

Annual Report for: 2016

Due Date: 15 Feb 2017

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

1. Refinery

Location of Refinery

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2. Metallurgical Alumina Production

Quantity of Metallurgical Alumina Produced
(As nominal aluminium oxide (Al₂O₃))

Tonnes

PART 1 – PRODUCTION OF HYDRATE

3. Energy Used for Hydrate Production (Do NOT include energy used to produce Chemical Alumina)

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 (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 (e.g. purchased steam)		kJ/unit	TJ

Please specify “Other” fuel type and units of quantity. If “Other” fuel type is purchased steam, then please state the fuel (for example, coal) used to produce the steam.

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b. Table 2 – Energy 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

PART 2 – CALCINATION

4. Energy Used for Calcination (Do NOT include drying energy used to produce Chemical Alumina)

a. Table 3 – 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 (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

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b. Table 4 – Energy 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

PART 3 – SURPLUS ENERGY EXPORTED FROM SITE

5. Surplus Energy Exported from Site

(Only complete this Section if appropriate)

Table 5 – As Electricity or Steam

Energy Source (Fuel)	Quantity of fuel Consumed (a)	Calorific Value of Fuel (b)	Fuel Energy Consumed (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

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Reported by:

Name:

Appointment:

Company:

Address:

Tel No:

Fax No:

E-Mail:

Date:

Please return completed form to:

Manager Statistical Analysis

International Aluminium Institute

10 Charles II Street

London SW1Y 4AA

United Kingdom

Tel No: + 44 20 7930 0528

E-Mail: wu@world-aluminium.org

Reporting Guidelines

1. Metallurgical alumina production is the quantity of metallurgical (smelter) grade alumina produced during the reporting year. It is reported in tonnes (metric tons) as nominal aluminium oxide (Al_2O_3). The Reporting Guidelines to Form 600 (Alumina Production) provide a definition of nominal aluminium oxide if required.
2. The material quantities and the fuel and electrical energy quantities reported in Part 1 are the quantities used to produce the hydrate that is subsequently calcined to produce the reported quantity of metallurgical alumina. The fuel and electrical energy quantities reported in Part 2 are the quantities used for calcination.
3. Energy reported for hydrate production in Tables 1 and 2 is all energy used within the plant perimeter associated with the relevant hydrate production. It includes energy used in the Bayer process and in all auxiliary operations on-site that are directly connected with the relevant hydrate production. Energy reported for calcination in Tables 3 and 4 is all energy used within the plant perimeter associated with the calcination of hydrate to produce metallurgical alumina. Reported energy excludes energy used for external activities such as mining, shipping, harbour operations, use of motor vehicles and railway operations.
4. The quantities of fuel reported in Tables 1 and 3 are those quantities of fuel used for on-site direct heating combined, if applicable, with the quantities of fuel used to self-generate or cogenerate electrical energy for on-site use. If surplus electricity or steam is exported from the site, the fuel relating to these exported quantities is not included in Table 1, but is reported in Table 5.
5. Electricity that is purchased is reported in Tables 2 and 4. 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.
6. The fuel relating to the production of surplus electricity or steam exported from the site is reported separately in Table 5.
7. The quantities of fuel entered in Tables 1, 3 and 5 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.
8. In Tables 1, 3 and 5, the reported calorific value of the fuel is ideally 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.

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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