

Annual Report for:

Due Date:

Please read the Reporting Guidelines on page 4 very carefully before completing this form.

1. Smelter

Location of Smelter

2. Cell Technology

Cell Technology Category

3. Primary Aluminium Production

Production Relating to this Smelter and Cell Technology

Tonnes

4. Söderberg Anode Paste Production and Use

(Only complete this Section if the Cell Technology Category is HSS or VSS)

a. Production at Smelter

(1) Calcined coke used

Tonnes

(2) Other coke used (Include any damaged baked anodes and anode butts being recycled)

Tonnes

(3) Pitch used

Tonnes

(4) Tonnage of Söderberg anode paste produced

(Check: This should be approximately equal to a(1) + a(2) + a(3))

Tonnes

b. Use at Smelter

(1) Anode paste sold or transferred to other smelters

Tonnes

(2) Anode paste purchased or transferred from other plants

Tonnes

(3) Tonnage of Söderberg anode paste used in potrooms to produce the primary aluminium reported in Section 3

(Equals: a(4) - b(1) + b(2) +/- change in inventory)

Tonnes

5. Prebake Anode Production and Use

(Only complete this Section if the Cell Technology Category is PFPB, CWPB or SWPB)

a. Production at Smelter

- (1) Calcined coke used Tonnes
(Do not include any damaged baked anodes or anode butts being recycled – Record these at a(4) below)
- (2) Pitch used Tonnes
- (3) Green anodes (anodes not yet baked) purchased or transferred from other plants Tonnes
- (4) Damaged baked anodes and anode butts used (Recycled within the smelter and/or received from another smelter) Tonnes
- (5) Gross tonnage (after baking) of prebake anodes produced (Check: Allowing for pitch loss on baking, this should be approximately equal to $a(1) + 0.65a(2) + 0.95a(3) + a(4)$) Tonnes

b. Use at Smelter

- (1) Prebake anodes sold or transferred to other plants Tonnes
- (2) Prebake anodes purchased or transferred from other plants (Do not include green anodes – see a(3) above) Tonnes
- (3) Gross tonnage of prebake anodes used in potrooms to produce the primary aluminium reported in Section 3 Tonnes
- (4) Anode butts recycled within the smelter Tonnes
- (5) Anode butts sent to another smelter or anode producing plant for recycling Tonnes
- (6) Anode butts sent off-site for recycling but not to another smelter or anode producing plant Tonnes
- (7) Net tonnage of prebake anodes used in potrooms to produce the primary aluminium reported in Section 3 (Equals: $b(3) - b(4) - b(5) - b(6)$) Tonnes
- (8) Anode butts received from another smelter for recycling within the smelter Tonnes

6. Energy Used for Anode Production at Smelter

(Complete this Section as appropriate to the specified Smelter and Cell Technology)

a. Table 1 – Energy from Fuel used for Direct Heating and to produce Self Generated Electricity

Energy Source (Fuel)	Quantity of fuel Consumed (a)	Calorific Value of Fuel (b)	Fuel Energy Consumed in Generating Heat (c) = (a) x (b) x 10 ⁻⁹
Coal	kg	kJ/kg	TJ
Heavy oil	kg	kJ/kg	TJ
Diesel oil	kg	kJ/kg	TJ
Gas	m ³	kJ/m ³	TJ
Other		kJ/unit	TJ

Please specify “Other” fuel type and units of quantity _____

b. Table 2 – From Purchased Electricity

Energy Source (Fuel)	Electrical Energy Consumed (d)	Conversion Factor (e)	Fuel Energy Consumed in Generating Electrical Energy Consumed (f) = (d) x (e) x 10 ⁻⁹
Hydro	kWh	3600 kJ/kWh	TJ
Coal	kWh	kJ/kWh	TJ
Oil	kWh	kJ/kWh	TJ
Natural Gas	kWh	kJ/kWh	TJ
Nuclear	kWh	3600 kJ/kWh	TJ

Reported by:

Name:

Appointment:

Company:

Address:

Tel No:

Fax No:

E-Mail:

Date:

Please return completed form to:

Deputy Secretary General

International Aluminium Institute

New Zealand House

Haymarket

London SW1Y 4TE

United Kingdom

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Reporting Guidelines

1. Primary aluminium production reported in Section 3 is molten (liquid) aluminium as tapped from the pots. It is reported in tonnes (metric tons) and is that production appropriate to the specified smelter and cell technology. It is the same figure reported in Section 2 on sister Form ES001.
2. Energy reported for anode production in Tables 1 and 2 is the energy used for Söderberg anode paste production or for prebake anode production as appropriate to the stated cell technology. It includes, for example, energy used for crushing, mixing, moulding, baking, rodding, pollution control, heating and lighting. It excludes energy used for coke calcination if green coke is calcined on-site.
3. The quantities of fuel used in Söderberg anode paste or prebake anode production are reported in Table 1 and are those quantities of fuel used for direct heating combined, if applicable, with the quantities of fuel used to produce any self-generated electricity used in anode production. The quantities of fuel entered in Table 1 are reported in the units indicated. If conversion from other units is necessary, then the Form is annotated to show the original units and the conversion factors used. Any conversion of units is carried out as precisely as possible but conversion factors given in the IAI Energy Returns Data Sheet are used as default values.
4. In Table 1, the reported calorific value of the fuel is ideally to be the actual average gross calorific value of the fuel. If the actual average gross calorific value of a fuel is not known, then the appropriate default value given in the IAI Energy Returns Data Sheet is used. If fuel is supplied by energy content: the 'Fuel Energy Consumed' column is completed first; a precise or default calorific value is entered in the 'Calorific Value of Fuel' column; hence the equivalent quantity of fuel is calculated and entered in the 'Quantity of Fuel Consumed' column; and finally a circle is drawn around the quantity of fuel consumed figure to indicate that it has been calculated from its energy content.
5. Electricity that is purchased is reported in Table 2. If a precise conversion factor (kJ of fuel energy consumed per kWh of electrical energy generated) is not known, then the default value given in the IAI Energy Returns Data Sheet is used.

IAI ENERGY RETURNS DATA SHEET

1. Fuel Calorific Values

(Default values to be used when precise values are not known)

Energy Source	Default Calorific Value (kJ/kg or kJ/m ³ for Gas)							
	Area 1 Africa	Area 2 North America	Area 3 Latin America	Area 4 East Asia	Area 5 South Asia	Area 6A West Europe	Area 6B East/Central Europe	Area 7 Oceania
Coal	25 728	23 497	23 312	21 422	23 238	24 237	18 386	21 515
Heavy Oil	42 176	41 868	42 860	42 077	42 695	41 868	42 287	41 868
Diesel Oil	42 176	41 868	42 860	42 077	42 695	41 868	42 287	41 868
Gas	40 000	38 200	38 000	39 300	39 300	37 800	37 700	38 200

2. Electrical Energy Generation Conversion Factors

(Default values to be used when precise values are not known)

Electrical Energy Source	Default Electrical Energy Generation Conversion Factor (kJ/kWh)							
	Area 1 Africa	Area 2 North America	Area 3 Latin America	Area 4 East Asia	Area 5 South Asia	Area 6A West Europe	Area 6B East/Central Europe	Area 7 Oceania
Coal	12 758	10 680	12 939	8 321	12 107	13 498	18 784	15 286
Oil	9 033	8 156	11 776	8 335	12 103	9 018	27 180	11 140
Natural Gas	8 962	6 533	16 837	8 756	10 899	10 529	28 360	10 806

3. Unit Conversion Factors

(Specific Gravity values for oil are default values to be used when precise values are not known)

Category	Conversion Factors	
Weight	1 kg	= 2.20462 lb
	1 lb	= 0.4536 kg
Volume	1 m ³	= 35.3147 ft ³
	1 ft ³	= 0.0283168 m ³
	1 US Gallon	= 3.7854 litres
	1 UK Gallon	= 4.546 litres
Energy	1 J	= 0.2388 cal
	1 cal	= 4.187 J
	1 kJ	= 0.948 Btu
	1 Btu	= 1055 J
	1 Therm	= 100 000 Btu
	1 kWh	= 3600 kJ
Oil (Volume)	1 Barrel	= 42 US gallons = 34.97 UK gallons = 159 litres
	1 litre Fuel Oil (Heavy)	= 0.96 kg
	1 litre Fuel Oil (Light)	= 0.87 kg
Oil (Specific Gravity)	1 litre Diesel Oil	= 0.87 kg
	1 litre Gas Oil	= 0.87 kg