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English Version

Steels and cast irons - Determination of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenylethers (PBDE) with regard to directives 2011/65/EU (RoHS) and 2000/53/EC (ELV) - Limitations

Aciers et fontes - Déterminations du plomb, du cadmium, du mercure, du chrome hexavalent, des diphenyles polybromés (PBB) et des diphenyléthers polybromés (PBDE) en relation avec les directives 2011/65/EU (RoHS) et 2000/53/EC (ELV) - Limites

Stahl und Gusseisen - Bestimmung von Blei, Cadmium, Quecksilber, sechswertigem Chrom, polybromierten Biphenylen (PBB) und polybromierten Diphenylethern im Hinblick auf EU-Direktiven 2011/65/EU (RoHS) und 2000/53/EC (ELV) - Beschränkungen

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European foreword

This document (CEN/TR 10364:2016) has been prepared by Technical Committee ECISS/TC 102 “Methods of chemical analysis for iron and steel”, the secretariat of which is held by SIS.

This project was submitted to the vote with document reference FprCEN/TR 16895.

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1 Scope

The present Technical Report gives guidance regarding the chemical composition controls of steels (except chrome plated products) and cast irons in respect of the European legislation, namely Directives 2011/65/EU (RoHS) [1], repealing 2002/95/EU and 2000/53/EC (ELV) [2].

These directives require the characterization of these materials for Cadmium (Cd), hexavalent chromium (Cr (VI)), mercury (Hg), Lead (Pb), polybrominated biphenyls (PBB) and polybrominated diphenylethers (PBDE). Nevertheless, the directives do not reflect the correspondence between these elements/compounds and the normal composition of each material concerned. In other words, for every material there is an obligation to determine all the compounds listed, independently of the relevance of such controls.

2 Requirements and applicability

2.1 General

Directive 2011/65/EU, article 4, restricts the following substances to the maximum concentration values to the following concentrations:

- Lead: 0,1 %;
- Mercury: 0,1 %;
- Cadmium: 0,01 %;
- Hexavalent chromium: 0,1 %;
- Polybrominated biphenyls (PBB): 0,1 %;
- Polybrominated diphenyl ethers (PBDE): 0,1 %.

Steel and cast iron manufacturers are often required to state/provide compliance with the directives above and submit analytical results for each of those elements/compounds. However, due to the manufacturing processes and the inherent properties of the steels and cast irons, the determination of most of the compounds listed is not applicable or relevant.

Subclauses 2.2 and 2.3 details the relevance of these requirements.

2.2 Bulk materials

2.2.1 Lead (Pb)

Due to a 1 755 °C boiling point, lead is the single element among the six compounds specified in the directives which can be present in the steels and cast irons.

NOTE For stainless steel production using the Argon Oxygen Decarburization (AOD) converter process or equivalent, the lead content in the alloy will be considerably decreased to orders of magnitude below the directives requirements levels.

In contrast to cadmium and mercury, lead is also possible to detect and quantify on a reproducible base by using standardized methods as EN 10181 [3], EN 62321 [4], EN 62321-1 [5] or ISO 16918-1 [6].