

5<sup>th</sup> International  
Trade Fair for CastingsDüsseldorf  
25/06 – 29/06/19**1****Ferrous castings –  
Iron, steel and malleable foundries****1.1**

## Material groups

- 1.1.1 Grey cast iron
- 1.1.2 Spheroidal graphite cast iron
- 1.1.3 Compacted graphite cast iron
- 1.1.4 Malleable cast iron
- 1.1.5 Austenitic-ferritic cast iron with spheroidal graphite (ADI)
- 1.1.6 Austenitic cast iron
- 1.1.7 Wear-resistant cast iron
- 1.1.8 Plain (unalloyed) cast steel
- 1.1.9 Heat-treatable cast steel
- 1.1.10 Heat-resistant cast steel
- 1.1.11 Corrosion-resistant cast steel
- 1.1.12 Creep resistant cast steel
- 1.1.13 Cold toughness cast steel
- 1.1.14 Superalloys (nickel-, cobalt-, iron-based)

**1.2**

## Production processes

- 1.2.1 Sand casting - machine moulding
  - 1.2.1.1 Flask moulding
  - 1.2.1.2 Flaskless moulding
  - 1.2.1.3 Evaporative pattern casting
  - 1.2.1.4 Shell moulding
- 1.2.2 Sand casting - hand moulding
  - 1.2.2.1 with permanent patterns
  - 1.2.2.2 Evaporative pattern casting
- 1.2.3 Permanent mould casting
  - 1.2.3.1 Gravity die casting
  - 1.2.3.2 Centrifugal casting
  - 1.2.3.3 Continuous casting
- 1.2.4 Investment casting
- 1.2.5 Other precision casting processes
- 1.2.6 Special processes
  - 1.2.6.1 Vacuum moulding
  - 1.2.6.2 Composite casting
- 1.2.7 Rapid prototyping

**1.3**

## Customers and uses for iron, steel and malleable castings

- 1.3.1 Plant construction
- 1.3.2 Drive engineering
- 1.3.3 Fittings
- 1.3.4 Preparation of ore, building and mineral materials
- 1.3.5 Automobile industry (road vehicles)
- 1.3.6 Building and building materials machinery
- 1.3.7 Fastenings
- 1.3.8 Mining
- 1.3.9 Small hardware industry (furniture, keys, locks)
- 1.3.10 Chemical industry
- 1.3.11 Printing and paper machinery
- 1.3.12 Iron, sheet metal and fabricated metal products industry
- 1.3.13 Electrical engineering
- 1.3.14 Power generation and distribution
- 1.3.15 Vehicles (passenger)
- 1.3.16 Vehicles (utility)
- 1.3.17 Precision mechanics/optics
- 1.3.18 Moulds, tools and jigs
- 1.3.19 Glass and plastics industry
- 1.3.20 Railway track machinery
- 1.3.21 Rubber and plastics machinery
- 1.3.22 Heating equipment
- 1.3.23 Building construction
- 1.3.24 Woodworking machinery

- 1.3.25 Hydraulic and pneumatic industries
- 1.3.26 Nuclear energy engineering
- 1.3.27 Compressors
- 1.3.28 Cranes
- 1.3.29 Art castings
- 1.3.30 Agricultural machinery
- 1.3.31 Aeronautical and space engineering
- 1.3.32 Machinery construction (general)
- 1.3.33 Medical engineering
- 1.3.34 Marine engineering
- 1.3.35 Metalworking machinery
- 1.3.36 Motor construction
- 1.3.37 Foodstuffs machinery
- 1.3.38 Offshore engineering
- 1.3.39 Presses and rolling mill equipment
- 1.3.40 Pumps and compressors
- 1.3.41 Robot engineering
- 1.3.42 Rail vehicles
- 1.3.43 Shipbuilding
- 1.3.44 Special machines
- 1.3.45 Municipal furniture
- 1.3.46 Steel industry (steelworks requirements)
- 1.3.47 Textile and sewing machines
- 1.3.48 Civil and underground engineering
- 1.3.49 Environmental engineering
- 1.3.50 Process industry
- 1.3.51 Packaging industry
- 1.3.52 Publicity and gift articles
- 1.3.53 Machine tools

**1.4**

## Examples of cast products

- 1.4.1 Discharge pipes, soil pipes
- 1.4.2 Exhaust manifolds
- 1.4.3 Axles and axle components
- 1.4.4 Fittings
- 1.4.5 Holding down plates
- 1.4.6 Building machinery components
- 1.4.7 Mining machinery components
- 1.4.8 Small hardware fittings
- 1.4.9 Base plates
- 1.4.10 Crusher jaws
- 1.4.11 Brake shoes
- 1.4.12 Brake drums and discs
- 1.4.13 Bushes
- 1.4.14 Chemical plant components
- 1.4.15 Pressure pipes
- 1.4.16 Electric motors
- 1.4.17 Electrical engineering components
- 1.4.18 Enamelled parts and bathtubs
- 1.4.19 Vehicle components
- 1.4.20 Fittings
- 1.4.21 Wing nuts and bolts
- 1.4.22 Conveyor components
- 1.4.23 Moulds
- 1.4.24 Housings
- 1.4.25 Forging dies
- 1.4.26 Transmission components
- 1.4.27 Weights
- 1.4.28 Handwheels
- 1.4.29 Domestic equipment components
- 1.4.30 Boiler components
- 1.4.31 Hearth and furnace castings
- 1.4.32 Hydraulic castings
- 1.4.33 Industrial furnace components



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1.4.34 Insulator caps  
1.4.35 Refrigerator components  
1.4.36 Calender rolls  
1.4.37 Sewage castings  
1.4.38 Nuclear reactor components  
1.4.39 Chemical plant boilers  
1.4.40 Chains, chain links  
1.4.41 Piano and grand piano frames  
1.4.42 Steelworks moulds  
1.4.43 Moulds for other purposes  
1.4.44 Pistons  
1.4.45 Piston rings  
1.4.46 Compressor components  
1.4.47 Motor vehicle components  
1.4.48 Art castings  
1.4.49 Couplings  
1.4.50 Crankshafts  
1.4.51 Bearings  
1.4.52 Agricultural machinery components  
1.4.53 Bushes (Bearing)  
1.4.54 Rollers  
1.4.55 Turbine impellers  
1.4.56 Grinding media  
1.4.57 Machine tool beds and tables  
1.4.58 Marine engineering components  
1.4.59 Measuring and control components  
1.4.60 Motor housings - electrical engineering  
1.4.61 Motor housings - large motors  
1.4.62 Motor housings - machines  
1.4.63 Motor housings - road vehicles  
1.4.64 Motor components  
1.4.65 Sleeves  
1.4.66 Hubs  
1.4.67 Sewing machine components  
1.4.68 Camshafts  
1.4.69 Oven and fireplace plates  
1.4.70 Petrochemical plant components  
1.4.71 Connecting rods  
1.4.72 Pneumatic plant components  
1.4.73 Rods (continuously cast material)  
1.4.74 Pump components  
1.4.75 Radiators  
1.4.76 Wheel bearing components  
1.4.77 Wheels  
1.4.78 Pulleys  
1.4.79 Rings  
1.4.80 Pipes  
1.4.81 Pipes (composite castings)  
1.4.82 Grates and fire bars  
1.4.83 Round rods  
1.4.84 Sanitary castings  
1.4.85 Manhole covers  
1.4.86 Switchbox components  
1.4.87 Rail vehicle components  
1.4.88 Shipbuilding components  
1.4.89 Ship propellers  
1.4.90 Slag ladles (pots)  
1.4.91 Lock and small hardware components  
1.4.92 Keys  
1.4.93 Weldable steel joints  
1.4.94 Welding rods  
1.4.95 Flywheels  
1.4.96 Municipal furniture  
1.4.97 Piston, Rods

1.4.98 Shotblasting abrasives  
1.4.99 Textile machinery components  
1.4.100 Historic castings, Restorations  
1.4.101 Tunnel segments  
1.4.102 Turbine components  
1.4.103 Valve boxes  
1.4.104 Traffic control components  
1.4.105 Rolls - steel milling  
1.4.106 Rolls - crushing  
1.4.107 Roll housings  
1.4.108 Heat exchanger components  
1.4.109 Machine tool components  
1.4.110 Tool components  
1.4.111 Gear rings  
1.4.112 Gearwheels  
1.4.113 Cylinders  
1.4.114 Cylinder blocks  
1.4.115 Cylinder heads  
1.4.116 Cylinder liners  
1.4.117 Cylinder jackets

## 2

### Nonferrous metal castings – Aluminium, zinc, copper, magnesium, nickel and other nonferrous metal foundries

#### 2.1

##### Material groups

2.1.1 Aluminium and its alloys  
2.1.2 Magnesium and its alloys  
2.1.3 Titanium and its alloys  
2.1.4 Copper and its alloys  
2.1.5 Zinc and its alloys  
2.1.6 Nickel and its alloys  
2.1.7 Cobalt and its alloys  
2.1.8 Lead and its alloys  
2.1.9 Tin and its alloys  
2.1.10 Precious metals  
2.1.11 Other alloys

#### 2.2

##### Production processes

2.2.1 Sand casting - machine moulding  
2.2.1.1 Flask moulding  
2.2.1.2 Flaskless moulding  
2.2.1.3 Lost foam process  
2.2.1.4 Vacuum sand casting  
2.2.1.5 Shell moulding  
2.2.1.6 Core package process  
2.2.2 Permanent mould casting  
2.2.2.1 Gravity die casting  
2.2.2.2 Low pressure die casting  
2.2.3 Pressure die casting  
2.2.3.1 Conventional pressure die casting  
2.2.3.2 Squeeze casting  
2.2.3.3 Thixocasting  
2.2.4 Continuous casting  
2.2.5 Centrifugal casting  
2.2.6 Investment casting  
2.2.7 Other precision processes  
2.2.8 Special processes  
2.2.8.1 Bell casting  
2.2.8.2 Art casting  
2.2.8.3 Vacuum centrifugal casting  
2.2.8.4 Vacuum differential pressure casting



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2.2.8.5 Composite casting  
2.2.9 Rapid prototyping

**2.3** Customers and uses of nonferrous metal castings

2.3.1 Plant construction  
2.3.2 Drive engineering  
2.3.3 Apparatus and appliance engineering  
2.3.4 Fittings  
2.3.5 Automobile industry (road vehicles)  
2.3.6 Main building industry  
2.3.7 Fastenings  
2.3.8 Lighting equipment  
2.3.9 Mining  
2.3.10 Small hardware  
2.3.11 Office equipment  
2.3.12 Chemical and petroleum industries  
2.3.13 Computers  
2.3.14 Printing and paper machinery  
2.3.15 Compressed air and welding engineering  
2.3.16 Iron, sheet metal and fabricated products  
2.3.17 Iron and steel industries  
2.3.18 Electric motors  
2.3.19 Electrical engineering  
2.3.20 Power generation and distribution  
2.3.21 Vehicles (passenger)  
2.3.22 Vehicles (utility)  
2.3.23 Precision mechanics, optics  
2.3.24 Light engineering  
2.3.25 Windows  
2.3.26 Filtration equipment  
2.3.27 Conveyors  
2.3.28 Moulds, tools and jigs  
2.3.29 Transmissions and motors  
2.3.30 Glass and plastics industry  
2.3.31 Bell casting  
2.3.32 Tools  
2.3.33 Domestic appliances  
2.3.34 Heating equipment  
2.3.35 Hydraulics and pneumatics  
2.3.36 Nuclear energy engineering  
2.3.37 Communications engineering  
2.3.38 Compressors  
2.3.39 Art castings  
2.3.40 Agricultural machines  
2.3.41 Foodstuff industry  
2.3.42 Aeronautical and space engineering  
2.3.43 Machinery (general)  
2.3.44 Medical engineering  
2.3.45 Marine engineering  
2.3.46 Measuring and control engineering  
2.3.47 Furniture industry  
2.3.48 Motor construction  
2.3.49 Motorcycles and 2-wheelers  
2.3.50 Offshore engineering  
2.3.51 Optical industry  
2.3.52 Presses and rolling mills  
2.3.53 Process industry  
2.3.54 Pumps and compressors  
2.3.55 Roller shutters and awnings  
2.3.56 Rail vehicles  
2.3.57 Shipbuilding  
2.3.58 Jewellery  
2.3.59 Safety engineering  
2.3.60 Special machines

2.3.61 Sports/Games/Leisure  
2.3.62 Municipal furniture  
2.3.63 Textile industry  
2.3.64 Clock industry  
2.3.65 Traffic engineering  
2.3.66 Packaging industry  
2.3.67 Publicity and gift articles  
2.3.68 Machine tools

**2.4** Examples of cast products for the listed customers and applications

2.4.1 Axles and axle components  
2.4.2 Armatures and fittings  
2.4.3 Construction machinery components  
2.4.4 Mining equipment components  
2.4.5 Mining machinery components  
2.4.6 Hardware (windows)  
2.4.7 Hardware (furniture)  
2.4.8 Baseplates  
2.4.9 Bushes  
2.4.10 Office equipment components  
2.4.11 Electric motor components  
2.4.12 Vehicle components  
2.4.13 Wheel rims  
2.4.14 Fittings  
2.4.15 Conveyor components  
2.4.16 Moulds  
2.4.17 Housings  
2.4.18 Transmission components  
2.4.19 Bells  
2.4.20 Handwheels  
2.4.21 Domestic equipment components  
2.4.22 Heating equipment components  
2.4.23 Human medicine components  
2.4.24 Industrial furnace components  
2.4.25 Refrigerator components  
2.4.26 Nuclear reactor components  
2.4.27 Pistons  
2.4.28 Compressor components  
2.4.29 Motor vehicle components  
2.4.30 Art castings  
2.4.31 Coupling components  
2.4.32 Laboratory equipment components  
2.4.33 Bearings  
2.4.34 Bearing materials  
2.4.35 Rollers  
2.4.36 Turbine impellers  
2.4.37 Marine engineering components  
2.4.38 Measuring & control engineering comp.  
2.4.39 Motor housings - electrical engineering  
2.4.40 Motor housings - road vehicles  
2.4.41 Motor components  
2.4.42 Sockets  
2.4.43 Wheel hubs  
2.4.44 Sewing machine components  
2.4.45 Oven and fireplace plates  
2.4.46 Oil sumps  
2.4.47 Connecting rods  
2.4.48 Pneumatic plant components  
2.4.49 Rods (continuous cast)  
2.4.50 Propellers  
2.4.51 Pump components  
2.4.52 Wheels  
2.4.53 Wheel bearing components



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- 2.4.54 Pipes
- 2.4.55 Pipes (composite castings)
- 2.4.56 X-ray plant components
- 2.4.57 Round rods
- 2.4.58 Sanitary castings
- 2.4.59 Switchbox components
- 2.4.60 Rail vehicle components
- 2.4.61 Shipbuilding components
- 2.4.62 Ship propellers
- 2.4.63 Lock and hardware components
- 2.4.64 Keys
- 2.4.65 Weldable pressure die cast joints
- 2.4.66 Welding machine components
- 2.4.67 Flywheels
- 2.4.68 Municipal furniture
- 2.4.69 Textile machinery components
- 2.4.70 Historic castings, restorations
- 2.4.71 Turbine components
- 2.4.72 Clock components
- 2.4.73 Valve boxes
- 2.4.74 Traffic control components
- 2.4.75 Gear rings
- 2.4.76 Gearwheels
- 2.4.77 Cylinders
- 2.4.78 Cylinder blocks
- 2.4.79 Cylinder heads
- 2.4.80 Cylinder liners
- 2.4.81 Cylinder jackets

### 3

#### Services

- 3.1** Concept
  - 3.1.1 Concept development
  - 3.1.2 Concept benchmark
- 3.2** Product development
  - 3.2.1 Design, development and simulation (design optimization, virtual trials)
  - 3.2.2 Provision of prototypes- rapid prototyping and rapid tooling
    - 3.2.2.1 Stereolithography (STL)
    - 3.2.2.2 Selective Laser Sintering (SLS)
    - 3.2.2.3 Fused Deposition Modeling (FDM)
    - 3.2.2.4 Laminated Object Modelling (LOM)
    - 3.2.2.5 3D Printing
    - 3.2.2.6 Sand milling method
  - 3.2.3 Advice on materials and component testing
  - 3.2.4 Pattern
    - 3.2.4.1 Wooden pattern
    - 3.2.4.2 Plastic pattern
    - 3.2.4.3 Foamed plastic pattern
    - 3.2.4.4 Metal pattern
    - 3.2.4.5 Plastic core making tools
    - 3.2.4.6 Metal core making tools
  - 3.2.5 Diemaking
    - 3.2.5.1 Diecasting tools
    - 3.2.5.2 Injection-moulding tools
    - 3.2.5.3 Cast iron mould
    - 3.2.5.4 Core making tools

- 3.3** Engineering services (research and consultation)
  - 3.3.1 Certification and classification
  - 3.3.2 Planning and logistics
  - 3.3.3 Value analysis
  - 3.3.4 Laboratory services
  - 3.3.5 Advice on materials

- 3.4** Education, learning and publications
  - 3.4.1 Technical information service (information, reference material, data banks)
  - 3.4.2 Technical literature
  - 3.4.3 Study and vocational training
  - 3.4.4 Education and further education, schooling and training

- 3.5** Measuring and testing
  - 3.5.1 Material testing
  - 3.5.2 Non-destructive testing processes
  - 3.5.3 Dimensional inspection
  - 3.5.4 Quality control

- 3.6** Secondary treatment/Machining
  - 3.6.1 Heat treatment
  - 3.6.2 Mechanical machining
  - 3.6.3 Coating, priming, painting
  - 3.6.4 Assembly

- 3.7** Quality assurance
  - 3.7.1 Marking technology
  - 3.7.2 Marking

- 3.8** Computer tomography
  - 3.8.1 Services, application technology
  - 3.8.2 Software

- 3.9** Software for foundries

### 4

#### Sinters

- 4.1** Moduled parts from sintered metal
- 4.2** Sintered bearings
- 4.3** Sintered magnets
- 4.4** Sintered metals
- 4.5** Sintered products, metallic
- 4.6** Sintered products, non-metallic
- 4.7** Coating
- 4.8** Laser-sintered parts
- 4.9** Others

### 5

#### Trade and logistics

- 5.1** Manufacturers



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<b>5.2</b>	Trade
<b>5.3</b>	Logistics
<b>5.4</b>	Storage techniques
<b>5.5</b>	Transport systems
<b>5.6</b>	Service
<b>5.7</b>	Delivery service
<b>5.8</b>	Pre-operational techniques (sawing, cutting)
<b>5.9</b>	Pre-operational centres