ISO 19694-4:2023-03 (E)

Stationary source emissions - Determination of greenhouse gas emissions in energy-intensive industries - Part 4: Aluminium industry

Contents

Page

Foreword iv

Introduction v

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 1

4 Symbols and abbreviated terms 2
4.1 Abbreviated terms 2
4.2 Symbols and chemical formulae 2
4.2.1 Symbols 2
4.2.2 Chemical formulae 4

5 Calculation methods -- General remarks 4
5.1 General 4
5.2 Calculation methods for process GHG emissions from primary aluminium production 4
5.3 Sources of greenhouse gases 5
5.3.1 Electrolysis 5
5.3.2 Anode baking 6
5.3.3 Aluminium smelting supporting processes 6
5.3.4 Alumina refining 6
5.3.5 Sources of PFC 6

6 Methods for calculation of process greenhouse gas emissions 6
6.1 General 6
6.2 Tier 1 -- Method using process specific formulae with technology typical parameters for carbon dioxide emissions 7
6.3 Tier 2 -- Method using process specific formulae with facility specific parameters for carbon dioxide emissions 7
6.4 Calculation of carbon dioxide emissions from prebake processes 7
6.4.1 General 7
6.4.2 Greenhouse gas emissions from prebake anode consumption during electrolysis 7
6.5 Baking furnace greenhouse gas emissions 8
6.5.1 General 8
6.5.2 Fuel 8
6.5.3 Combustion of volatile matter 9
6.5.4 Baking furnace packing material 10
6.5.5 Calculation of greenhouse gas emissions from the Søderberg process 11

7 Methods for calculation of PFC emissions 12
7.1 General 12
7.2 Tier 1 method for calculating PFC emissions 12
7.3 Tier 2 method for calculating PFC emissions 13
7.4 Calculation of PFC emissions from aluminium reduction processes 13
7.4.1 Step 1 -- Calculation of the emissions of each PFC gas per tonne of aluminium 13
7.4.2 Step 2 -- Calculation of the total kilogram emissions of each PFC gas 15
7.4.3 Step 3 -- Calculation of the total tonnes of carbon dioxide emissions equivalent to the PFC emissions 15
7.5 Verification of the GHG calculation 15
7.5.1 Validation of the CO2 emission calculation 15
7.5.2 Validation of the PFC emission calculation 16

8 Key performance indicators 16

Bibliography 17