



**TÜRKİYE DÖKÜM
SANAYİCİLERİ
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THE TURKISH FOUNDRY
ASSOCIATION

Turkish Metal Casting Industry & Current Trends

Azerbaijan - Kazakhstan - Romania Joint Economic Commissions

Online Seminar- April 20, 2022

Tuncag Cihangir Sen, Business Development Director



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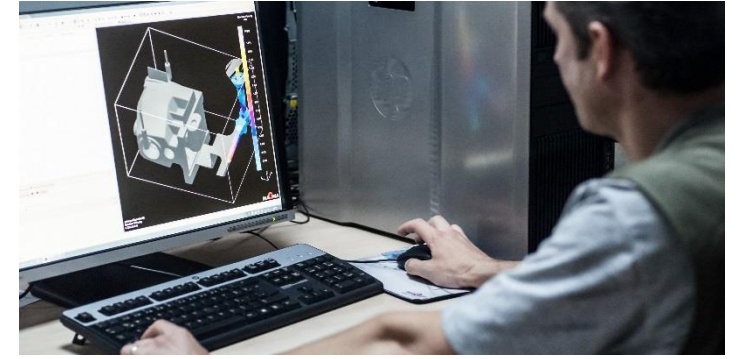
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The European
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- ❑ TUDOKSAD Turkish Foundry Association
- ❑ Metal Castings: Adding Value To Metals and Our Lives
- ❑ Turkish Metal Casting Industry
- ❑ Sectoral Datas
- ❑ Current Trends





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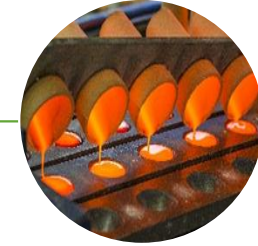
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Brief History



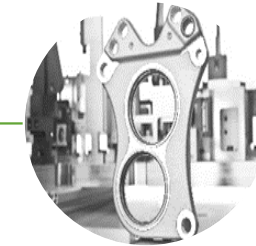
October 26, 1976

- Established under the leadership of 8th President Turgut OZAL, one of the industrialists of the period.



June 12, 1996

- The phrase "Turkey" has been added to its title with the Council of Ministers' decision.



May 11, 1989

- Have become a member of the WFO-World Foundry Association to represent Turkey, with the Council of Ministers' decision.



June 4, 2007

- Have become a member of the CAEF- European Foundry Association.



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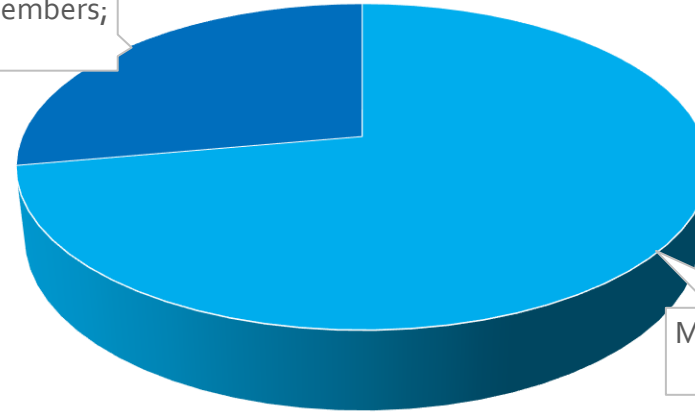
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TUDOKSAD

Member Profile

Member Profile

Associate Members;
49



Member Foundries;
127

85%

TUDOKSAD Members'
share in the Turkish Metal Casting Production

90%

TUDOKSAD Members'
share in the Turkish Metal Casting Exports



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Metal Castings

Adding Value To Metals and
& Our Lives



Metal casting

One of the deep-rooted manufacturing methods used in shaping metals and alloys.

How?

By melting selected metal or alloys and solidifying them by pouring into cavities called «molds» in order to obtain a desired part.



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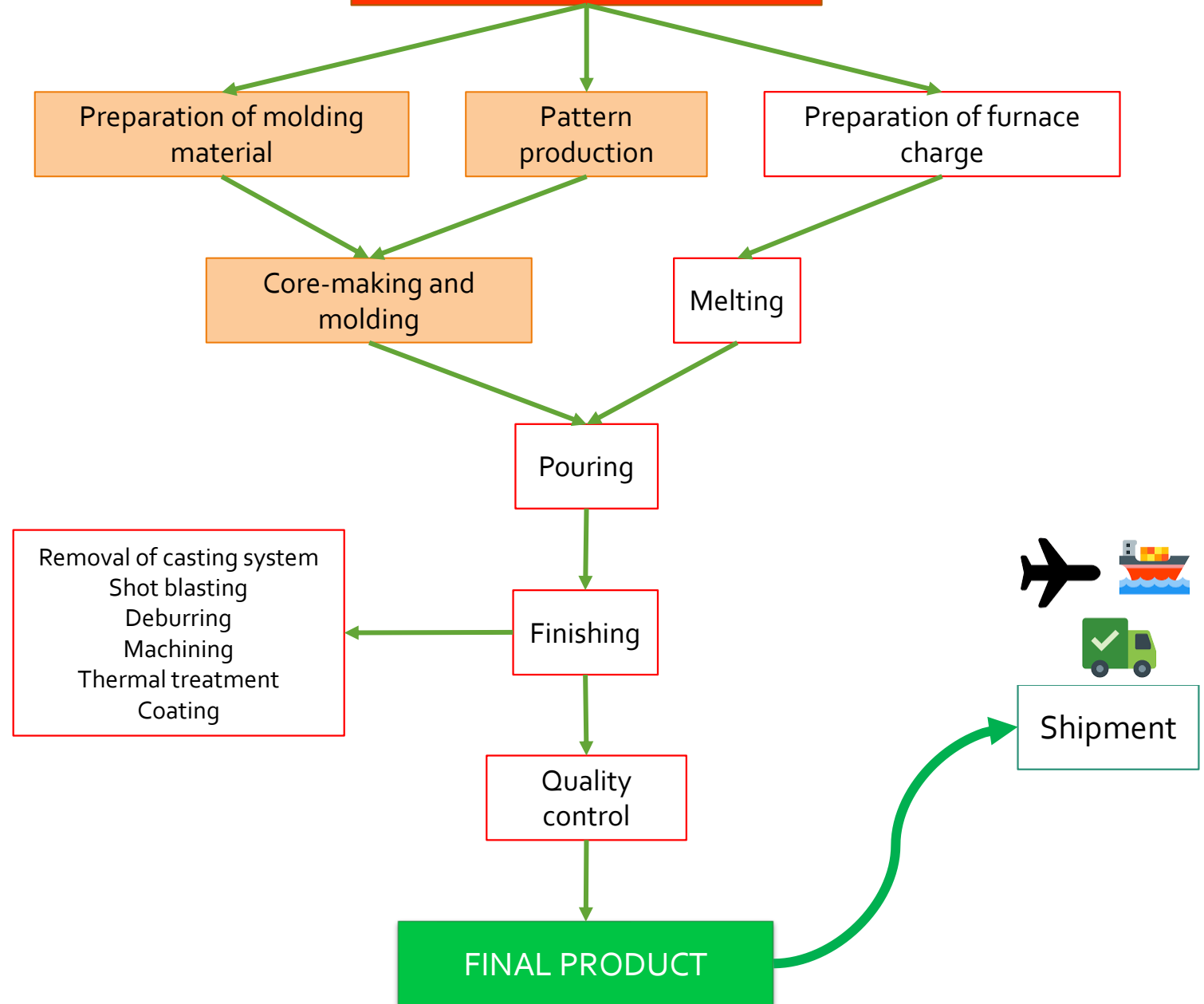
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Metal Castings

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Metal Casting Process Flow



Metal Castings

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Process Diversity

1. Pattern production



Part of a pattern made of wood



A pattern is a replica of the object to be cast, used to create the cavity into which molten material will be poured during the process.



It could be made of wood, metal, plastic, or composite materials.



Patterns are the objects used to create **expendable** molds. A single pattern can make up to thousands of molds.

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Process Diversity


2. Molding type

Expendable

 Refers to any casting process in which the mold can **not** be reused

- ❖ Sand casting
- ❖ Shell mould casting
- ❖ Ceramic mould casting
- ❖ Lost foam casting
- ❖ Investment casting

Permanent

 Refers to any casting process in which the mold can be reused (Molds made of metal can be reused multiple times, applied mainly in aluminum, magnesium, zinc, and copper alloys)

- ❖ Gravity die casting
- ❖ High pressure die casting
- ❖ Low pressure die casting
- ❖ Centrifugal casting
- ❖ Continuous casting

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Process Diversity

3. Core making



Core placed in a mould of green sand

A core is a sand (mostly) insert used to shape any part of a casting that cannot be shaped by the pattern. The mold provides a space for the molten metal to go, while the core keeps the metal from filling the entire space.



❖ No Bake Resin Systems
(Furan, Alkaline phenolic etc.)



❖ Gas Cured Resin Systems
(CO₂, Amine etc.)



❖ Heat Cured Resin Systems
(Hot box)



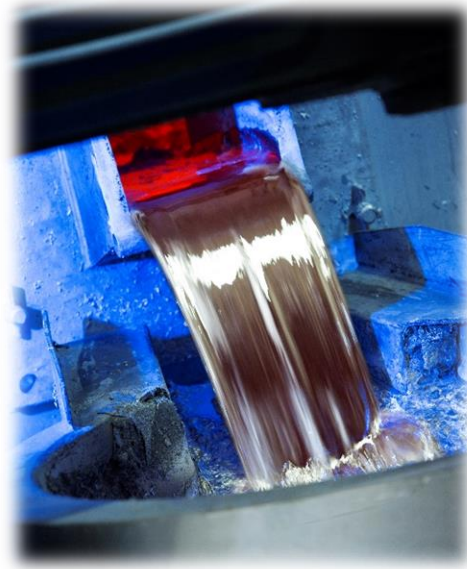
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Process Diversity

4. Melting technology



❖ Fuel fired systems (coal,
natural gas etc.)



❖ Electricity (**induction**,
electric arc furnaces)



Melting Temperature
Iron (Fe): 1538°C
Aluminium (Al): 660°C



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Metal Castings

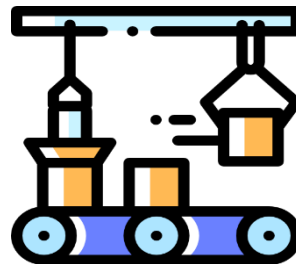
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Eco-friendly & Sustainable
Enabler of the **Circular Economy**



Cavity structure, complex design,
All sizes,
Production from **all metals & alloys at once**



Flexible & low cost production





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Metal Castings

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Used in almost all
manufacturing
industries



Included in millions of
products used in daily
life

- Automobile, truck etc. all kinds of land transportation vehicles
- Ships
- Airplanes
- Missiles, tanks, guns, bomb parts
- Train, tram etc. rail transport vehicles
- Machines used for production in every sector
- Robots
- Agricultural tools and equipment
- Mineral, oil and gas exploration equipment
- Nuclear and renewable energy plant parts
- Energy turbines
- Energy distribution network key parts
- Transformer, generator and electric motors
- Imaging devices
- Artificial limbs
- Construction materials
- Radiators and boilers
- Water, sewage, etc. all kinds of pipe
- Fire hydrants
- Pumps, valves, plugs and water meters
- Connectors
- Furniture parts
- Household appliances
- Oven, cooker, coffee machine etc. pieces
- Monitors and cell phones
- Toys
- Ornaments
- Sculptures
- Municipality parks and garden supplies
- Manhole and all kinds of covers
- ...



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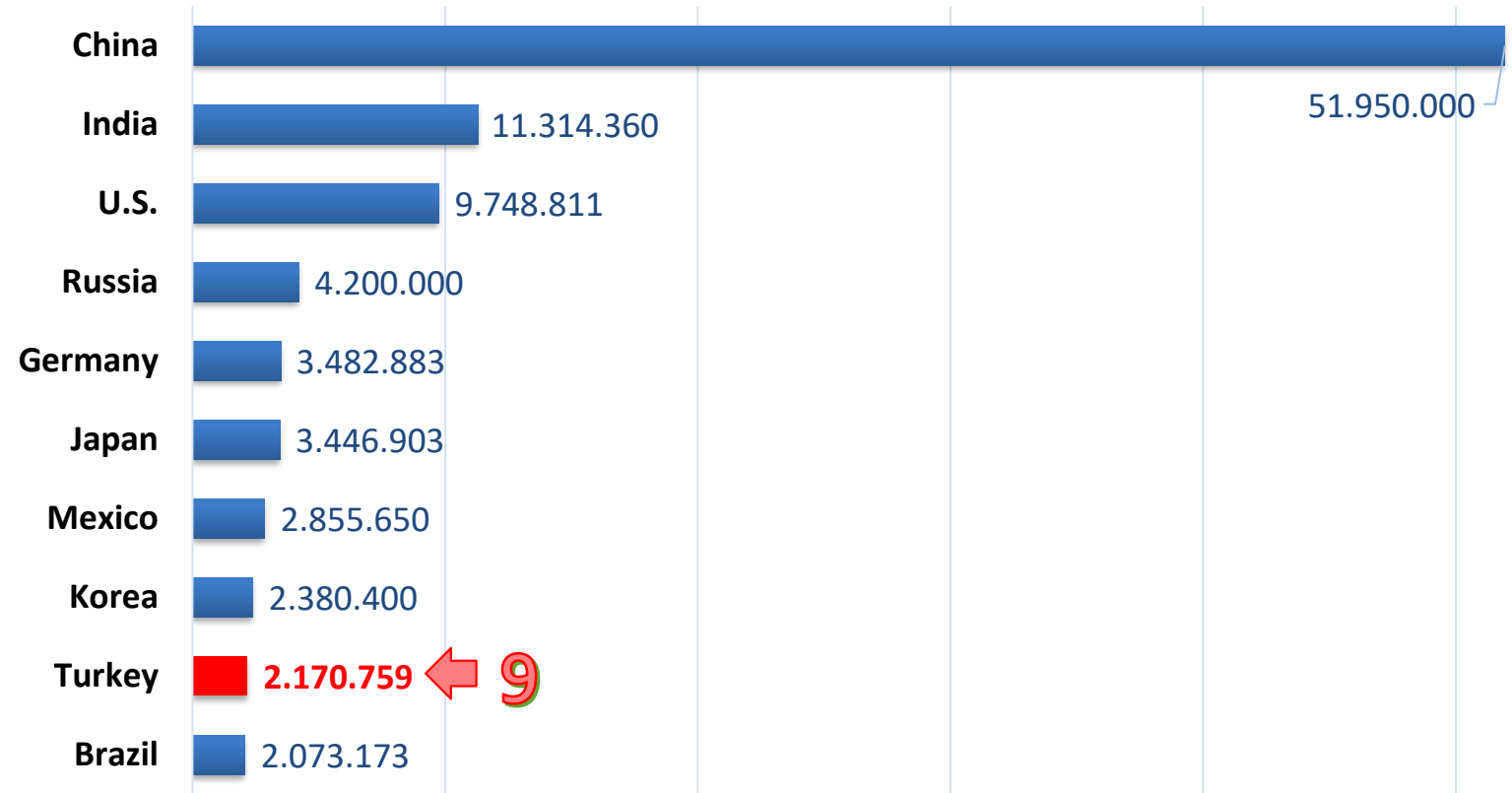


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Turkish Metal Casting Industry

Position in World Production

World Metal Casting Production – 2020 (x1000 tons)



Source: AFS Census of World Casting Production, Modern Casting Magazine, December 2021



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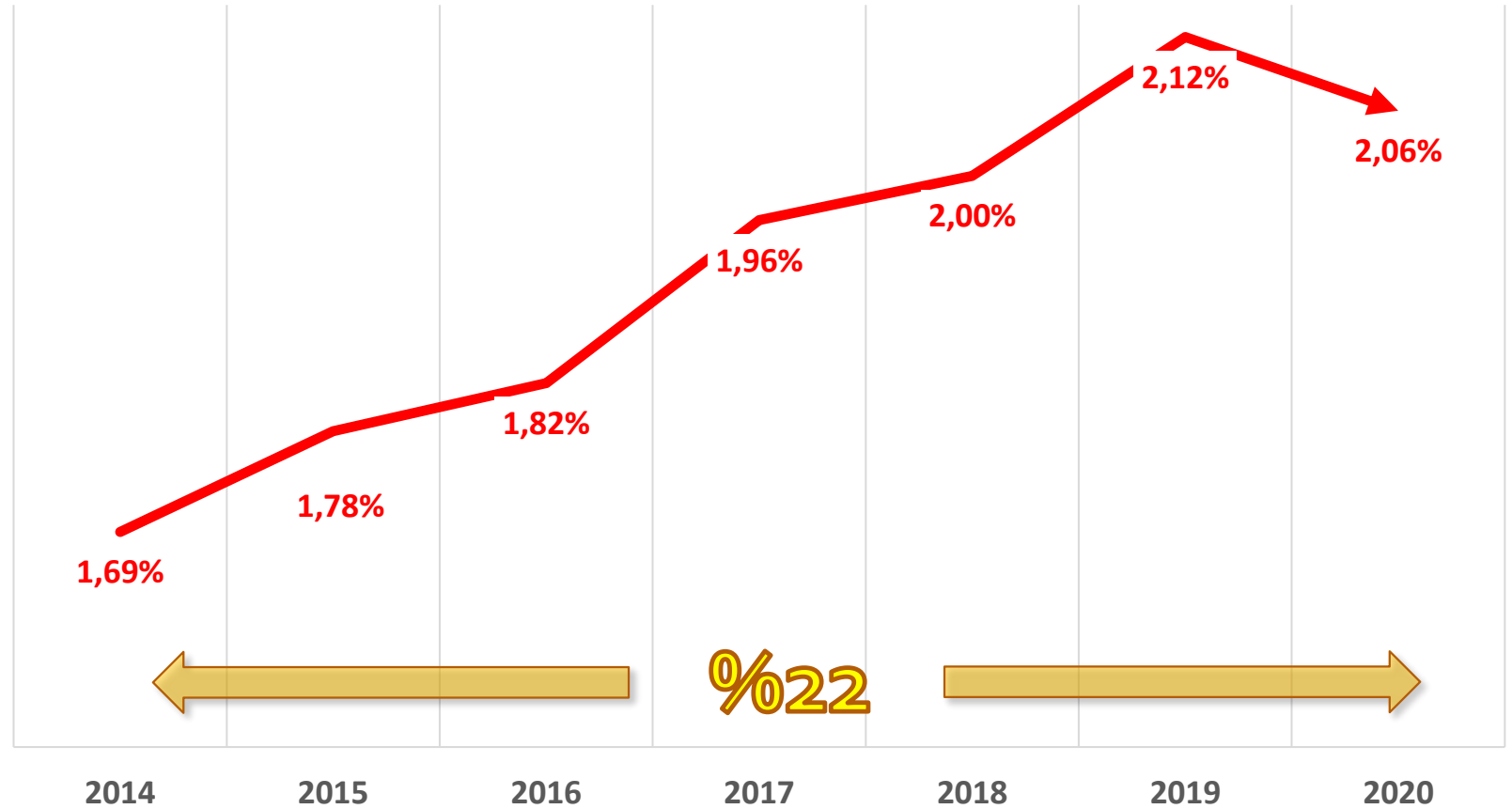
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Turkish Metal Casting Industry

Share in World Production

Share of Turkish Metal Casting Industry in Total World Production



Source: AFS Census of World Casting Production, Modern Casting Magazine, December 2021

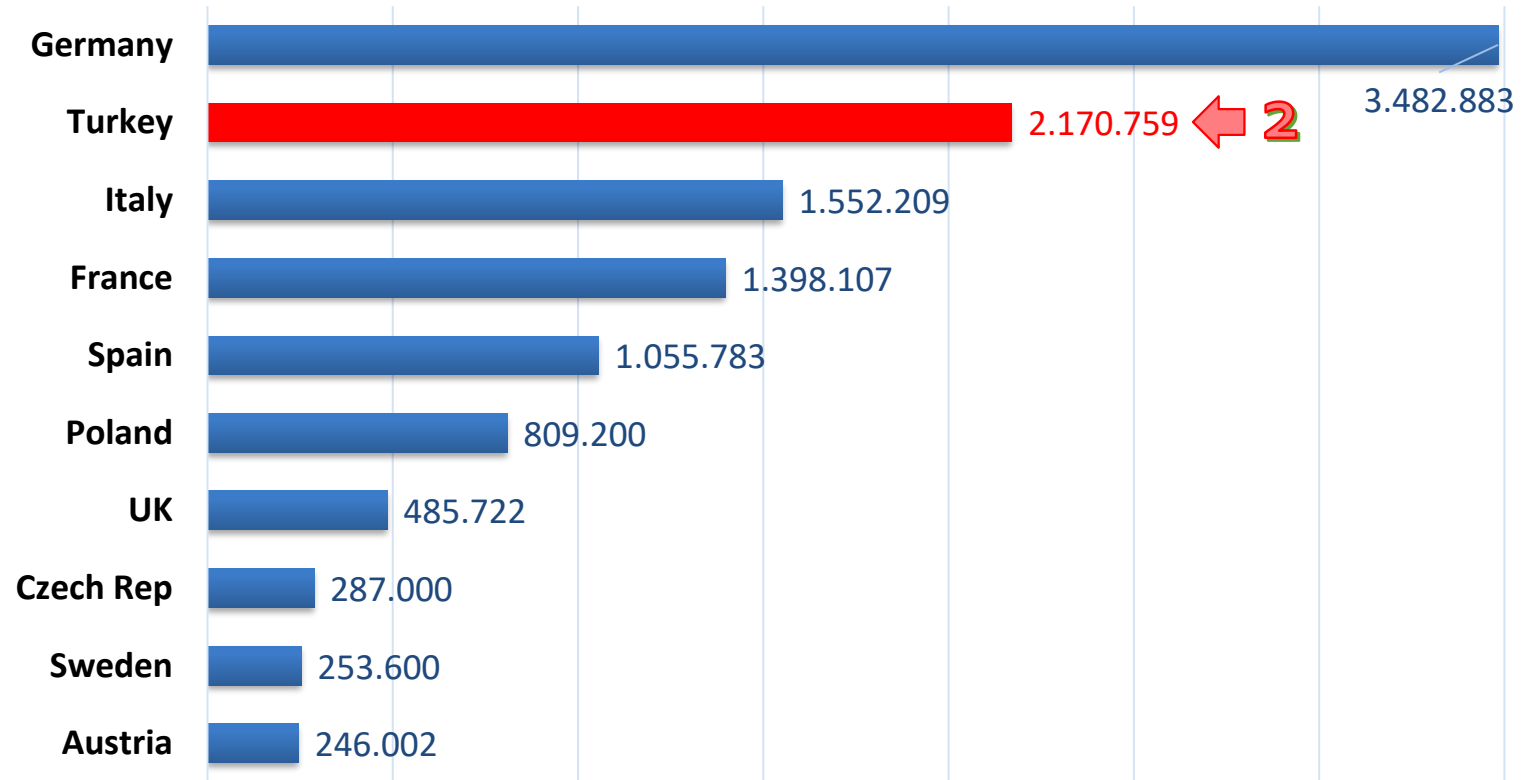


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Turkish Metal Casting Industry

Position in EU Production

European Metal Casting Production – 2020 (x1000 tons)



*Source: CAEF



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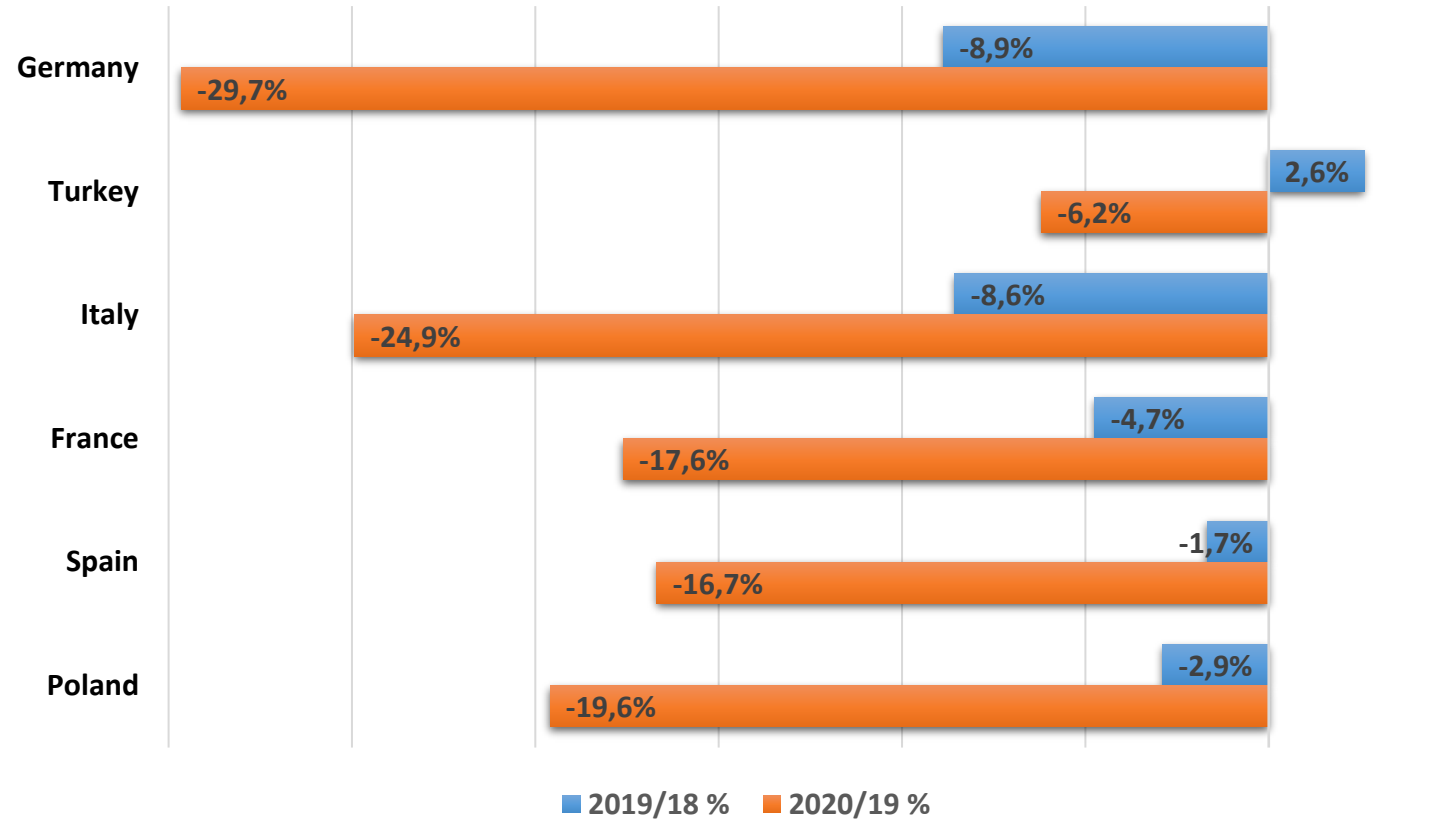
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Turkish Metal Casting Industry

Position in EU Production

European Metal Casting Production (YoY%)



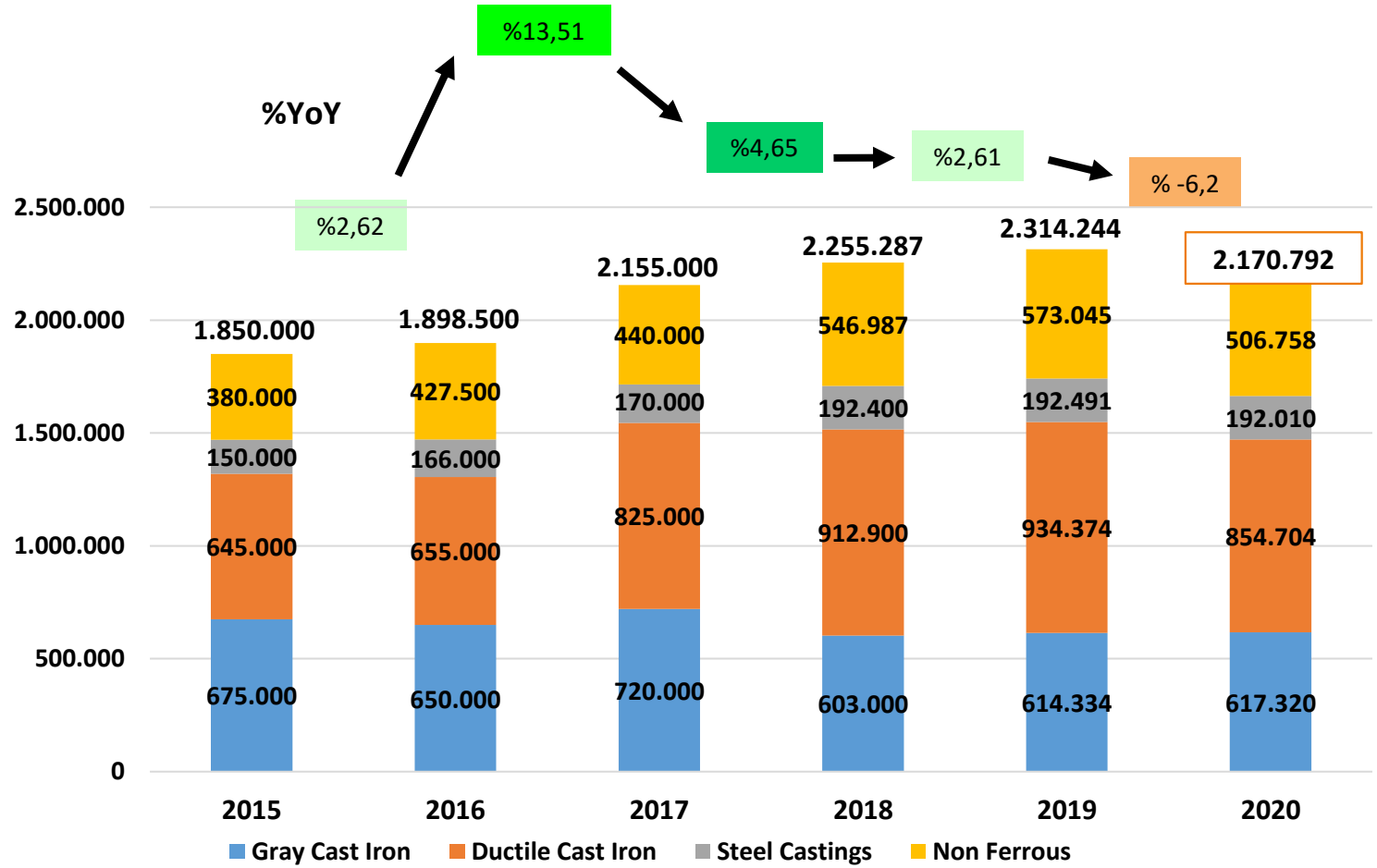
Source: AFS Census of World Casting Production, 2019 - 2021



Turkish Metal Casting Industry

Sectoral Datas

Turkish Metal Casting Production (tons/year)



Source: TUDOKSAD

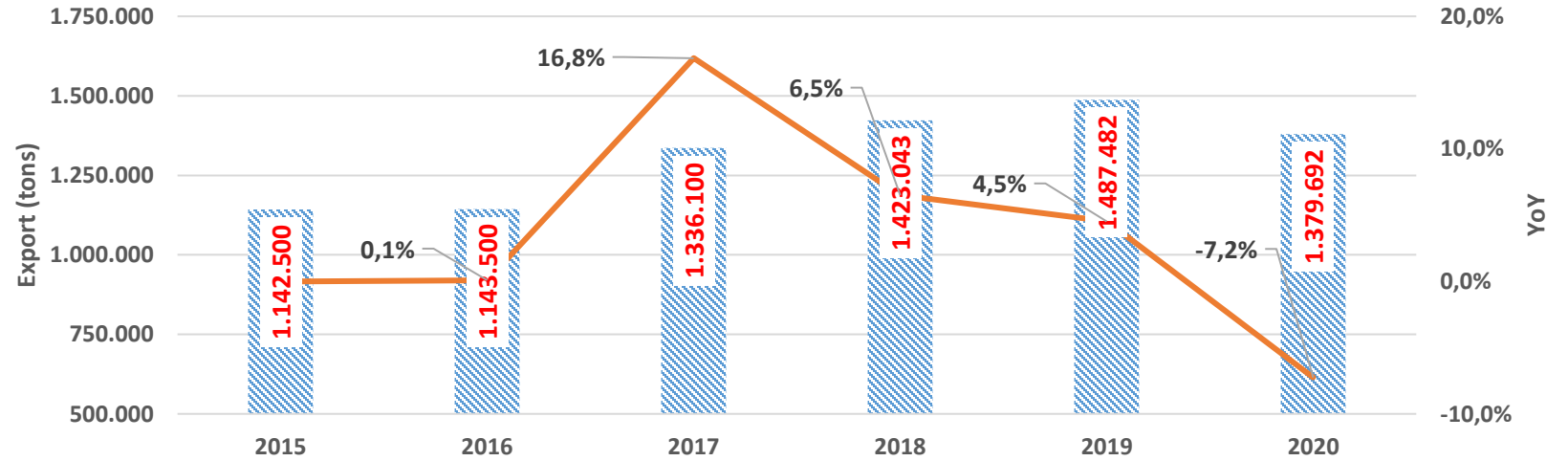


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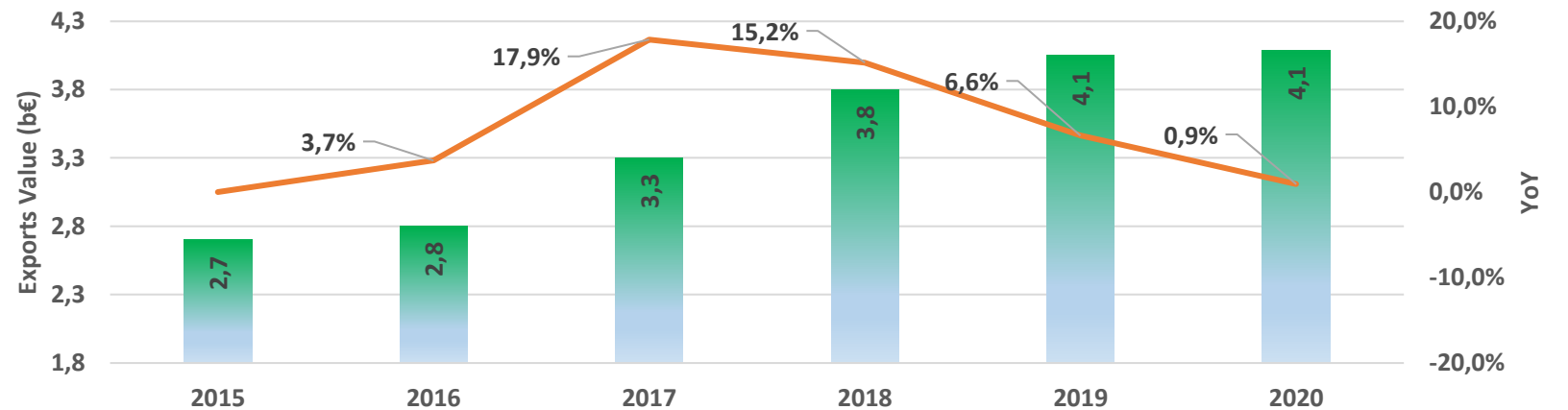
Turkish Metal Casting Industry

Sectoral Datas

Turkish Metal Casting Exports (tons)



Export Value of Turkish Metal Casting Industry



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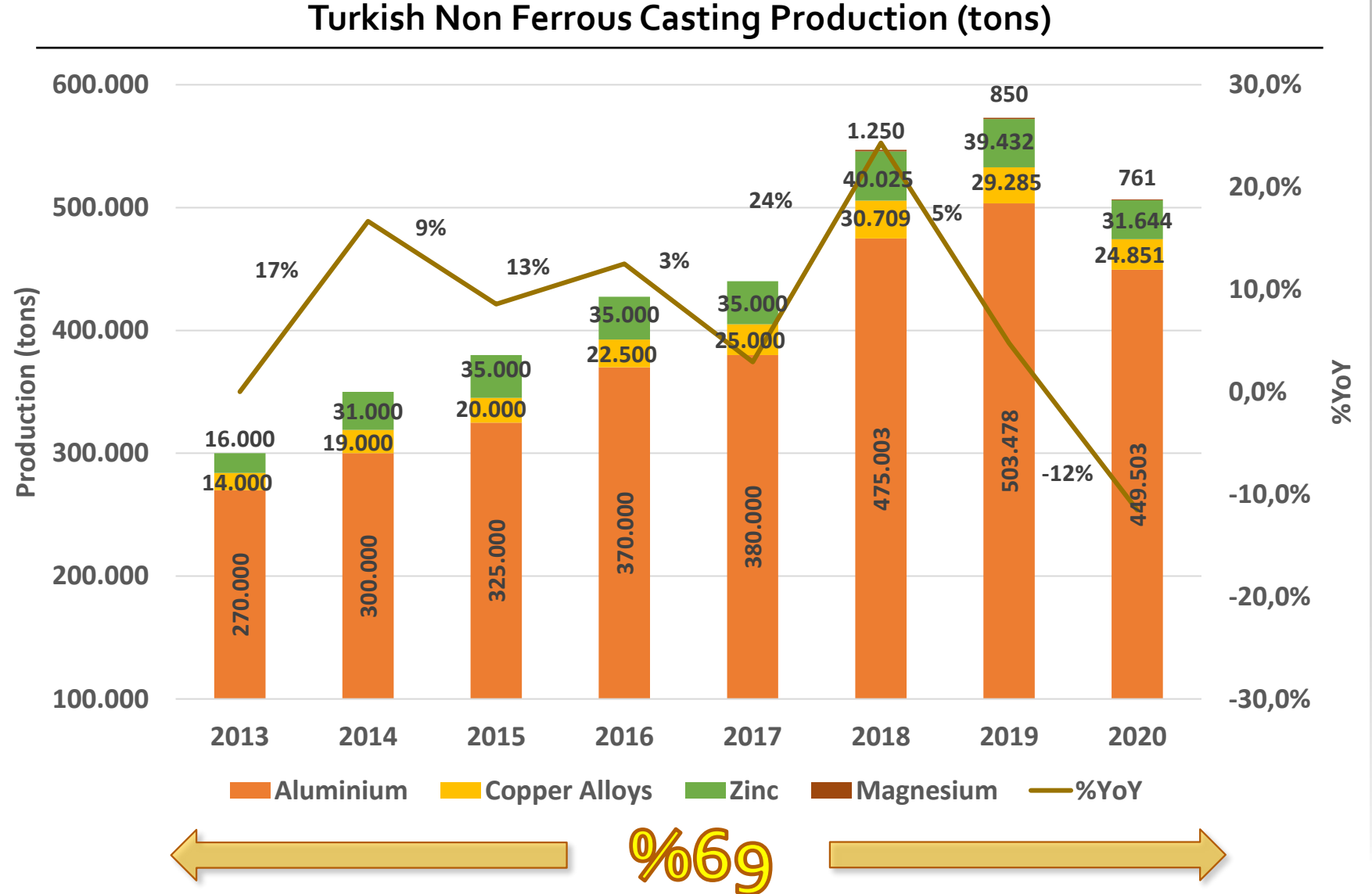




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Sectoral Datas



Source: TÜDÖKSAD



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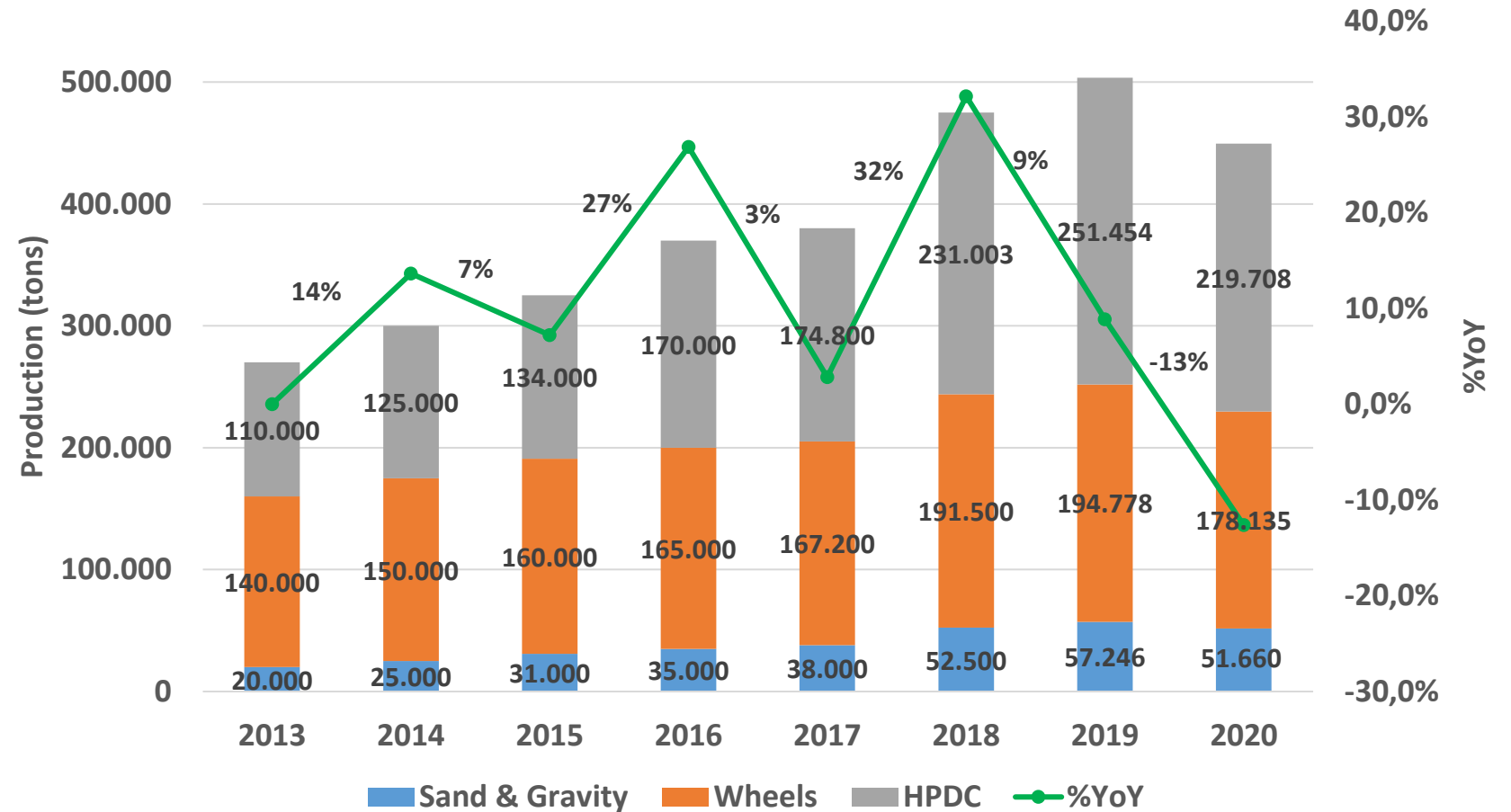


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Sectoral Datas

Turkish Aluminium Casting Production (tons)



← **%99,7** →

Source: TÜDÖKSAD



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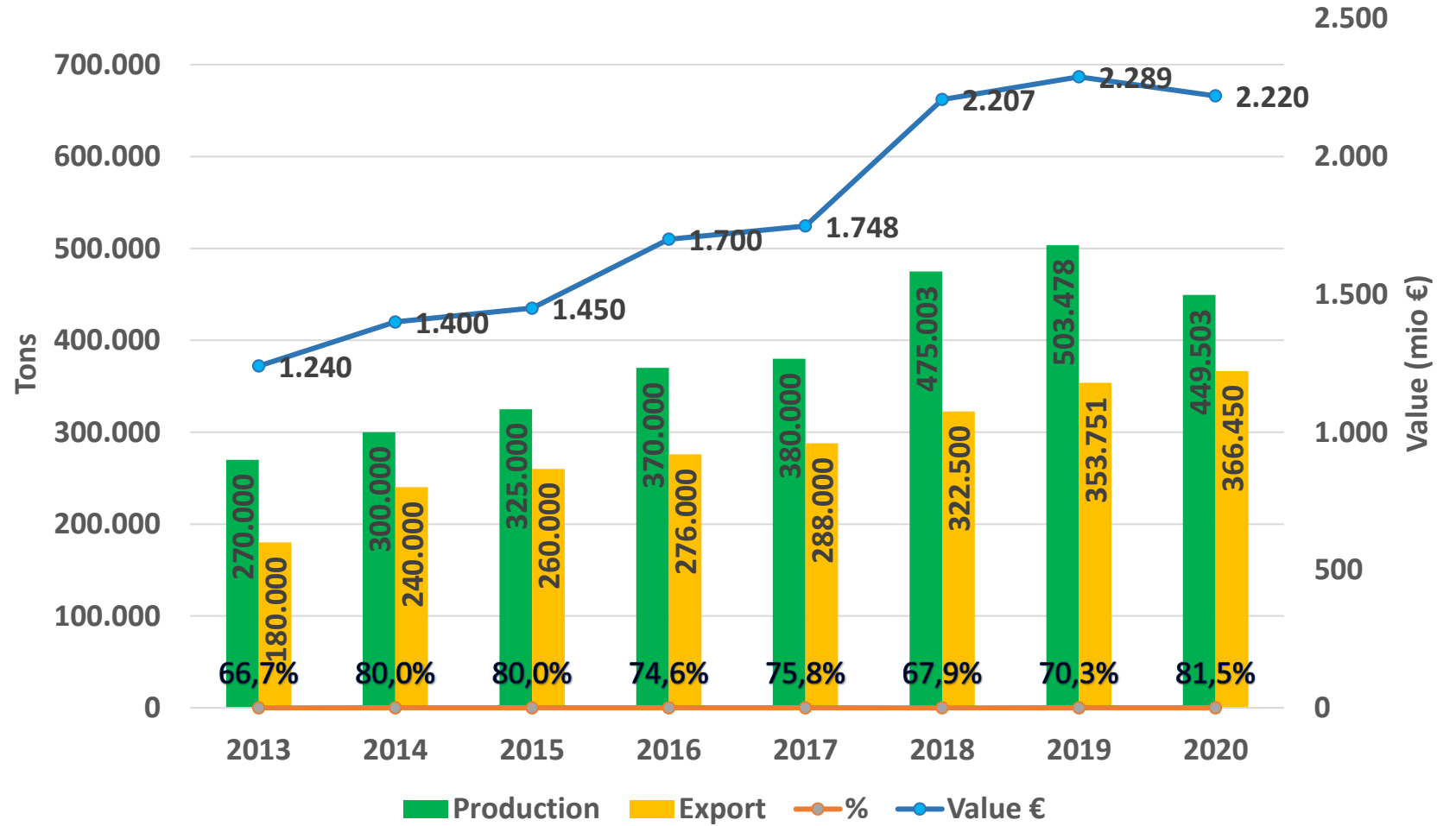


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Turkish Metal Casting Industry

Sectoral Datas

Turkish Aluminium Casting Exports (tons)



← **%103,7** →

Source: TÜDÖKSAD



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Turkish Metal Casting Industry

Sectoral Datas

Turkish Non Ferrous Casting Production

Total production (tons) - Aluminium + Magnesium							
Country	2016	2017	2018	2019	2020	2019/18 %	2020/19 %
Germany	1.114.105	1.137.096	1.038.211	1.011.599	673.227	-2,6%	-33,4%
Italy	668.471	717.844	724.300	685.584	543.972	-5,3%	-20,7%
Turkey	370.000	380.000	476.253	504.328	450.264	5,9%	-10,7%
France	324.102	346.899	394.727	348.062	293.529	-11,8%	-15,7%
Poland	331.500	330.000	330.000	340.000	272.000	3,0%	-20,0%
Hungary	118.637	124.229	136.791	122.675	119.186	-10,3%	-2,8%
Austria	147.096	148.287	150.559	133.406	111.302	-11,4%	-16,6%
UK	126.200	136.200	149.540	149.100	104.522	-0,3%	-29,9%
Spain	138.591	141.810	127.159	129.345	101.317	1,7%	-21,7%
Czechia	98.000	101.000	102.500	95.000	77.700	-7,3%	-18,2%

Source: CAEF



Turkish Metal Casting Industry

Sectoral Datas

Turkish Non Ferrous Casting Production

Total production (tons) - Zinc							
Country	2016	2017	2018	2019	2020	2019/18 %	2020/19 %
Italy	87.764	89.673	91.287	92.161	75.834	1,0%	-17,7%
Germany	56.247	62.188	59.205	57.182	49.761	-3,4%	-13,0%
Turkey	35.000	35.000	40.025	39.432	31.644	-1,5%	-19,8%
France	20.329	24.719	24.854	24.486	18.880	-1,5%	-22,9%
Slovenia	3.494		8.510	9.665	7.477	13,6%	-22,6%
Spain	9.079	8.941	9.020	8.426	7.304	-6,6%	-13,3%
UK	7.000	7.350	8.085	8.090	7.300	0,1%	-9,8%
Poland	7.600	7.500	7.500	7.500	6.000	0,0%	-20,0%
Portugal	2.152	2.250	2.440	2.464	2.165	1,0%	-12,1%
Hungary	2.985	1.717	1.610	763	1.662	-52,6%	117,8%

Source: CAEF



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Turkish Metal Casting Industry

Current trends



- ❖ Raw materials
- ❖ Energy



TÜDÖKSAD Monthly Raw Materials Index



Competitive Edges of Turkish Foundries

❖ TÜDÖKSAD Green Deal Working Group

- ❖ Carbon footprint
- ❖ Sustainability projects

- ❖ Deep know-how
- ❖ Modern investments
- ❖ Favorable logistics
- ❖ R&D projects

❖ Workforce potential



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GOALS



Turkey
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Platform



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Turkish Metal Casting Industry

Current trends

Competitive Edges of the Turkish Metal Casting Industry

1. Deep Know-How & Technical Background

- ❖ Production capacity in all processes and methods covering ferrous, steel and non-ferrous alloys
- ❖ High series production with the state-of-the-art automatic molding lines
- ❖ Big part manufacturing up to maximum tonnages in single part with available flask sizes
- ❖ Jobbing foundries serving different industries with ready-to-assembly component production

2. Continuous Production & International Trade & Logistics

- ❖ Wide range of natural resources and continuous access to the raw materials
- ❖ Besides EU Customs Union, Turkey has Free Trade Agreement with 22 countries
- ❖ Unique geographical location and transportation network

Turkish Metal Casting Industry

Current trends

Competitive Edges of the Turkish Metal Casting Industry

3. Modern investments

- ❖ Latest design, simulation and ERP softwares to achieve highest productivity and traceability
- ❖ Eco-friendly manufacturing processes, sustainable product options
- ❖ Energy efficiency and renewables

4. R&D projects

- ❖ Rapid prototyping, additive manufacturing
- ❖ New processes, alloys and additives
- ❖ Circularity and industrial symbiosis projects

5. Quality Management



6. Workforce Potential



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industry cooper



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In conjunction with

11. Uluslararası Döküm Kongresi 2022

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