,3	0,5	18,4
	2019					3,5	4,8	1,9	8,0	18,2
	in %					-26,7	2,5	-42,7	1.627,2	-1,2
France	2018									597,4
	2019									537,2
	in %									-10,1
Germany	2018						517,6	1.656,2	261,9	2.435,6
	2019						416,9	1519,0	256,9	2192,8
	in %						-19,5	-8,3	-1,9	-10,0
Hungary	2018									22,0
	2019									18,4
	in %									-16,5
Italy	2018		b)	b)	37,5		15,0	359,2	257,2	98,7	767,6
	2019		31,9				13,8	319,0	222,8	80,4	667,8
	in %						-8,0	-11,2	-13,4	-18,5	-13,0
Norway	2018			6,5			0,3		2,1	8,8
	2019			6,5			0,3		2,1	8,8
	in %			0,0			0,0		0,0	0,0
Poland	2018									480,0
	2019									450,0
	in %									-6,3
Portugal	2018		1,3	1,7			1,3	36,2	2,9	43,4
	2019	5,0	1,2	1,6			1,3	34,3	2,8	41,1
	in %		-10,0	-9,0			-5,4	-5,2	-2,6	-5,3
Slovenia	2018									106,5
	2019									130,5
	in %									22,5
Spain	2018									357,6
	2019									362,6
	in %									1,4
Sweden	2018									161,7
	2019									154,9
	in %									-4,2
Switzerland	2018									36,7
	2019									9,3
	in %									-74,7
Turkey	2018	10,0	10,0	65,0	20,0	15,0	210,0	233,0	40,0	603,0
	2019	12,3	12,0	66,3	21,1	16,1	213,0	230,9	42,8	614,3
	in %	22,6	19,7	2,1	5,6	7,0	1,4	-0,9	6,9	1,9
United Kingdom	2018									144,9
	2019									144,5
	in %									-0,3

b) contained in: Pos. 3

Table 9
Number of foundries (Production units) - Iron castings (incl. nodular and malleable castings)

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	23	20	20	12	12	-40,0	0,0
Belgium	11	10		5	5		0,0
Bulgaria							
Croatia		26					
Czech Rep.	63	71		56	56		0,0
Denmark	8	8	8	8	8		0,0
Finland	12	11	11	11	11	0,0	0,0
France	86	86					
Germany a)	149	148	151	150	144	-0,7	-4,0
Hungary	16	28	27	27	27	0,0	0,0
Italy	149	140	139 b)	147 b)	134	5,8	-8,8
Norway	5	6	5	5	5	0,0	0,0
Poland	180	185	180	180	180	0,0	0,0
Portugal	23	23	23	23	23	0,0	0,0
Slovenia					11		
Spain	45	45	46	46	42	0,0	-8,7
Sweden	30	27	26	26	25	0,0	-3,8
Switzerland	14	15	15	15	13	0,0	-13,3
Turkey	481	439	441	441	443	0,0	0,5
United Kingdom							
Total CAEF	**1.295**	**1.288**	**1.092**	**1.152**	**1.139**		**-1,1**

a) adjusted data, foundries >50 employees, end of the year b) ISTAT

Table 10
Employment in the foundry industry - Iron castings (incl. nodular and malleable castings)

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium	570 b)	570 b)					
Bulgaria							
Croatia		2.125					
Czech Rep.		7.000					
Denmark		914	1.095		1.047		
Finland	778	768	741	800	724	8,0	-9,5
France	10.894	10.370					
Germany a)	36.530	35.170	35.006	35.398	34.120	1,1	-3,6
Hungary							
Italy	10.969	6.984 c)	6.869 c)	6.990	6.736	1,8	-3,6
Norway	660	743	640				
Poland	12.600	12.500	12.500	12.500	12.500	0,0	0,0
Portugal	1.584	1.762	1.815	1.848	2.064	1,8	11,7
Slovenia					1.110		
Spain	8.176	8.585	8.752	8.600	8.800	-1,7	2,3
Sweden		3.477					
Switzerland		984		951	910		-4,3
Turkey	16.000	13.520	14.000	13.600	13.600	-2,9	0,0
United Kingdom							
Total CAEF	**98.761**	**105.472**	**81.418**	**80.687**	**81.611**	**-0,9**	**1,1**

a) foundries >50 employees, end of the year b) only workers c) ISTAT

Table 11
Direct exports total in 1000 t - Iron castings (incl. nodular iron castings)

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	18,1	22,6	23,8	18,5	12,9	-22,4	-30,4
France	602,8 a)	450,8 a)	432,4	409,4	429,2	-5,3	4,8
Germany	1.544,4 a)	1.450,5 a)	1.551,4 a)	1.589,0 a)	2.184,7 a)	2,4	37,5
Hungary	71,1	51,7	55,9				
Italy							
Norway	13,5	16,8	14,8	16,1	16,1	8,8	0,0
Poland	307,6	297,0	295,9	295,0		-0,3	
Portugal	118,0	115,7	132,5	133,3	124,3	0,6	-6,8
Slovenia							
Spain	548,2 a)	631,7 a)	655,2	696,4	693,0	6,3	-0,5
Sweden		46,9					
Switzerland							
Turkey	750,0	680,0	833,5	875,8	936,8	5,1	7,0
United Kingdom							
Total CAEF	**3.973,7**	**3.763,8**	**3.995,5**	**4.033,5**	**4.396,9**	**1,0**	**9,0**

a) incl. malleable iron castings

DUCTILE IRON CASTINGS

Table 12
Total production in 1000 t - Ductile iron castings (Nodular and Malleable iron castings)

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	95,5	101,8	102,9	109,7	104,7	6,6	-4,6
Belgium	6,9	7,2	8,4	7,8	5,1	-6,2	-34,8
Bulgaria			9,2				
Croatia		11,8					
Czech Rep.	59,0	51,8	55,0	57,0	50,0	3,6	-12,3
Denmark	47,1	52,5	56,1	61,9	58,1	10,4	-6,2
Finland	32,1	33,5	36,3	36,2	29,3	-0,2	-19,0
France	761,2	675,2	696,3	682,1	711,4	-2,0	4,3
Germany	1.560,1	1.509,9	1.587,7	1.636,0	1.433,7	3,0	-12,4
Hungary	63,0	57,9	54,5	63,4	55,6	16,3	-12,3
Italy	374,6	381,2	425,1	428,6	381,3	0,8	-11,0
Norway	21,2	19,2	21,1	22,3	22,3	5,6	0,0
Poland	173,9	166,2	160,0	160,0	155,0	0,0	-3,1
Portugal	90,0	93,4	97,2	96,8	94,4	-0,5	-2,4
Slovenia		31,0	38,6	46,6	46,7	20,9	0,2
Spain	644,8	671,4	698,1	711,6	663,0	1,9	-6,8
Sweden		49,5	55,6	64,0	62,0	15,2	-3,1
Switzerland	24,7	22,8	22,8	22,1	14,7	-3,1	-33,5
Turkey	645,0	655,0	825,0	912,9	934,4	10,7	2,4
United Kingdom	199,6	178,5	196,0	219,5	220,5	12,0	0,4
Total CAEF	**4.798,6**	**4.769,6**	**5.145,9**	**5.338,5**	**5.042,2**	**3,7**	**-5,6**

Table 13
Production value in Mio. € - Ductile iron castings (Nodular and Malleable iron castings)

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	71,4	70,1	54,7	89,2	71,5	63,1	-19,8
France							
Germany	a)	a)	a)	a)	a)		
Hungary							
Italy				1.602,6			
Norway	53,0	46,6	55,5	25,0	25,0	-55,0	0,0
Poland							
Portugal	147,6	152,3	155,4	150,4	143,5	-3,2	-4,6
Slovenia							
Spain	a)	a)	a)	a)			
Sweden							
Switzerland							
Turkey	860,0	885,0	1.155,0	1.304,5	1.382,5	12,9	6,0
United Kingdom							
Total CAEF							

a) contained in: Tab. 7

Table 14
Production of Ductile iron castings (Nodular and Malleable iron castings) in 1000 t
subdivided by the major customer industries

Country	Year	1 Pressure pipes and fittings	2 Eng. plant and machinery	3 Vehicle industry	4 Any other nodular iron castings	Total nodular iron castings
Austria	2018					109,7
	2019					104,7
	in %					-4,6
Belgium	2018					7,8
	2019					5,1
	in %					-34,8
Czech Rep.	2018					57,0
	2019					50,0
	in %					-12,3
Denmark	2018					61,9
	2019					58,1
	in %					-6,2
Finland	2018		20,4	13,7	2,0	36,2
	2019		19,6	9,6	11,0	29,3
	in %		-3,8	-29,7	440,3	-19,0
France	2018					682,1
	2019					711,4
	in %					4,3
Germany	2018	a)	538,6	661,7	435,7	1.636,0
	2019		469,3	554,5	409,8	1.433,7
	in %		-12,9	-16,2	-5,9	-12,4
Hungary	2018					63,4
	2019					55,6
	in %					-12,3
Italy	2018	49,8	229,2	131,1	18,5	428,6
	2019	43,2	208,8	116,1	13,1	556,2
	in %	-13,2	-8,9	-11,4	-29,3	29,8
Norway	2018		2,2		20,1	22,3
	2019		2,2		20,1	22,3
	in %		0,0		0,0	0,0
Poland	2018					160,0
	2019					155,0
	in %					-3,1
Portugal	2018	6,0	0,9	87,6	2,2	96,8
	2019	8,4	1,1	82,8	2,1	94,4
	in %	40,1	17,6	-5,5	-3,1	-2,4
Slovenia	2018					46,6
	2019					46,7
	in %					0,2
Spain	2018					711,6
	2019					663,0
	in %					-6,8
Sweden	2018					64,0
	2019					62,0
	in %					-3,1
Switzerland	2018					22,1
	2019					14,7
	in %					-33,5
Turkey	2018	123,0	263,4	412,0	114,5	912,9
	2019	127,7	270,4	414,7	121,6	934,4
	in %	3,8	2,7	0,6	6,2	2,4
United Kingdom	2018					219,5
	2019					220,5
	in %					0,4

a) contained in: Pos. 4

STEEL CASTINGS

Table 15
Total production in 1000 t - Steel castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	9,5	11,3	10,8	11,4	11,4	6,3	0,0
Belgium	36,0	17,4	7,3	7,5	6,6	1,6	-11,4
Bulgaria			10,4				
Croatia		0,0					
Czech Rep.	60,0	61,0	64,0	62,0	52,0	-3,1	-16,1
Denmark							
Finland	12,5	8,4	6,2	10,1	10,4	63,1	3,0
France	62,8	57,0	60,4	60,4	55,7	0,1	-7,8
Germany	190,6	174,2	175,8	184,7	178,5	5,1	-3,4
Hungary	5,7	3,8	3,1	2,8	2,2	-10,0	-22,4
Italy	62,0	57,0	54,1	56,9	59,9	5,1	5,2
Norway	1,2						
Poland	49,9 a)	50,5 a)	50,0	50,0	50,0	0,0	0,0
Portugal	8,1	7,8	5,9	5,3	4,9	-10,2	-6,2
Slovenia		32,0	30,2	2,1		-92,9	
Spain	72,6	65,6	64,9	66,6	71,4	2,6	7,2
Sweden	19,2	21,2	21,8	22,9	23,5	5,3	2,6
Switzerland	1,2	1,1	1,1	2,3	2,3	99,1	4,0
Turkey	150,0	166,0	170,0	192,4	192,5	13,2	0,1
United Kingdom	48,0	40,7	44,7	49,2	49,2	10,0	0,0
Total CAEF	**789,3**	**775,0**	**780,6**	**786,5**	**770,4**	**0,8**	**-2,0**

a) estimated

Table 16
Production value in Mio. € - Steel castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	85,5	60,7	66,3	76,1	71,9	14,8	-5,6
France							
Germany a)	1.199,4	1.090,6	1.102,8	1.154,3	1137,2	4,7	-1,5
Hungary							
Italy				452,8			
Norway	10,0						
Poland							
Portugal	53,5	54,0	42,7	41,6	41,6	-2,7	0,1
Slovenia							
Spain	367,0	345,0	339,0	327,0	376,0	-3,5	15,0
Sweden							
Switzerland							
Turkey	345,0	401,3	510,0	574,8	619,7	12,7	7,8
United Kingdom							
Total CAEF							

a) foundries >50 employees, turnover

Table 17
Production of steel castings in 1000 t / subdivided by the major customer industries

Country	Year	1 Eng. plant and machinery	2 Vehicle industry	3 Steel castings for railways, locomotives, carriages, wagons and trams	4 Any other steel castings	Total steel castings
Austria	2018					11,4
	2019					11,4
	in %					0,0
Belgium	2018					7,5
	2019					6,6
	in %					-11,4
Czech Rep.	2018					62,0
	2019					52,0
	in %					-16,1
Finland	2018	9,0	0,0	0,0	1,0	10,1
	2019	5,1	0,4		4,9	10,4
	in %					3,0
France	2018					60,4
	2019					55,7
	in %					-7,8
Germany	2018	47,7	13,3		123,7	184,7
	2019	47,0	13,6		117,9	178,5
	in %	-1,4	1,7		-4,7	-3,4
Hungary	2018					2,8
	2019					2,2
	in %					-22,4
Italy	2018	8,6	3,3	1,3	43,6 a)	56,9
	2019	10,5	3,0	1,4	44,9	59,9
	in %	21,8	-10,0	7,9	3,0	5,2
Poland	2018					50,0
	2019					50,0
	in %					0,0
Portugal	2018	2,6	0,3	0,2	2,2	5,3
	2019	2,3	0,3	0,1	2,2	4,9
	in %	-11,4	4,4	-26,2	0,0	-6,2
Slovenia	2018					2,1
	2019					
	in %					
Spain	2018					66,6
	2019					71,4
	in %					7,2
Sweden	2018					22,9
	2019					23,5
	in %					2,6
Switzerland	2018					2,3
	2019					2,3
	in %					4,0
Turkey	2018	70,4	21,0	26,0	75,0	192,4
	2019	70,4	21,1	26,0	75,0	192,5
	in %	0,0	0,6	-0,2	0,0	0,1
United Kingdom	2018					49,2
	2019					49,2
	in %					0,0

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

Table 18
Number of foundries (Production units) - Steel castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	4	3	3	3	3	0,0	0,0
Belgium	5	5		8	8		0,0
Bulgaria							
Croatia		5					
Czech Rep.	27			28	28		0,0
Denmark							
Finland	7	7	7	7	7	0,0	0,0
France	35	34					
Germany a)	46	42	41	40	39	-2,4	-2,5
Hungary	11	9	7		12		
Italy	25	37 b)	37 b)	38 c)	38	2,7	0,0
Norway	3	3					
Poland	36	36	35	35	35	0,0	0,0
Portugal	8	8	8	8	8	0,0	0,0
Slovenia				5			
Spain	30	29	29	29	29	0,0	0,0
Sweden	10	12	12	12	11	0,0	-8,3
Switzerland	2	2	2	2	2	0,0	0,0
Turkey	66	105	105	105	107	0,0	1,9
United Kingdom							
Total CAEF	**315**	**337**	**286**	**320**	**327**		**2,2**

a) adjusted data, foundries >50 empl. b) ISTAT c) incl. Investment casting foundries

Table 19
Number of persons employed total - Steel castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium		496					
Bulgaria							
Croatia		168					
Czech Rep.							
Denmark							
Finland	576	474	577	563	540	-2,4	-4,1
France	3.100	3.050					
Germany a)	7.439	6.674	6.768	6.621	6.459	-2,2	-2,4
Hungary							
Italy	2.580	2.369 b)	2.313 b)	2.258	2.304	-2,4	2,0
Norway	123	107					
Poland	3.600	3.500	3.500	3.500	3.500	0,0	0,0
Portugal	614	619	825	596	518	-27,8	-13,1
Slovenia				352			
Spain	2.325	2.395	2.318	2.328	2.362	0,4	1,5
Sweden		1.269					
Switzerland		132	130	107	102	-17,7	-4,7
Turkey	6.500	6.500	6.500	6.500	6.500	0,0	0,0
United Kingdom							
Total CAEF	**26.857**	**27.753**	**22.931**	**22.825**	**22.285**	**-0,5**	**-2,4**

a) foundries >50 empl. b) ISTAT

Table 20
Direct exports total in 1000 t - Steel castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	1,8	1,1	1,5	2,9	1,6	100,2	-45,8
France	18,0	20,6	19,0	23,8	18,8	25,5	-21,0
Germany	77,5	75,2	79,1	80,8	83,9	2,1	3,9
Hungary	1,6	2,1	2,1				
Italy							
Norway	0,4						
Poland	15,0	15,7	16,0	16,0		0,0	
Portugal	7,0	5,7	4,1	3,7	3,7	-9,5	-1,4
Slovenia							
Spain	54,0	49,4	48,8	50,4	53,7	3,2	6,7
Sweden		0,9					
Switzerland							
Turkey	115,0	125,5	128,0	140,5	149,8	9,8	6,6
United Kingdom							
Total CAEF	**290,3**	**296,1**	**298,5**	**318,1**	**311,6**	**6,6**	**-2,1**

NON-FERROUS METAL CASTINGS

Table 21
Total production in 1000 t - Non-ferrous metal castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	140,7	147,1	148,3	163,4	144,8	10,2	-11,4
Belgium	2,2	0,8		2,2	1,0		-52,6
Bulgaria							
Croatia		24,8					
Czech Rep.	116,0 a)	119,0 a)	122,0 a)	124,2 a)	116,0	1,8	-6,6
Denmark	4,3	3,9	4,4	4,0	3,5	-9,8	-11,4
Finland	8,0	4,8	5,9	5,5	5,3	-6,3	-3,9
France	356,9	362,2	367,3	441,3	392,4	20,2	-11,1
Germany	1.221,3	1.248,8	1.206,1	1.176,7	1.146,0	-2,4	-2,6
Hungary	112,4	123,3	127,7	139,2	124,0	9,0	-10,9
Italy	900,5	934,0	1.000,1	1.008,1	958,7	0,8	-4,9
Norway	7,2 b)	6,4 b)	5,9 b)	6,5 b)	6,5	10,9	0,0
Poland	353,0 a)	348,8 a)	346,5 a)	346,5 a)	356,5	0,0	2,9
Portugal	45,4	50,5	54,1	56,5	56,5	4,6	0,0
Slovenia		52,1	52,1	70,6	75,7	35,6	7,3
Spain	146,0	163,5	166,7	153,1	153,9	-8,2	0,5
Sweden	62,6	61,5	63,7	67,3	65,1	5,6	-3,2
Switzerland	18,1	16,2	15,4	17,0	15,9	10,4	-6,5
Turkey	380,0	427,5	440,0	547,0	573,0	24,3	4,8
United Kingdom	131,0	141,7	152,1	166,3	165,8	9,4	-0,3
Total CAEF	**4.005,6**	**4.236,8**	**4.278,2**	**4.495,4**	**4.360,8**	**1,1**	**-3,0**
Bulgaria			5,9	5,9 c)		0,0	
Romania	88,2	90,9	82,3	74,4 c)		-9,5	
Russia		700,0	725,0	882,0 c)		21,7	
Ukraine	430,0						

a) estimated b) without copper (only 2 foundries = no data collection) c) Source: Modern Casting 2018

Table 22
Production value in Mio. € - Non-ferrous metal castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	991,3	997,5	1.079,9	1.123,4	973,7	4,0	-13,3
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	60,8	55,9	62,5	62,1	51,0	-0,6	-17,9
France	2.805,0	2.707,0	2.876,0	2.727,0	2.373,0	-5,2	-13,0
Germany c)	5.743,5	5.764,9	5.962,5	6.067,6	5.570,8	1,8	-8,2
Hungary	370,0	387,0	396,0	395,0	387,0	-0,3	-2,0
Italy	4.460,0	4.431,0	4.856,4	4.178,7	4.491,0	-14,0	7,5
Norway					51,0		
Poland	63,0 b)	61,0 b)	58,0 b)	51,0 b)		-12,1	-100,0
Portugal					381,1		
Slovenia	291,5	317,1	325,8	334,9		2,8	-100,0
Spain					1.020,0		
Sweden	853,0	896,0	960,0	951,0		-0,9	-100,0
Switzerland							
Turkey					2.690,8		
United Kingdom	1.730,0	1.995,0	2.060,0	2.628,7	1.050,0	27,6	-60,1
Total CAEF	**17.368**	**17.612,5**	**18.637,0**	**18.519,3**	**19.039,3**	**-0,6**	**2,8**

b) without copper (only 2 foundries = no data collection) c) foundries >50 employees, turnover

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	
	2018	2019	2018	2019	2018	2019	2018	2019
Austria	23	23						
Belgium	6	6						
Bulgaria								
Croatia								
Czech Rep.	37	37						
Denmark	7	7						
Finland	14	14	5	5	5	5	4	4
France								
Germany	337	330						
Hungary	31	33	19	21	9	9	3	3
Italy	859 a)	864						
Norway	3	3			3	3		
Poland	240	240						
Portugal a)	57	57	28	28	12	12	17	17
Slovenia	46	47						
Spain	51	52						
Sweden	61	60	35		26			
Switzerland	40	31	10	10	26	21	4	6
Turkey	390	394	295	297	59	60	36	37
United Kingdom	203	199						
Total CAEF	**2.405**	**2.397**	**392**	**361**	**140**	**110**	**64**	**67**

a) ISTAT

Table 24
Employment in the foundry industry - Non-ferrous metal castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	3.399	3.923	4.127	5.029	4.718	21,9	-6,2
Belgium	262	262	266	496	496	86,5	0,0
Bulgaria			280				
Croatia							
Czech Rep.	6.000	4.000	4.000	4.000	4.000	0,0	0,0
Denmark		408			372		
Finland	376	330	413	413	381	0,0	-7,7
France	11.800	12.000					
Germany	34.897	35.229	35.967	36.845	35.522	2,4	-3,6
Hungary	5.190	5.490	6.076	5.650	5.230	-7,0	-7,4
Italy	15.092	15.100	18.836 b)	18.312 b)	18.815	-2,8	2,7
Norway	447	452	296	287	287	-3,0	0,0
Poland	8.000	8.300	8.300	8.300	8.300	0,0	0,0
Portugal	2.356	2.399	3.400	3.461	3.365	1,8	-2,8
Slovenia		2.500	4.195	4.138	4.032	-1,4	-2,6
Spain	4.862	5.027	5.275	5.321	5.242	0,9	-1,5
Sweden		3.157			7.000		
Switzerland	1.239	1.297	1.274	1.504	1.450	18,1	-3,6
Turkey	10.000	14.000	13.500	13.750	13.750	1,9	0,0
United Kingdom	8.900	14.000 c)	13.000	13.650	13.150	5,0	-3,7
Total CAEF	**112.820**	**127.874**	**119.205**	**121.156**	**126.110**	**1,6**	**4,1**

a) foundries > 50 empl. b) ISTAT c) new survey, more accurate figures!

COPPER ALLOY CASTINGS

Table 25
Total production in t - Copper alloy castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria			292				
Croatia		221					
Czech Rep.	21.000 ac)	20.000 ac)	20.000 a)	20.500 a)	20.000	2,5	-2,4
Denmark	1.055	779	1.292	1.285	1.188	-0,5	-7,5
Finland	3.903	2.630	3.247	3.031	3.124	-6,7	3,1
France	18.344	17.724	17.877	19.307	17.409	8,0	-9,8
Germany	79.403	78.471	79.192	79.278	77.225	0,1	-2,6
Hungary	1.796	1.681	1.799	705	483	-60,8	-31,5
Italy	63.752	66.081	71.007	69.729	66.438	-1,8	-4,7
Norway	b)	b)	b)	b)	b)		
Poland	6.950 a)	6.100 a)	6.100 a)	6.100 a)	6.000	0,0	-1,6
Portugal	14.152	15.967	16.800	16.496	17.054	-1,8	3,4
Slovenia		947	842	755	872	-10,3	15,5
Spain	10.876	15.098	15.096	14.400	14.634	-4,6	1,6
Sweden		6.934	8.312	8.792		5,8	
Switzerland	2.068	2.308	2.021	2.086	2.131	3,2	2,2
Turkey	20.000	22.500	25.000	30.709	29.285	22,8	-4,6
United Kingdom	8.832	8.500	8.500	8.670	8.650	2,0	-0,2
Total CAEF	**252.131**	**265.941**	**277.377**	**281.843**	**264.493**	**1,6**	**-6,2**

a) estimated b) only 2 foundries = no data collection c) copper and zinc

Table 26
Production value in Mio. € - Copper alloy castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	30,7	27,2	35,4	27,5	29,7	-22,2	8,0
France							
Germany	869,3 b)	863,7 b)	871,0 b)	895,2 b)	865,6 b)	2,8	-3,3
Hungary							
Italy							
Norway							
Poland							
Portugal	107,7	114,7	115,2	105,5	114,6	-8,4	8,6
Slovenia							
Spain							
Sweden							
Switzerland							
Turkey	150,0	170,0	187,0	246,5	237,1	31,8	-3,8
United Kingdom							
Total CAEF	**1.157,7**	**1.175,5**	**1.208,6**	**1.274,7**	**1.247,0**		

b) copper and zinc, revised figures: foundries >50 employees, turnover

Table 27
Copper alloy castings in t

Country	Year	Sandcast and gravity die castings					Pressure die casting (Messing, Laiton, Brass)	general engineering	automotive industry	other	Total production	
		Total	thereof: Copper	Aluminium Bronze	other Bronzes	Brass						
Czech Rep.	2018										20.500	
	2019										20.000	
	in %										-2,4	
Denmark	2018										1.285	
	2019										1.188	
	in %										-7,5	
Finland	2018			674	1.504	905		3.031			3.031	
	2019	3.124		622	1.567	935		3.124			3.124	
	in %			-7,7	4,2	3,3		3,1			3,1	
France	2018										19.307	
	2019										17.409	
	in %										-9,8	
Germany	2018	37.615						287	29	78.962	79.278	
	2019	35.916						154	28	77.043	77.225	
	in %	-4,5						-46,3	-3,9	-2,4	-2,6	
Hungary	2018										705	
	2019										483	
	in %										-31,5	
Italy	2018										69.729	
	2019										66.438	
	in %										-4,7	
Norway	2018											a)
	2019											a)
	in %											
Poland	2018										6.100	b)
	2019										6.000	
	in %										-1,6	
Portugal	2018			1.800	2.360	12.336		1.700		14.796	16.496	
	2019			2.000	2.360	12.694		1.900		12.694	17.054	
	in %			11,1	0,0	2,9		11,8		-14,2	3,4	
Slovenia	2018										755,0	
	2019										872,0	
	in %										15,5	
Spain	2018										14.400	
	2019										14.634	
	in %										1,6	
Sweden	2018										8.792	
	2019											
	in %										-100,0	
Switzerland	2018	2.086,0									2.086	
	2019	2131,0									2.131	
	in %	2,2									2,2	
Turkey	2018	15.750	4.250	3.750	1.750	6.000	6.209	5.500	3.250		30.709	
	2019	14.808	4.111	3.524	1.510	5.663	6.042	5.313	3.122		29.285	
	in %	-6,0	-3,3	-6,0	-13,7	-5,6	-2,7	-3,4	-3,9		-4,6	
United Kingdom	2018										8.670	
	2019										8.650	
	in %										-0,2	

a) only 2 foundries
= no data collection
b) estimated

LIGHT AND ULTRALIGHT CASTINGS

Table 28
Total production in t - Light and ultralight castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria	140.749	147.096	148.287	150.559	133.406	1,5	-11,4
Belgium	878	783	799	799	683	0,0	-14,5
Bulgaria			5.540				
Croatia		25.174					
Czech Rep.	95.000 a)	98.000 a)	101.000 a)	102.500 a)	95.000	1,5	-7,3
Denmark	3.086	3.117	3.014	2.566	2.224	-14,9	-13,3
Finland	2.240	2.114	2.548	2.395	2.184	-6,0	-8,8
France	316.931	324.102	346.899	394.727	348.062	13,8	-11,8
Germany	1.087.211 b)	1.114.105 b)	1.137.096	1.038.211	1.011.599	-8,7	-2,6
Hungary	106.873	118.637	124.229	136.791	122.675	10,1	-10,3
Italy	767.815	790.075	856.381	864.081	817.744	0,9	-5,4
Norway	7.221	6.373	5.883	6.525	6.526	10,9	0,0
Poland	334.600 a)	331.500 a)	330.000	330.000	340.000	0,0	3,0
Portugal	29.150	32.382	35.000	37.612	37.009	7,5	-1,6
Slovenia		47.610	51.209	61.315	65.162	19,7	6,3
Spain	125.652	138.591	141.810	127.159	129.345	-10,3	1,7
Sweden		46.053	46.138	48.000	48.000	4,0	0,0
Switzerland	14.922	12.902	13.373	13.790	12.699	3,1	-7,9
Turkey	325.000	370.000	380.000	476.253	504.328	25,3	5,9
United Kingdom	113.400	126.200	136.200	149.540	149.100	9,8	-0,3
Total CAEF	**3.470.728**	**3.734.814**	**3.865.406**	**3.942.824**	**3.825.746**	**2,0**	**-3,0**

a) estimated b) revised

Table 29
Production value in Mio. € - Light and ultralight castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	28,7	25,9	26,3	33,6	21,3	27,7	-36,6
France							
Germany b)	4.874,2	4.901,2	5.091,5	5.232,6	4.705,2	2,8	-10,1
Hungary							
Italy							
Norway	63,0	61,0	58,0	51,0	51,0	-12,1	0,0
Poland							
Portugal	167,6	185,5	192,4	211,0	247,0	9,7	17,1
Slovenia							
Spain							
Sweden							
Switzerland							
Turkey	1.450,0	1.700,0	1.748,0	2.207,4	2.289,4	26,3	3,7
United Kingdom							
Total CAEF	**6.583,6**	**6.873,6**	**7.116,2**	**7.735,6**	**7.313,9**		

b) foundries >50 employees, turnover

Table 30
Light and ultralight castings
in t

Country	Year	Aluminium			Magnesium			general engineering	automotive industry	other	Total Production
		Sandcast and gravity die casting	Pressure die casting	Total	Sandcast and gravity die casting	Pressure die casting	Total				
Austria	2018	25.476	119.219	144.695							150.559
	2019	23.277	106.138	129.415							133.406
	in %	-8,6	-11,0	-10,6							-11,4
Belgium	2018										799
	2019										683
	in %										-14,5
Czech Rep.	2018			101.000			300				102.500
	2019			94.700			300				95.000
	in %			-6,2			0,0				-7,3
Denmark	2018										2.566
	2019										2.224
	in %										-13,3
Finland	2018	1.682	713	2.395				1.845	550		2.395
	2019	1.584	600	2.184				1.747	437		2.184
	in %	-5,8	-15,8	-8,8				-5,3	-20,5		-8,8
France	2018										394.727
	2019										348.062
	in %										-11,8
Germany	2018	394.549	616.740	1.020.013		17.921	18.198	9.691	939.451	89.046	1.038.211
	2019	384.002	603.633	996.127		15.472	15.472	8.140	917.794	85.646	1.011.599
	in %	-2,7	-2,1	-2,3		-13,7	-15,0	-16,0	-2,3	-3,8	-2,6
Hungary	2018	57.556	78.962	136.518	15	258	273				136.791
	2019			122.425	32	218	250				122.675
	in %	-100,0	-100,0	-10,3	113,3	-15,5	-8,4				-10,3
Italy	2018			856.016			8.065				864.081
	2019			810.647			7.097				817.744
	in %			-5,3			-12,0				-5,4
Norway	2018	6.525		6.525							6.525
	2019	6.526		6.526							6.526
	in %	0,0		0,0							0,0
Poland	2018										330.000
	2019			340.000							340.000
	in %										3,0
Portugal	2018	1.650	35.962	37.612							37.612
	2019	1.253	35.736	37.009							37.009
	in %	-24,1	-0,6	-1,6							-1,6
Slovenia	2018			52.050							61.315
	2019			54.625							65.162
	in %			4,9							6,3
Spain	2018										127.159
	2019										129.345
	in %										1,7
Sweden	2018	7.200	40.800	48.000							48.000
	2019	7.200	40.800	48.000							48.000
	in %	0,0	0,0	0,0							0,0
Switzerland	2018	2.314	11.476	13.790							13.790
	2019	2.374	10.325	12.699							12.699
	in %	2,6	-10,0	-7,9							-7,9
Turkey	2018	244.000	231.003	475.003	750	500	1.250				476.253
	2019	252.024	251.454	503.478	450	400	850				504.328
	in %	3,3	8,9	6,0	-40,0	-20,0	-32,0				5,9
United Kingdom	2018			146.900			2.640				149.540
	2019			146.460			2.600				149.100
	in %			-0,3			-1,5				-0,3

ZINC

Table 31
Total production in t - Zinc

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria			42				
Croatia		25					
Czech Rep.		1.000	1.000	1.200	1.000	20,0	-16,7
Denmark							
Finland	86	86	101	100		-1,0	
France	18.083	20.329	24.719	24.854	24.486	0,5	-1,5
Germany	54.661	56.247	62.188	59.205	57.182	-4,8	-3,4
Hungary	3.543	2.985	1.717	1.610	763	-6,2	-52,6
Italy	68.254	70.474	72.007	73.303	74.036	1,8	1,0
Norway							
Poland	7.540 a)	7.600 a)	7.500 a)	7.500 a)	7.500	0,0	0,0
Portugal	2.135	2.152	2.250	2.440	2.464	8,4	1,0
Slovenia		3.494		8.510	9.665		13,6
Spain	8.771	9.079	8.941	9.020	8.426	0,9	-6,6
Sweden		8.531	9.274				
Switzerland	1.094	989	1.209	1.118	1.051	-7,5	-6,0
Turkey	35.000	35.000	35.000	40.025	39.432	14,4	-1,5
United Kingdom	7.800	7.000	7.350	8.085	8.090	10,0	0,1
Total CAEF	**206.967**	**224.992**	**233.298**	**236.970**	**234.095**		**-1,2**

a) estimated

Table 32
Production value in Mio. € - Zinc

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia							
Czech Rep.							
Denmark							
Finland	1,3	0,8	0,8	1,0		25,0	
France							
Germany	b)	b)	b)	b)	b)		
Hungary							
Italy							
Norway							
Poland							
Portugal	16,1	17,0	18,2	18,4	19,5	1,1	5,8
Slovenia							
Spain							
Sweden							
Switzerland							
Turkey	130,0	125,0	125,0	174,8	164,3	39,8	-6,0
United Kingdom							
Total CAEF	**147,4**	**142,8**	**144,0**	**194,2**	**183,7**		

b) included in table 33

Table 33

Zinc in t

Country	Year	Pressure die casting	general engineering	automotive industry	other	Total Production
Czech Rep.	2018					1.200
	2019					1.000
	in %					-16,7
Finland	2018		100			100
	2019					
	in %					
France	2018					24.854
	2019					24.486
	in %					-1,5
Germany	2018	59.252	121	1.395	57.689	59.205
	2019		131	1.582	55.469	57.182
	in %		8,2	13,4	-3,8	-3,4
Hungary	2018					1.610
	2019					763
	in %					-52,6
Italy	2018					73.303
	2019					74.036
	in %					1,0
Poland	2018					7.500 a)
	2019					7.500
	in %					0,0
Portugal	2018		2.440			2.440
	2019		2464,0			2.464
	in %		1,0			1,0
Slovenia	2018					8.510
	2019					9.665
	in %					13,6
Spain	2018					9.020
	2019					8.426
	in %					-6,6
Switzerland	2018					1.118
	2019					1.051
	in %					-6,0
Turkey	2018		6.025	10.500	23.500	40.025
	2019		6.078	10.252	23.102	39.432
	in %		0,9	-2,4	-1,7	-1,5
United Kingdom	2018					8.085
	2019					8.090
	in %					0,1

a) estimated

OTHER ALLOY CASTINGS

Table 34
Total production in t - Other alloy castings

Country	2015	2016	2017	2018	2019	2018 / 17 in %	2019 / 18 in %
Austria							
Belgium							
Bulgaria							
Croatia		15,0					
Czech Rep.							
Denmark	207,0	128,0	100,0	89,0	112,0	-11,0	25,8
Finland							
France	2.533,0	2.340,0	2.501,0	2.424,0	2.486,0	-3,1	2,6
Germany	1,8	0,9	3,7	5,2	5,2	42,4	0,0
Hungary	169,0	123,0		93,0	86,0		-7,5
Italy	630,0	654,0	700,0	983,0	481,0	40,4	-51,1
Norway							
Poland a)	3.860,0	2.900,0	2.900,0	2.900,0	3.000,0	0,0	3,4
Portugal							
Slovenia							
Spain	711,0	706,0	850,0	2.516,0	1.502,0	196,0	-40,3
Sweden							
Switzerland							
Turkey							
United Kingdom	1.000,0						
Total CAEF	**9.111,8**	**6.866,9**	**7.054,7**	**9.010,2**	**7.672,2**		

a) estimated

WORLD PRODUCTION

Table 35

World production 2018, selected countries - Iron and Steel castings in t

Country		Iron castings		Nodular iron castings		Malleable iron castings	Steel castings	Total
Austria		43.000		109.700			11.400	**164.100**
Belgium		69.900		7.800			7.500	**85.200**
Bosnia/Herzegovina	**	17.500		9.100			1.350	**27.950**
Brazil		1.305.036		535.116			244.008	**2.084.160**
Bulgaria	*	30.300		9.200	A		10.400	**49.900**
Canada	***	330.841					90.091	**420.932**
China		20.650.000		14.150.000		600.000	5.750.000	**41.150.000**
Croatia	**	31.100		11.800			50	**42.950**
Czech. Rep.		176.500		57.000			62.000	**295.500**
Denmark		29.600		61.900				**91.500**
Finland		18.400		36.200			10.100	**64.700**
France		597.400		682.100			60.400	**1.339.900**
Germany		2.435.600		1.636.000			184.700	**4.256.300**
Hungary		22.000		63.400			2.800	**88.200**
India		9.413.164		1.313.104		50.000	1.215.636	**11.991.904**
Italy		767.600		428.600			56.900	**1.253.100**
Japan		2.070.301		1.689.391		39.940	171.860	**3.971.492**
Korea (Republic of)		989.200		700.200		1.000	158.300	**1.848.700**
Mexico	*	892.188		526.897			373.965	**1.793.050**
Norway		8.800		22.300				**31.100**
Pakistan		181.000		24.540			48.750	**254.290**
Poland		480.000		160.000			50.000	**690.000**
Portugal		43.400		96.800			5.300	**145.500**
Romania		19.500		2.000		20	9.000	**30.520**
Russia		2.184.000	D				1.134.000	**3.318.000**
Serbia		26.300		3.100			18.150	**47.550**
Slovenia		62.501		43.538		3.100	27.801	**136.940**
South Africa	*	140.000		157.000			93.500	**390.500**
Spain		357.600		711.600			66.600	**1.135.800**
Sweden		161.700		64.000			22.900	**248.600**
Switzerland		36.700		22.100			2.300	**61.100**
Taiwan		641.178		215.796			68.577	**925.551**
Turkey		603.000		912.900			192.400	**1.708.300**
Ukraine	***	400.000		120.000		30.000	580.000	**1.130.000**
United Kingdom		144.900		219.500			49.200	**413.600**
United States		4.062.373		3.325.740		37.195	931.679	**8.356.987**

Source: Modern Casting, data can differ from CAEF data

* 2017 Results

** 2016 Results

*** 2015 Results

A) Included with ductile iron

B) All nonferrous

C) Includes zinc

D) Includes all iron

Table 36

World Production 2018 selected countries - Non-ferrous metal castings in t

Country		Copper	Aluminum		Magnesium		Zinc	Others	Total
Austria			144.695						**144.695**
Belgium			2.200						**2.200**
Bosnia/Herzegovina	**		10.500						**10.500**
Brazil		20.945	172.076		5.040		1.158		**199.219**
Bulgaria	*	292	5.540				42		**5.874**
Canada	***	14.237	211.374						**225.611**
China		800.000	7.150.000					250.000	**8.200.000**
Croatia	**	221	25.174				25	15	**25.435**
Czech. Rep.		20.500	101.000		300		1.200		**123.000**
Denmark		1.285						89	**1.374**
Finland		3.031	2.395				100		**5.526**
France		19.307	394.727				24.854	2.424	**441.312**
Germany		79.278	1.020.013		18.198		59.205	5	**1.176.699**
Hungary		705	136.518		273		1.610	93	**139.199**
India			1.396.778	B					**1.396.778**
Italy		69.729	856.016		8.065		73.303	983	**1.008.096**
Japan		74.559	1.505.499				19.085	4.782	**1.603.925**
Korea (Republic of)		25.100	630.000		13.000	C			**668.100**
Mexico	*	217.200	817.911				81.300		**1.116.411**
Norway			6.525						**6.525**
Pakistan		14.200	21.200					2.730	**38.130**
Poland		6.100	330.000				7.500	2.900	**346.500**
Portugal		16.496	37.612				2.440		**56.548**
Romania		2.900	66.000		5.000		400	116	**74.416**
Russia		117.600	588.000		75.600			100.800	**882.000**
Serbia		3.100	10.120		1		30		**13.251**
Slovenia		755	52.050				8.510		**61.315**
South Africa	*	14.000	38.000				500		**52.500**
Spain		14.400	127.159				9.020	2.516	**153.095**
Sweden		8.792	48.000						**56.792**
Switzerland		2.086	13.790				1.118		**16.994**
Taiwan		31.202	421.283						**452.485**
Turkey		30.709	475.003		1.250		40.025		**546.987**
Ukraine	***	60.000	280.000		15.000		25.000	50.000	**430.000**
United Kingdom		8.670	146.900		2.640		8.085		**166.295**
United States		288.485	1.609.346		140.614		313.886	47.174	**2.399.505**

Source: Modern Casting, data can differ from CAEF data

* 2017 Results

** 2016 Results

*** 2015 Results

A) Included with ductile iron

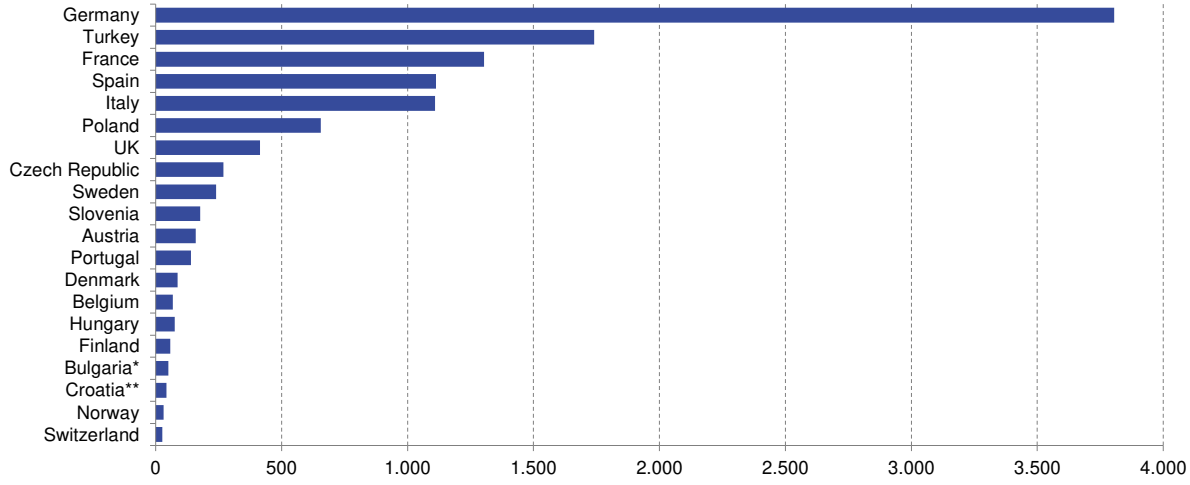
B) All nonferrous

C) Includes zinc

D) Includes all iron

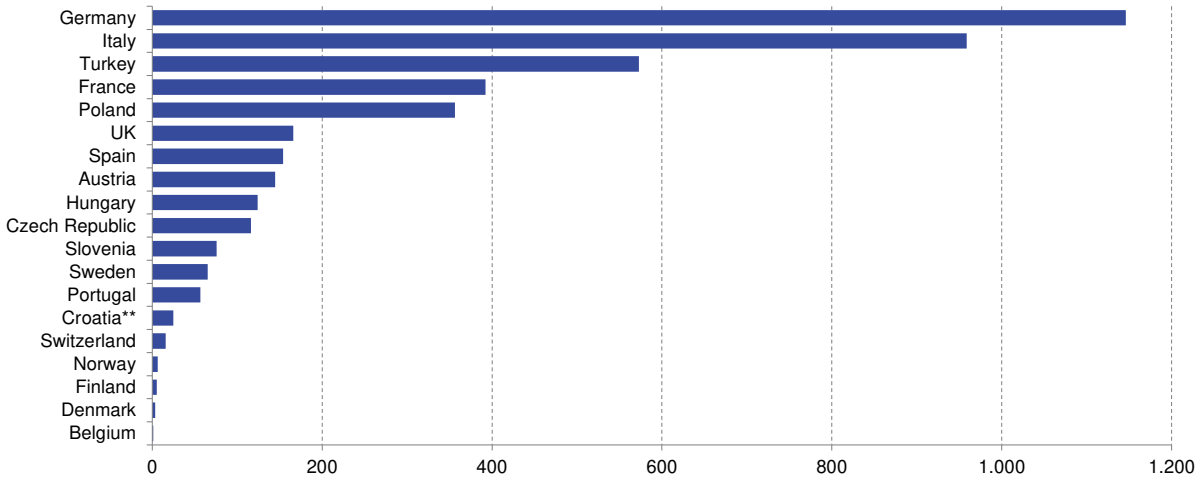
GRAPHS

Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2019 (in 1.000 t)



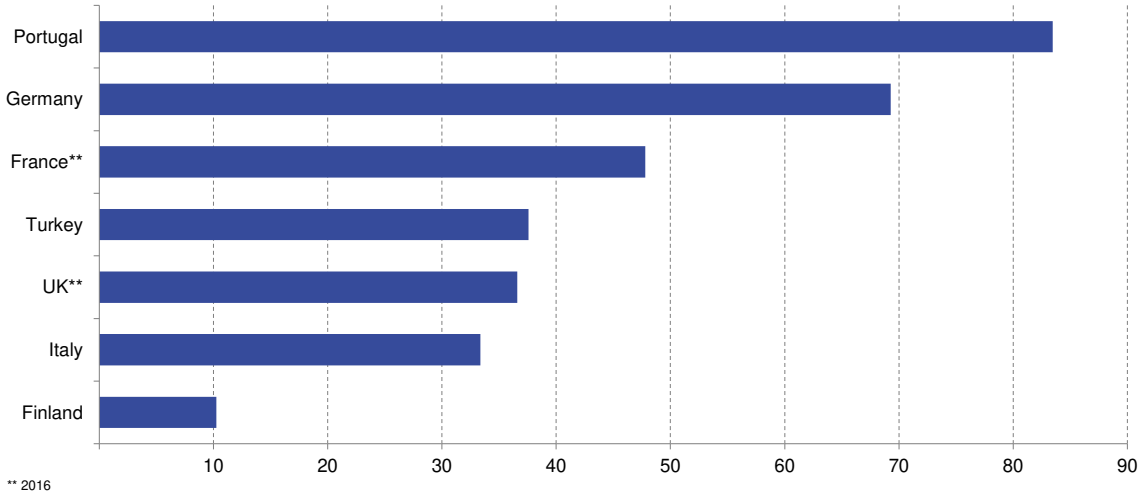
* 2017, ** 2016

Production of Non-Ferrous Metal Castings in the European Foundry Industry 2019 (in 1.000 t)



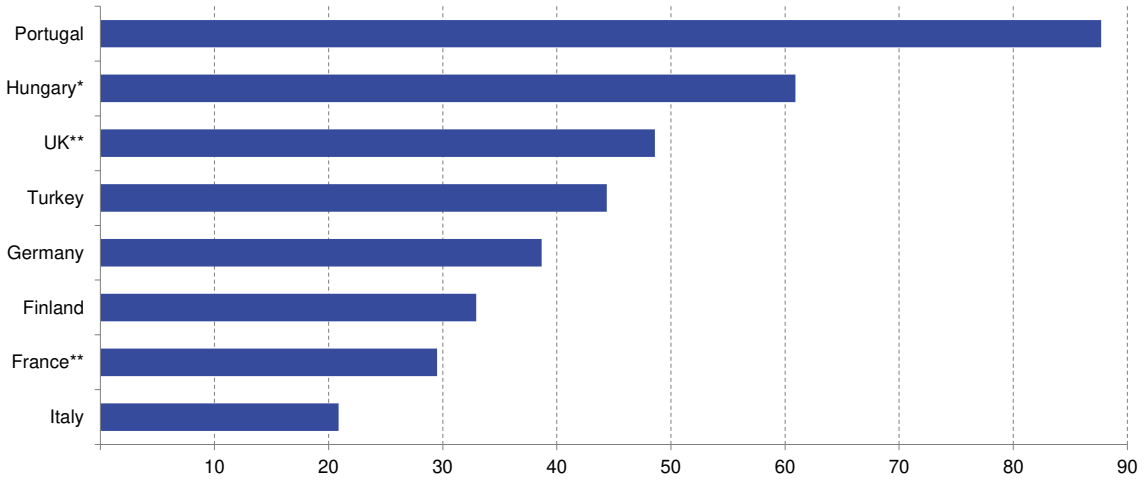
** 2016

Iron Castings for the Vehicle Industry
National Production Share 2019 (in %)



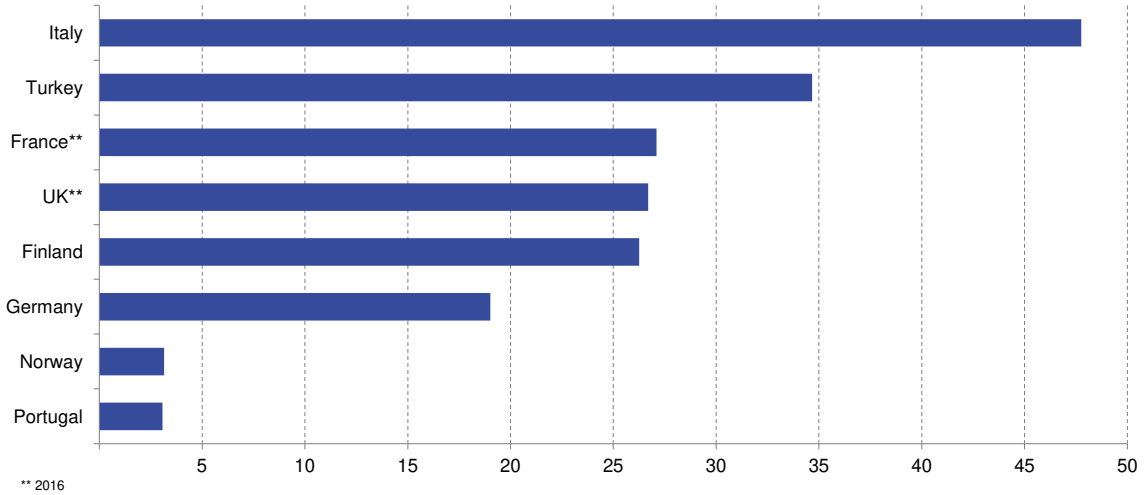
** 2016

Ductile Iron Castings for the Vehicle Industry
National Production Share 2019 (in %)



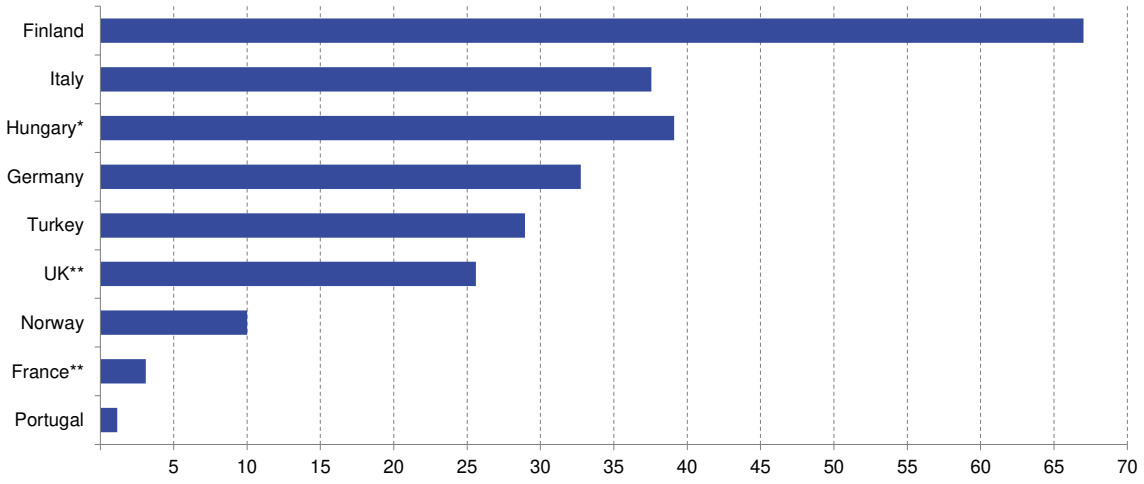
* 2017, ** 2016

Iron Castings for Engineering Plant and Machinery
National Production Share 2019 (in %)



** 2016

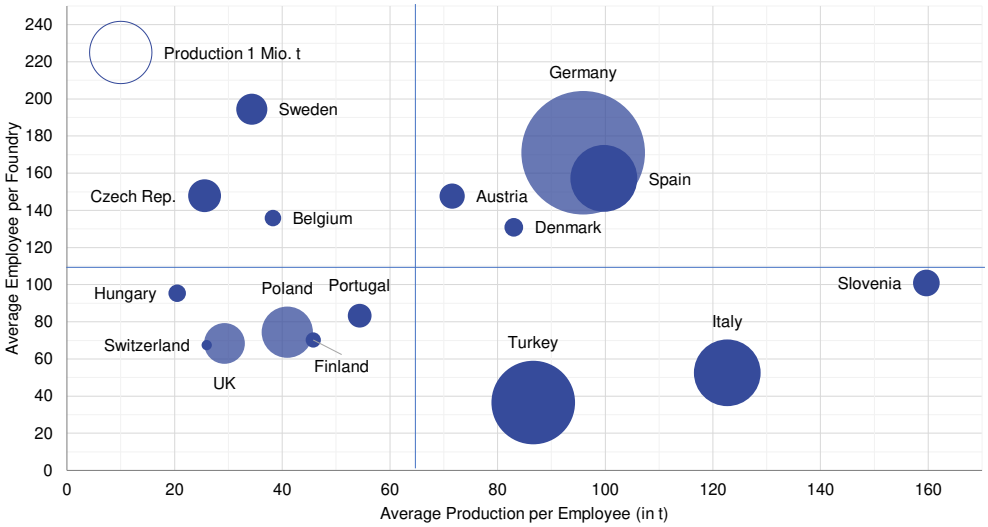
Ductile Iron Castings for Engineering Plant and Machinery
National Production Share 2019 (in %)



* 2017, ** 2016

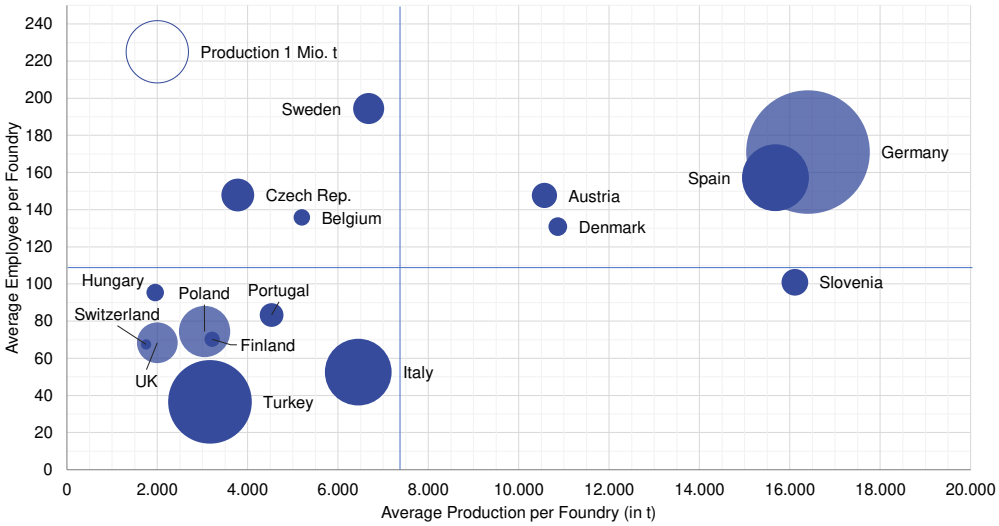
Average Production per Employee – Iron, Steel and Malleable Iron Castings

Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2019 (in t)

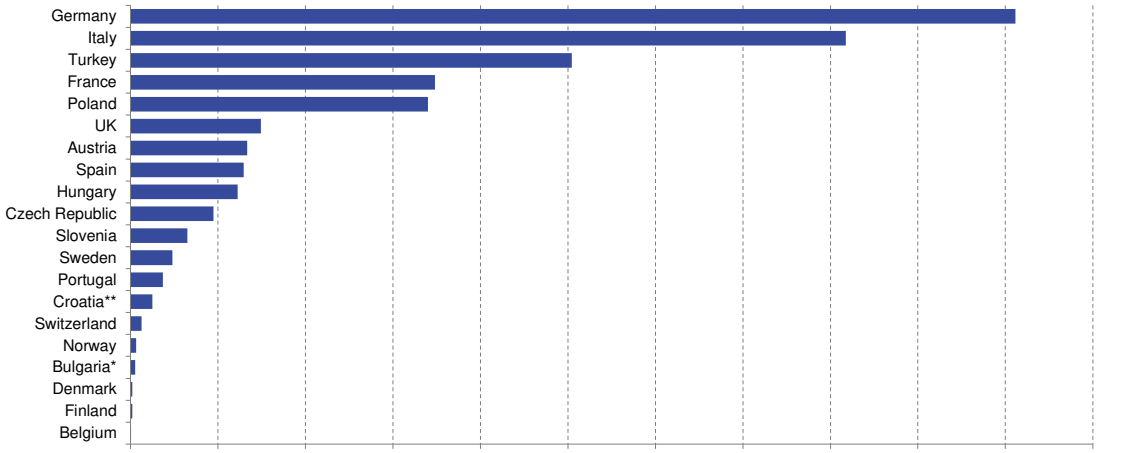


Average Production per Foundry – Iron, Steel and Malleable Iron Castings

Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2019 (in t)

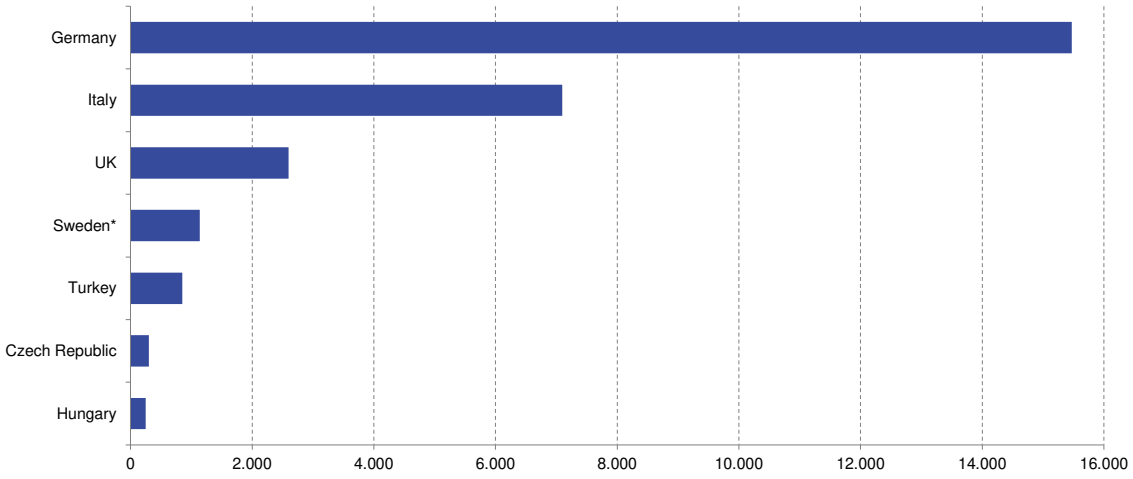


Production of Light and Ultralight Castings in the European Foundry Industry 2019 (in t)



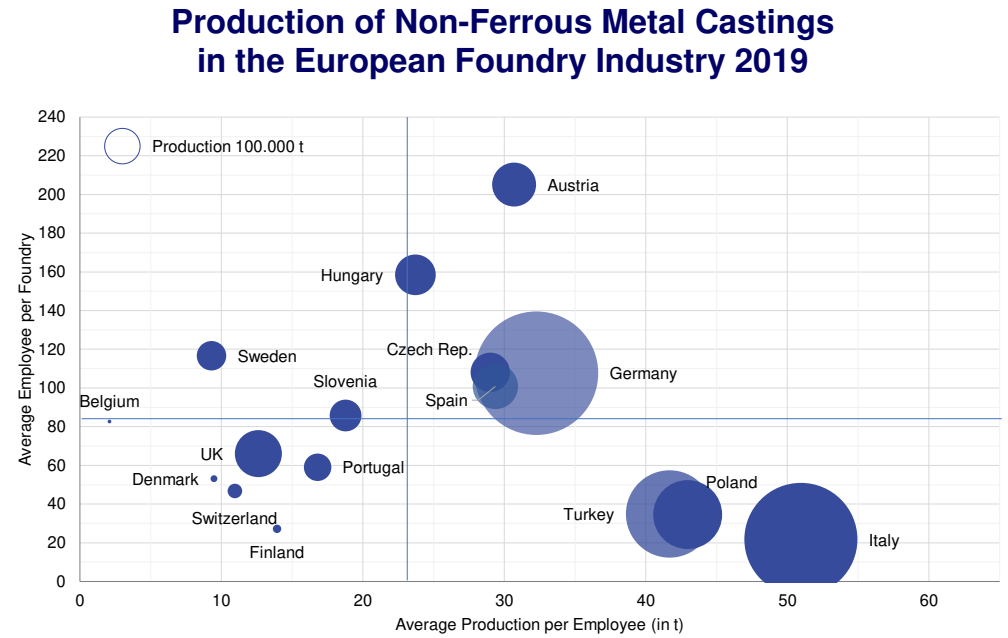
* 2017, ** 2016

Major Producers of Magnesium Castings in the European Foundry Industry 2019 (in t)

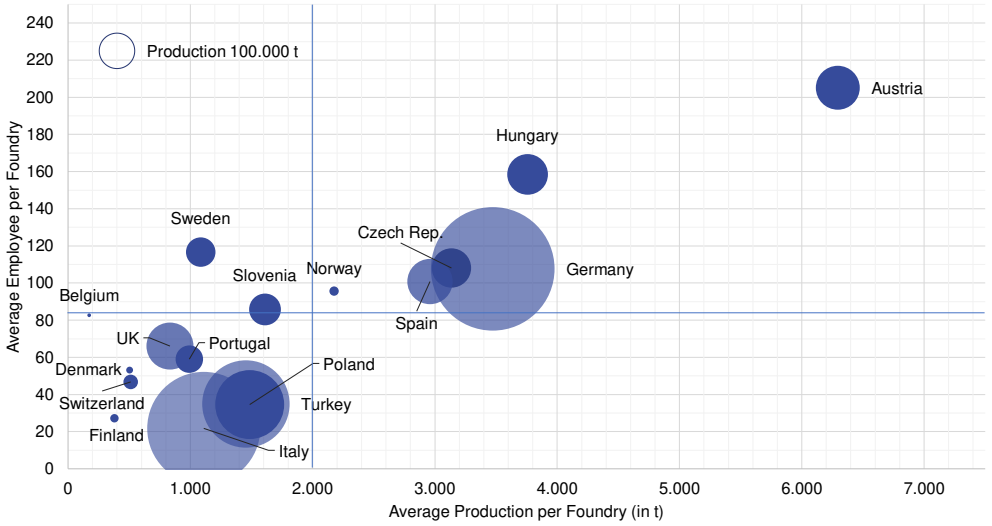


* 2017

Average Production per Employee – Non-Ferrous Metal Castings

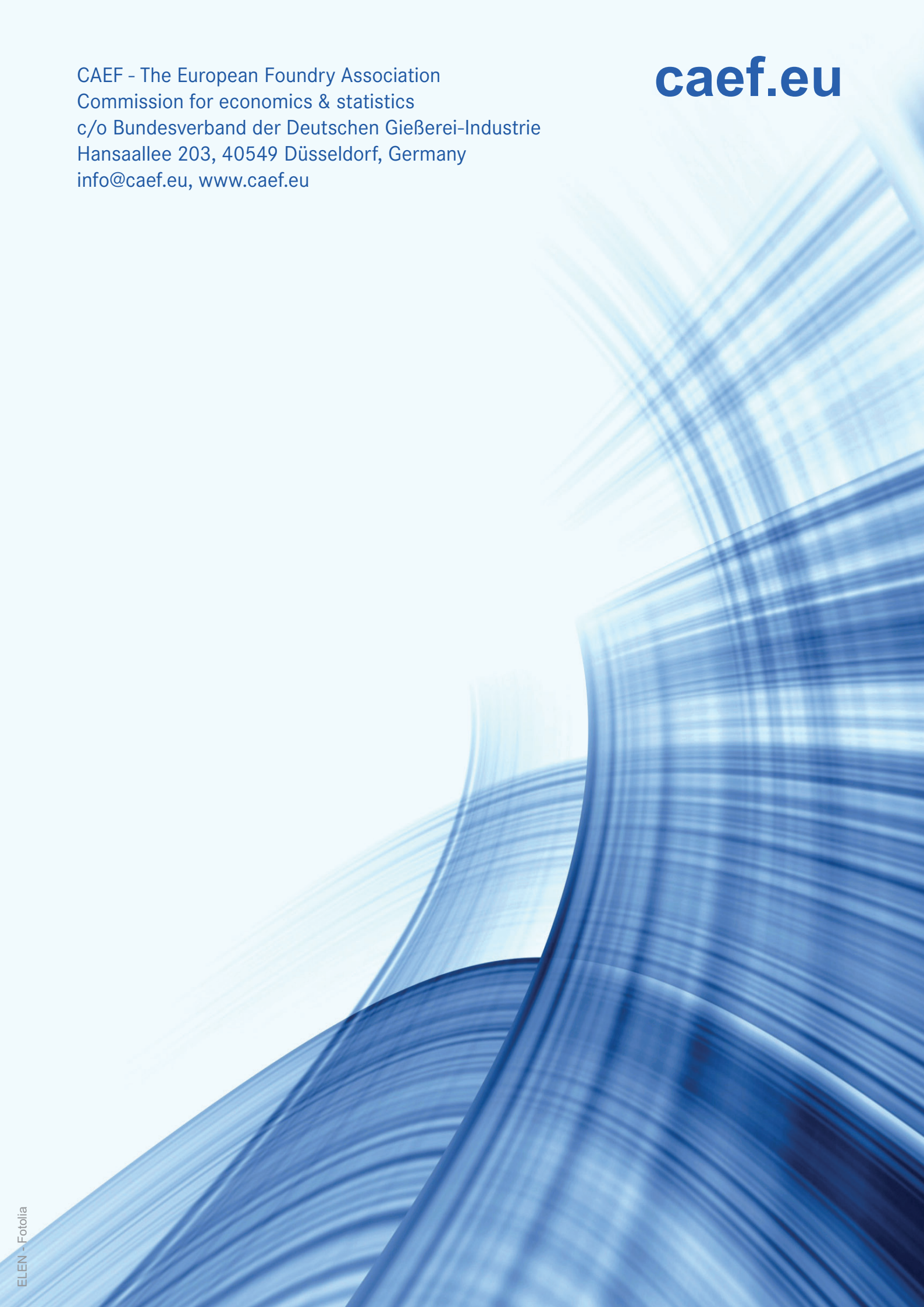


Average Production per Foundry – Non-Ferrous Metal Castings



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