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BUSINESS PLAN

CEN/TC 190
Foundry Technology

EXECUTIVE SUMMARY

Business Environment

The main activity of CEN/TC 190 "Foundry Technology" is the standardization in the field of cast metallic material.

The following cast iron and magnesium groups are covered by the CEN/TC 190 standardization work:

- Grey cast iron;
- Malleable cast iron;
- Spheroidal graphite and ausferritic spheroidal graphite iron;
- Austenitic and abrasion resistant cast iron;
- Cast magnesium;
- Compacted graphite cast iron.

The standardization work covers:

- Designation of cast iron materials;
- Designation of cast magnesium;
- Technical conditions of delivery for castings;
- Dimensional tolerances and machining allowances;
- Production equipments, tools , foundry auxiliaries (e.g. patterns, permanent moulds, moulding materials);
- Mechanical properties of cast metallic materials;
- Methods of testing cast metallic materials (Testing for inner discontinuities, surface testing);
- Welding of cast iron materials.

Organisations involved

- Foundries;
- Agents and contractors;
- Subcontractors,
- Customers / Purchasers,
- Industry related Associations
- Non-destructive testing,
- Universities and research institutes.

Benefits

To prepare standards covering the materials, processes, equipment and parameters for the European markets as listed above.

- since 1990 more than 100 standards have been published;
- support of European Directives [Pressure Equipment Directive (PED)].

Priorities

- Completion of the programme of work for the publication of European Standards defined under the general heading benefits;
- continuous adaptation and further improvements to existing standards;
- preparation of harmonized supporting standards under the PED;
- preparation of standards related to testing;
- revision of some of the previously published European Standards which are within the remit of CEN/TC 190

1 BUSINESS ENVIRONMENT OF THE CEN/TC 190

1.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this CEN/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

The market for cast irons embraces virtually all manufacturing activity. It also impinges upon environmental, social, leisure, entertainment, strategic and communications activity across the globe.

The production of cast iron materials is considered to be a primary manufacturing process. Based on raw material (pig iron, steel scrap, etc.), semi-processed products and ready-to-install components for the most of the manufacturing European industry sectors. The following industry sectors make up the largest market sectors for cast iron materials:

- Automotive (Cars, Commercial and Off-Road)
- Railways
- Marine
- Agriculture and Horticulture
- Architecture
- Civil Engineering
- Domestic Appliances
- Mechanical Engineering
- Electrical Engineering
- Gas Engineering
- Machine Tools
- Mining (Underground and Open Cast)
- Oil Exploration and Exploitation
- Ornamental
- Process Plant
- Power Generation
- Petrochemicals and Chemicals

- Pumps, Valves and Pipes
- Water Industry
- Steelmaking

The volume of Magnesium applications is increasing continuously mainly driven by the automotive industry and the strong demand for light weight, energy and CO₂ saving cars. New application fields with high temperature alloys are strengthening this development.

Certain industry sectors and countries dominate the market both in terms of volume of production and also in relation to the specific type of cast iron material that it is produced. For example Spheroidal Graphite Cast Iron (GJS) is widely used in the water, gas and oil industries for the transportation of the media. Consequently the volume of GJS produced is high compared to other cast irons and this production tends to be concentrated in France and Germany.

European Standards for Spheroidal, Austenitic, Abrasion Resistant, Ausferritic, Malleable, Grey Cast Irons, Magnesium, Magnesium alloys, Foundry patterns, tools and equipment were published in the late 1990s.

The designation of materials is an important requirement of contractual arrangements between manufacturers and purchasers. Standards on this subject have been published for cast iron and magnesium and magnesium alloy ingots and castings.

The developments in technology in the assessment of microstructure and the increasing quality requirements for cast iron materials has required the revision of the standard for the classification of the microstructure of cast iron materials (EN ISO 945). This work is carried out under the VA within ISO/TC 25 as the lead body.

The increasing demand for high-strength cast iron materials has lead to the standardisation of compacted graphite cast iron in ISO/TC 25 in order to complete the group of standardised cast iron materials. CEN/TC 190 will also start work on a standard for this material

There are two areas that will have an impact on the industry:

- the continued search for and the use of alternative materials in some of the market sectors, and
- the rapid capitalisation of Eastern European, Asian and African countries.

In order to meet these challenges CEN/TC 190 examines its present standards at regular intervals.

It has long been recognised that cast iron materials are able to meet current National, European and International regulations in those areas where it plays an active part such as: oil exploration, pumps and valves, pressure applications, compression strength (in tunnels), explosion protection and so on.

1.2 Quantitative Indicators of the Business Environment

The following tables 1, 2 and 3 of quantitative indicators describe the business environment in order to provide adequate information to support actions of CEN/TC (Tables 1, 2, 3: Reference: CAEF, The European Foundry Association in 2022).

Table 1: Total production in 1 000 t — Iron, Steel and Malleable iron castings

Country	2018	2019	2020	2021	2022	2021/20 in %	2022/21 in %
Austria	164,2	158,5	134,7	152,3	149,5	13,0	-1,8
Belgium	85,2	67,6	52,4	54,2		3,5	
Bulgaria				42,1	43,7		3,6
Czech Rep.	295,5	268,5	192,5	225,5	222,5	17,1	-1,3
Denmark	91,5	86,9		82,0			
Finland	64,6	57,8	47,1	51,8	52,8	10,0	2,1
France	1.339,9	1.304,3	1.067,4	1.212,4	1.244,4	13,6	2,6
Germany	4.256,2	3.804,9	2.714,8	3.158,4	3.116,4	16,3	-1,3
Hungary	88,3	76,2	76,4	75,2	74,9	-1,6	-0,4
Italy	1.253,1	1.108,9	893,1	1058,8	1.051,0	18,6	-0,7
Norway	31,2	31,2		29,4			
Poland	690,0	655,0	524,0	571,2	485,5	9,0	-15,0
Portugal	145,4	140,4	106,3	120,7	114,3	13,5	-5,3
Slovenia	137,4	177,2	116,7	124,5	112,1	6,7	-9,9
Spain	1.135,7	1.113,3	931,1	1.000,8	1.022,0	7,5	2,1
Sweden	248,6	240,4	197,2	210,4	242,0	6,7	15,0
Switzerland	61,0	26,3	22,8	23,9	25,6	5,0	6,9
Turkey	1.708,2	1.741,2	1.664,0	2.308,0	2.369,9	38,7	2,7
United Kingdom	413,6	414,2	365,6	359,4	402,0	-1,7	11,9
Total CAEF	12.209,8	11.472,8	9.106,1	10.861,0	10.728,7	17,6	0,3

Table 2: Number of foundries (Production units) — Iron, Steel and Malleable iron castings

Country	2018	2019	2020	2021	2022	2021/20 in %	2022/21 in %
Austria	15	15	15	15	15	0,0	0,0
Belgium	13	13	13	13	13	0,0	0,0
Bulgaria				39	37		-5,1
Czech Rep.	71	71	70	69	69	-1,4	0,0
Denmark	8	8					
Finland	16	18	16	15	15	-6,3	0,0
France							
Germany	239	232	225	220	220	-2,2	0,0
Hungary	29	39			32		
Italy	185 ^{a)}	172	172	176	171	2,3	-2,8
Norway	5	5					
Poland	215	215	216	216	216	0,0	0,0
Portugal	31	31	31	31	30	0,0	-3,2
Slovenia	13	11	11	10	10	-9,1	0,0
Spain	75	71	74	74	74	0,0	0,0
Sweden	38	36	36				
Switzerland	17	15	15	13	14	-13,3	7,7
Turkey	546	550	556	564	570	1,4	1,1
United Kingdom	210	207	202	197	194	-2,5	-1,5
Total CAEF	1.726	1.709	1.652	1.652	1.680	-0,2	-0,2

a) including investment casting

Table 3: Employment in the foundry industry — Iron, Steel and Malleables iron castings

Country	2018	2019	2020	2021	2022	2021/20 in %	2022/21 in %
Austria	2.257	2.215	2.158	2.165	2.218	0,3	2,4
Belgium	1.757 ^{b)}	1.766	1.727	1.633		-5,4	
Bulgaria				2.548	2.439		-4,3
Czech Rep.	11.000	10.500	9.500	9.400	9.000	-1,1	-4,3
Denmark	1.079	1.047					
Finland	1.363	1.264	1.170	995	1.084	-15,0	8,9
France							
Germany a)	42.019	39.675	35.385	34.657	34.985	-2,1	0,9
Hungary	3.850	3.720	3.620	3.506	3.340	-3,1	-4,7
Italy	9.248	9.040	9.432	9.587	9.310	1,6	-2,9
Norway							
Poland	16.000	16.000	11.125	10.600	10.600	-4,7	0,0
Portugal	2.444	2.582	2.181	2.380	2.380	9,1	0,0
Slovenia	1.135	1.110	1.277	1.321	1.355	3,4	2,6
Spain	10.928	11.162	10.808	10.869	10.881	0,6	0,1
Sweden		7.000	7.000				
Switzerland	1.058	1.012	1.012	764	807	-24,5	5,6
Turkey	20.100	20.100	20.500	20.995	21.525	2,4	2,5
United Kingdom	14.600	14.150	13.850	13.700	13.510	-1,1	-1,4
Total CAEF	138.838	142.343	130.745	125.120	123.434	-0,9	0,0

a) foundries >50 employees

b) only workmen

2 BENEFITS EXPECTED FROM THE WORK OF CEN/TC 190

The continuous appraisal and revision of the cast iron and pig iron international standards ensures that as new nations come into the arena there is a consistency of material standard that allows all the producers to compete on an equal footing. At the same time, it is necessary to reflect the high quality of cast metals production in Europe by producing standards with demanding mechanical property values.

The exploitation of technological changes by the industry and its customer industries ensures that CEN/TC 190 is always ready to react to the new industries and applications that emerge by the revision of and the writing of new international standards to cover these eventualities.

Cast iron and magnesium materials are almost entirely recyclable and fulfil the needs for an environmentally friendly product use. Its content of valuable alloying elements underlines the need for recyclability.

3 PARTICIPATION IN CEN/TC 190

All the CEN national members are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organizations is also possible under certain conditions. To participate in the activities of CEN/TC 190, please contact the national standards organization in your country.

4 OBJECTIVES OF CEN/TC 190 AND STRATEGIES FOR THEIR ACHIEVEMENT

4.1 Defined objectives of CEN/TC 190

To elaborate and revise European Standards for Materials, Designations and Delivery conditions for cast irons and cast magnesium, to elaborate non-destructive testing and appraisal methods to check the quality of such castings and the provision of technical advice on cast irons and cast magnesium to design engineers.

Continuous attention is paid to the updating of standards and test methods to align with the latest developments. For instance the harmonization of European cast iron material standards within the framework of the Pressure Equipment Directive continues to be a major task of CEN/TC 190.

- To elaborate a complete set of European material standards in the field of iron castings (grey cast iron, malleable cast iron, spheroidal cast iron, ausferritic spheroidal graphite cast iron, spheroidal graphite cast iron for elevated temperature applications, austenitic and abrasion resistant cast iron, compacted graphite cast iron) and cast magnesium;
- to elaborate technical delivery conditions for all types of castings;
- to prepare a set of non-destructive test standards for surface testing and ultrasonic and radiographic testing for inner discontinuities in all types of castings;
- to prepare standards on patterns.

4.2 Identified strategies to achieve CEN/TC 190's defined objectives

General approach and priorities

The standards further developed in CEN/TC 190 are mainly based on a complete set of EN standards, and progressive development of ISO standards. Some standardization projects are developed using the Vienna Agreement.

Adoption and adaptation of standards to new challenges, e. g. European Directives (PED)

Organization and structure

CEN/TC 190 is comprised of 8 Working Groups. In addition there is an Editing Committee responsible for all projects of the TC. The editing work is mainly carried out at meetings.

Liaisons

Official liaisons are listed for:

CEN/TC 138	Non-destructive testing
CEN/TC 438	Additive manufacturing
CEN/TC 459/SC 11	Steel castings and forgings
ISO/TC 25	Cast irons and pig irons
ISO/TC 213/WG 9	Dimensional and geometrical tolerancing for castings
ISO/TC 261	Additive manufacturing

During each TC-meeting reports are given on the activities of other committees.

4.3 Environmental aspects

The Working groups will follow the detailed guidance on how to address environmental issues in standards as given in the CEN Guide 4.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF CEN/TC 190's WORK PROGRAMME

The TC suffers from lack of support by most of the Member Bodies. It has had some success in making direct contact with the industry in the Member Body countries concerned.

Secretariats of the TC and the WGs are held by France, Germany and Portugal.

It is important for more countries to participate actively in European standardization. This requires them also to comment regularly during the enquiry phases. This is the only means of finding out whether different national requirements have been taken into account.

CEN/TC 190 maintains a watching brief on developments in the EEC on Directives that might affect its standards drafting and reacts to such situations as they arise.