

ENERGY USED IN CASTING

FORM ES001D

Annual Report for:

Due Date:

Please read the Reporting Guidelines on page 2 very carefully before completing this form.

1. Smelter

Location of Smelter

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2. Casting Production

Cast Metal Production Relating to this Smelter

 Tonnes

3. Casting Inputs

a. Electrolysis Metal

 Tonnes

b. Remelt Ingot

 Tonnes

c. Scrap

(Excluding casthouse run-around scrap)

 Tonnes

d. Alloy Additives

 Tonnes

4. Energy Used for Casting

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 <sup>-9</sup>
Coal	kg	kJ/kg	TJ
Heavy oil	kg	kJ/kg	TJ
Diesel oil	kg	kJ/kg	TJ
Gas	m <sup>3</sup>	kJ/m <sup>3</sup>	TJ
Other		kJ/unit	TJ

Please specify "Other" fuel type and units of quantity

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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 <sup>-9</sup>
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:

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**Please return completed form to:**

Deputy Secretary General

International Aluminium Institute

New Zealand House, Haymarket

London SW1Y 4TE

United Kingdom

Tel No: 00 44 20 7930 0528

Fax No: 00 44 20 7321 0183

E-Mail: [bertram@world-aluminium.org](mailto:bertram@world-aluminium.org)

**Reporting Guidelines**

1. Cast metal production reported in Section 2 is the total tonnage of metal cast in the smelter casthouse. It includes all types of casting, for example, ingot, billet and cast rod.
2. Casting inputs reported in Section 3 are the quantities of electrolysis metal, remelt ingot, scrap (excluding casthouse run-around scrap) and alloy additives that make up the composition of the metal that is cast and reported in Section 2.
3. Energy reported in Tables 1 and 2 is all energy used for casting. It includes, for example, energy used by holding furnaces and energy used for heating and lighting.
4. The quantities of fuel used in casting 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 casting. 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.
5. In Table 1, 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.
6. 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 <sup>3</sup> 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 <sup>3</sup>	= 35.3147 ft <sup>3</sup>
	1 ft <sup>3</sup>	= 0.0283168 m <sup>3</sup>
	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