

International **A**luminium **I**nstitute



The Aluminium Sector Greenhouse Gas Protocol

(Addendum to the WRI/WBCSD Greenhouse Gas Protocol)

Greenhouse Gas Emissions Monitoring and Reporting by the
Aluminium Industry

October 2006

$44/12 = \text{CO}_2 \text{ Molecular Mass : Carbon Atomic Mass Ratio, dimensionless}$

1.6 Additional Sources of Process Carbon Dioxide

1.6.1 Coke Calcination

For those production facilities that have coke calcining operations Equation 6 is used to calculate CO₂ emissions from this source.

Equation 6 Carbon Dioxide Emissions from Coke Calcining

$$E_{CO_2} = \left[\left[GC \times \left(\frac{100 - H_{2O_{gc}} - V_{gc} - S_{gc}}{100} \right) \right] - \left[(CC + UCC + DE) \times \left(\frac{100 - S_{cc}}{100} \right) \right] \right] \times \frac{44}{12} + \left[GC \times 0.035 \times \left(\frac{44}{16} \right) \right]$$

where:

E_{CO_2} = CO₂ emissions in tonnes per year

GC = Green coke feed, tonnes green coke per year

$H_{2O_{gc}}$ = Humidity in green coke, wt %

V_{gc} = Volatiles in green coke, wt %

S_{gc} = Sulphur content in green coke, wt %

CC = Calcinated coke produced, tonnes calcined coke per year

UCC = Under-calcinated coke collected, tonnes under-calcined coke per year

DE = Coke dust emissions, tonnes coke dust per year

S_{cc} = Sulphur content in calcinated coke, wt %

$44/12 = \text{CO}_2 \text{ Molecular Mass : Carbon Atomic Mass Ratio, dimensionless}$

$44/16 = \text{CO}_2 \text{ Molecular Mass : CH}_4 \text{ Molecular Mass Ratio, dimensionless}$

Parameters included in Equation 6 are defined and industry typical values noted in Table 6.

Table 6 Data Sources for Parameters Used in Tier 2 or 3 Method for Carbon Dioxide Emissions from Calcining Operations

Parameter	Tier 2 Method Data Source	Tier 3 Method Data Source
GC: green coke feed (<i>tonnes per year</i>)	Individual facility records	Individual facility records
H₂O_{gc}: humidity in green coke (<i>wt %</i>)	Use industry typical value, 10	Individual facility records
V_{gc}: volatiles in green coke ⁴ (<i>wt %</i>)	Use industry typical value, 10	Individual facility records
S_{gc}: sulphur content in green coke (<i>wt %</i>)	Use industry typical value, 3	Individual facility records
CC: calcinated coke produced (<i>tonnes per year</i>)	Use industry typical value, 0.8 x GC	Individual facility records
UCC: under calcinated coke collected (<i>tonnes per year</i>)	Use industry typical value, 0	Individual facility records
DE: coke dust emissions (<i>tonnes per year</i>)	Use industry typical value, 0.075 x GC	Individual facility records
S_{cc}: sulphur content in calcinated coke (<i>wt %</i>)	Use industry typical value, 2.5	Individual facility records

Any fuel consumption for coke calcination is included in the overall plant fuel consumption and is thus excluded from the above calculation.

1.6.2 Soda Ash Use