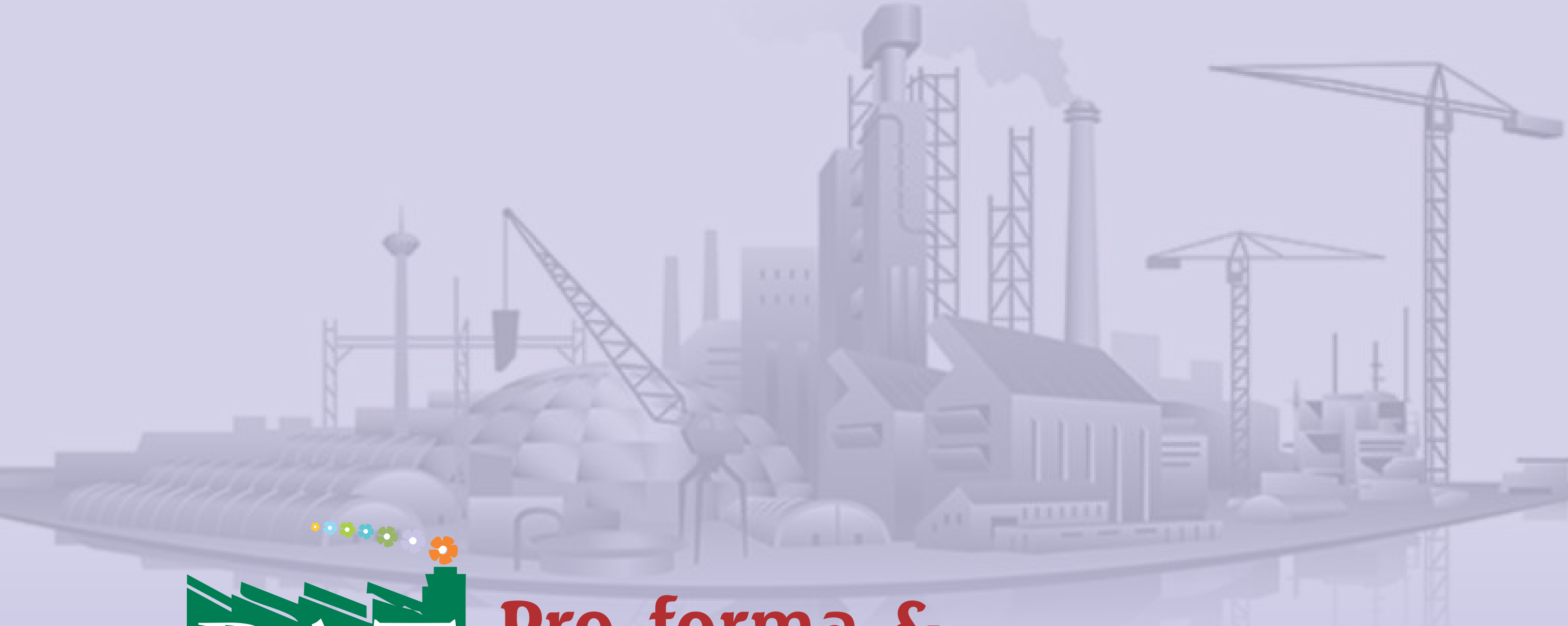

PAT SCHEME

PERFORM, ACHIEVE, TRADE

Pro-forma & Normalisation Equations

सत्यमेव जयते

MINISTRY OF POWER

GOVERNMENT OF INDIA

PAT SCHEME
PERFORM, ACHIEVE, TRADE

Pro-forma & Normalisation Equations

सत्यमेव जयते

MINISTRY OF POWER
GOVERNMENT OF INDIA

Published by

Bureau of Energy Efficiency

Ministry of Power,

Government of India

4th Floor, Sewa Bhawan

R K Puram

New Delhi -110 066

Developed specifically for Designated Consumers notified under Perform Achieve and Trade (PAT) Program for National Mission for Energy Efficiency (NMEEE)

Disclaimer

This document has been developed after an extensive and in consultation with a number of experts and stakeholders of the scheme. BEE disclaim any liability for any kind of loss whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, or reliance on this document.

Conceptualized by Media NMEEE

Processed and Printed in India by Viba Press Pvt. Ltd.,

C-66/3, Okhla Industrial Area, Phase-II, New Delhi-110020

Tel. : 011-41611300 / 301 l Email : vibappl@hotmail.com

Contents

Executive Summary

The document "PAT Pro-forma and Normalization Equations" is a compilation of Sector specific Pro-forma and normalization equations applicable to 8 notified sectors.

Pro-forma

These Pro-forma facilitates capturing of data and information related to energy consumption and production and external factors considered for normalizing the target reduction of Specific Energy Consumption of a particular Designated Consumer.

These Pro-forma are developed with an objective of assimilating additional information or data which was not being captured in earlier notified generic FORM-1 which was common to all above sectors.

In order to address the sector/sub-sector characteristics, development of a comprehensive reporting format was essential to develop sector/subsector specific Pro-forma based on parameters such as process, product, input material etc.

To cover the complete details of sector/subsector specific parameters, 13 nos. of Pro-forma have been designed for 8 sectors. This would facilitate 478 Designated Consumers to assess their specific energy consumption which are notified under Perform Achieve and Trade (PAT) scheme of National Mission of Enhanced Energy Efficiency (NMEEE.

Normalisation Equations

"Normalization" is a process of rationalization of the energy and production data of a plant of Designated Consumers to take into account the impact of quantifiable external variables such as natural disaster or rioting or social unrest, or major change in the Government policy including environmental standards or impact of market such as shortage of raw material including its quality or sales, or any other factor beyond the control of the Designated consumers on the value of energy and production so as to ensure that the Designated Consumers is not placed in a position of advantage or disadvantage when compared to baseline scenario

To account for the impact of external factors beyond the control of Designated consumers , normalization factors and their equations are developed and integrated with the Pro-forma.

These normalization equations help in assessment of normalized energy performance of a Designated consumers.

These Pro-forma and normalization equations have been developed in consultations with sectoral technical committees, industrial associations, Designated Consumers, research and development organizations/institutions and other key stakeholders.

Abstract

The Perform, Achieve and Trade (PAT) scheme is a market based mechanism under the National Mission for Enhanced Energy Efficiency (NMEEE) to make energy efficiency more cost effec¬tive through certification of energy savings that could be traded. PAT is designed particularly for energy-intensive large industries and facilities in 8 energy intensive industrial sectors, including thermal power stations. PAT is a mechanism that flows from the Energy Conservation Act, 2001 (amended in 2010).

Eight energy intensive sectors – thermal power plants, iron and steel, cement, fertilisers, aluminium, textiles, pulp and paper and chlor-alkali – have been included during the first cycle of PAT, i.e. from 2012-13 to 2014-15. There are 478 designated consumers (DC) in the 8 sectors and they account for about 165 million Tonne oil equivalent (mtoe) of energy consumption annually. This implies a saving of 3.4 mtoe from 7 of the 8 energy intensive industries (DCs) and 3.2 mtoe from the thermal power sector alone.

The savings in the first 3 years of the scheme are estimated at 6.686 million Tonne of oil equivalent of energy, without compromising on the industrial output. This will significantly enhance global competitiveness of industry while simultaneously reducing India's overall greenhouse gas (GHG) emissions.

Further, the scheme incentivises units to achieve energy efficiency higher than their specific energy consumption (SEC) targets. The scheme rewards industries that achieve better performance with Energy Saving Certificates (ESCerts) and allows them to trade the certificates with other designated consumers who have overshot their SEC target. Since failing to achieve the target would attract penalty for non-compliance, these units would like to buy these certificates to comply with their reduction targets. The ESCerts so issued will be tradable on special trading platforms to be created in the two power exchanges. The scheme also allows units which have earned ESCerts to bank them for the next cycle of PAT. The number of ESCerts would depend upon the quantum of energy saved in the particular year.

Indian industry needs to undertake modernisation of old plants and install energy efficient technologies, which will help lower the energy intensity. Technological revamp and retrofit projects need to be undertaken in a number of industries. Many industrial units have already taken conscious and concerted measures to lower their specific energy consumption in order to be competitive while maintaining profitability given the rising fuel and feedstock prices.

Industries, including power plants, have great responsibility to perform and achieve the targets through implementation of best available technologies with better operation and maintenance. At the same time capacity utilisation, product mix, power mix, intermediary products, plant load factor, fuel availability and its quality, scheduling or backing down, new project activities, legal factors,among other aspects, are also being looked at for normalisation and a level playing field. The exercise ensures uniformity in the baseline as well as the assessment year, so that a designated consumer is not accorded undue advantage or disadvantage in the assessment of its performance in the target year 2014-15 as compared to the baseline year.

Direct comparison of an SEC value in the assessment year with its corresponding SEC in the baseline year allows for a simple measurement of improvement in energy performance. This direct, or un-normalised, method reflects the results from all activities that occurred during the assessment period and includes the contributions from all relevant variables present.

At times however, the plant may have the need to determine the performance change resulting from specific selected activities and conditions as distinct from the effect of certain variables and thus calls for normalisation. In real terms this will equate the variables of the baseline year in the assessment year.

Supporting Pro-forma for Form I and Normalisation Process

The Bureau of Energy Efficiency (BEE) has taken up the issue of normalisation and constituted a technical committee to formulate factors that affect a plant's energy performance in the assessment year. To facilitate normalisation, a data entry format needs to be developed to capture the parameters used for calculating the factors for different variables and change with respect to the baseline year in assessment year. The massive exercise was carried out for all the 8 sectors under PAT with an inclusive and rational approach besides developing 13 sector and sub-sector specific data entry supporting Pro-forma for Form I in 8 PAT sectors. The relevant Pro-forma comprises all the energy and production parameters required for the valuation of different factors.

The approach was made very simple and comprehensible utilising the mathematical tools with statistical analysis for the actual energy performance of the plant while keeping the design and operating parameters in the calculation of normalisation factors. A logical methodology was followed to arrive at the situation onthe ground level keeping various plant operating conditions in consideration.
PAT requires a conducive operational and implementation framework. This makes necessarythe involvement of various industrial bodiesto facilitate interactions between the industry and the government, the participating designated consumer units to provide an insight into their processes and access to their vital annual energy performance database. The framework also requires stout contribution and assistance from various sector specific technical and sub-technical committees on formulation of appropriate normalisation factors within these 8 sectors.

The Book

The substantial workouts carried out to formulate normalisation factors is a unique example in the world. In no other country has the normalisation methodology been adopted in such a broad range, with micro level data input, for comparing the baseline with the reporting year to assess the tangible outcome of energy saving from the measures adopted in the 3 years of the cycle.

BEE has been instrumental in setting the pace of the PAT scheme by incorporating all the necessary measures in bringing the variables on one platform. To make these outcomes more visible and available to all, consolidation of all the Pro-forma and normalisation equation is required; this will support a smooth monitoring and verification process. BEE has been disseminating the information among DC energy managers, certified energy auditors, and empanelled accredited energy auditors in a consultative and transparent manner from a single platform.

By introducing the sector specific pro-forma and Normalisation factors, the pace of the scheme is all set to accelerate further for its timely implementation.

The empanelled accredited energy audit agencies will have a much bigger task to follow, when the practical aspects of these factors are looked into. Monitoring and verification, due after March 2015, will require technical expertise and exposure to field processes. A pool of experts and accredited energy auditors will be conducting actual data verification and comparing data of the assessment year with that of the baseline year.

A. Form 1

(1) Every designated consumer shall furnish in electronic form as well as in hard copy to the state designated agency, a report on the status of energy consumption for the financial year ending on the 31st March of every calendar year on or before 30th June of the said calendar year, in Form 1

(2) The details of data furnished in Form 1shall be drawn from the sector-specific pro-forma applicable to a designated consumer, and duly filled in relevant sector specific pro-forma shall be annexued to Form 1."

"Sector specific pro-forma" means the supporting pro-forma for the sector specified in section F of Form I applicable to a designated consumer.

Form-1				
Details of information regarding total energy consumed and specific energy consumption per unit of production (See Rule 3)				
A.	**General Details**	**Description**		
1	Name of the Unit			
2	i) Year of Establishment ii) Registration No (As provided by BEE)			
3	Sector and Sub-Sector in which the Designated Consumer falls	Sector		Sub-Sector
4. (i)	Complete address of DCs unit location (including Chief Executive's name & designation) with mobile, telephone, fax nos. & e-mail.			
(ii)	Registered Office address with telephone, fax nos. & e-mail			
(iii)	Energy Manager's name, designation, EM/EA Registration No., address, mobile, telephone, fax nos. & e-mail			
B. Production details				
5	**Manufacturing Industries specified as Designated Consumers**			
Sr. No.	**Products**	**Unit**	**Previous Year (20__- 20__)**	**Current Year (20__- 20__)**
		(1)	**(2)**	**(3)**
(i)	Product 1	Tonne		
(ii)	Product 2	Tonne		
(iii)	Product 3	Tonne		
(iv)	Product (Please add extra rows in case of additional products)	Tonne		
(v)	Total Equivalent Product	Tonne		

C	**Energy Consumption Details of Manufacturing Industries specified as Designated Consumers**			
		(1)	(2)	(3)
6. (i)	Total Electricity Purchased from Grid/Other Source	Million kWh		
(ii)	Total Electricity Generated	Million kWh		
(iii)	Total Electricity Exported	Million kWh		
(iv)	Total Electrical Energy Consumption	Million kWh		
(v)	Total Solid Fuel Consumption	Million kcal		
(vi)	Total Liquid Fuel Consumption	Million kcal		
(vii)	Total Gaseous Fuel Consumption	Million kcal		
(viii)	Total Thermal Energy Consumption	Million kcal		
(ix)	Total Energy Consumption (Thermal + Electrical)	TOE		
(x)	Total Normalized Energy Consumption (Thermal + Electrical)	TOE		
D	**Specific Energy Consumption Details**			
7. (i)	Specific Energy Consumption (Without Normalization)	TOE/Tonne		
(ii)	Specific Energy Consumption (Normalized)	TOE/Tonne		
E	**Power Plants specified as Designated Consumer**			
8. (i)	Total Capacity	MW		
(ii)	Unit Configuration	No. of units with their capacity		
(iii)	Annual Gross Generation	MU		
(iv)	Annual Plant Load Factor (PLF)	%		
(v)	Station Gross Design Heat Rate	kcal/kWh		
(vi)	Station Gross Operative Heat Rate	kcal/kWh		
(vii)	Auxiliary Power Consumption	%		
(viii)	Operative Net Heat Rate	kcal/kWh		
(ix)	Operative Net Heat Rate (Normalized)	kcal/kWh		
F	**Sector- specific details**			
S. No	**Name of the Sector**	**Sub-Sector**	**Supporting Pro-froma for Form 1 in which the details to be furnished**	
a.	Aluminium	Refinery/Smelter	Sa_1	
		Cold Rolling Sheet	Sa_2	
b.	Cement	Cement	Sb	
c.	Chlor-Alkali	Chlor-Alkali	Sc	
d.	Fertilizer	Fertilizer	Sd	

e.	Iron and Steel	Integrated Steel	Se_1	
		Sponge Iron	Se_2	
f.	Pulp and Paper	Pulp and Paper	Sf	
g.	Textile	Composite	Sg_1	
		Fiber	Sg_2	
		Spinning	Sg_3	
		Processing	Sg_4	
h.	Thermal Power Plant	Thermal Power Plant	Sh	

I/We undertake that information supplied in the the Form 1 and pro-forma is accurate to the best of my knowledge and the data furnished in From 1 has been adhered to the data given in the concerned pro-forma.

Signature:

Authorised signatory and seal

Name :
Designation :
Name of the Designated Consumer :
Address :
Seal
Date

Signature:-
Name of Energy Manager:
Registration Number:

Sector Specific Pro-forma for Form 1

The supporting pro-froma is made with the purpose of capturing correct data for Production and Energy as well as Normalization while maintaining the data format for ease of entry. The Profroma, so filled up is also being used to calculate the Notional Energy for Normalization to be deducted or added in separate sheets Once complete data are filled inthe Pro-forma, the SEC after Normalization of plant automatically comes out in the summary sheet enabling the DC to see the status of GtG SEC of the plant

The following sector-specific Pro-forma, as specified in section F of the said Form 1, shall be used, namely:-

Supporting Pro-forma Sa_1: Aluminium Sector (Refinery & Smelter)

Form-Sa_1 (General Information)				
Sector - Aluminium Sector				
1	**Name of the Unit**			
2	**Sub Sector**		Subsector	
3	**Major Product**			
4	**i) Year of Establishment**			
	ii) Registration No (As provided by BEE)			
5	**Plant Contact Details & Address**			
a	City/Town/Village			
	District			
	State		Pin	
	Telephone		Fax	
b	Plant's Chief Executive Name			
	Designation			
	Telephone		Fax	
	Mobile		E-mail Id	
6	**Registered Office**			
	Company's Chief Executive Name			
	Designation			
	Address			
	City/Town/Village		P.O.	
	District			
	State		Pin	
	Telephone		Fax	
7	**Energy Manager Details**			
	Name			
	Designation		Whether EA or EM	
	EA/EM Registration No.			
	Telephone		Fax	
	Mobile		E-mail Id	

Sector Specific Form-Sa_1 (Details of Production and Energy Consumption)

Sector: Aluminium Sector									
Name of the Unit									
Sub Sector									
Major Product									
S. No	**Particulars**	**Basis / Formulae**	**Unit**	**Year 1**	**Year 2**	**Year 3 / Previous Year**	**Baseline Year [BY] (Average of Year 1 to Year 3)**	**Year 4 / Current / Assessment / Target Year**	**Source of data**
A	**Production and capacity utilization details**								
A1	**Refinery Process**								
i	Production Capacity (Hydrate Alumina)	Annual	Tonne						
ii	Production Capacity (Calcined Alumina)	Annual	Tonne						
iii	Total Hydrate Alumina Production	Annual	Tonne						
iv	Total Calcined Alumina Production	Annual	Tonne						
v	Capacity Utilization (Hydrate Alumina)	[A1(iii) / A1(i)] X 100	%						
vi	Capacity Utilization (Calcined Alumina)	[A1(iv) / A1(ii)] X 100	%						
A2	**Smelter Process**								
i	Production Capacity (Molten Aluminium)	Annual Capacity	Tonne						
ii	Production Capacity - Cast House	Annual Capacity	Tonne						
iii	Total Molten Aluminum Production	Annual	Tonne						

iv	Total Production- Cast House	Annual	Tonne						
v	Capacity Utilization (Molten Aluminum)	[A2(iii) / A2(i)] X 100	%						
vi	Capacity Utilization (Cast House)	[A2(iv) / A2(ii)] X 100	%						
A3	**Process wise production and performance detail**								
A3.1	**Refinery Process**								
a	**Hydrate Alumina**								
i	Total Hydrated Alumina sold to Market (Export)	Annual	Tonne						
ii	Total Hydrated Alumina purchased from Market for Calcined Alumina (Import)	Annual	Tonne						
iii	Opening stock of Hydrated alumina	Annual	Tonne						
iv	Closing stock of Hydrated alumina	Annual	Tonne						
v	Thermal SEC of Hydrated Alumina	Annual	Mkcal/ Tonne						
vi	Electrical SEC of Hydrated Alumina	Annual	kWh/Tonne						
vii	Running Hrs	Annual	Hrs						
b	**Digestion Process Parameter**								
i	Type of Digestion Technology	Annual	Single/ Double						

ii	Number of Digestion Units	Annual	No.						
iii	Production Capacity of Digestion Units	Annual	Tonne						
iv	Specific Steam Consumption for Digestion	Annual	Tonne of Steam/ Tonne of Hydrate Alumina						
v	Specific Power Consumption for Digestion	Annual	kWh/Tonne						
vi	Temperature of Low Temperature Digestion Units	Annual	^oC						
vii	Pressure of Low Temperature Digestion Units	Annual	kg/cm^2						
viii	Temperature of High Temperature Digestion Units	Annual	^oC						
ix	Pressure of High Temperature Digestion Units	Annual	kg/cm^2						
x	LP Steam Temperature	Annual	^oC						
xi	LP steam Pressure	Annual	kg/cm^2						
xii	LP Steam Enthalpy	Annual	kcal/kg						
xiii	LP Steam Consumption	Annual	Tonne						
xiv	MP Steam Temperature	Annual	^oC						
xv	MP steam Pressure	Annual	kg/cm^2						
xvi	MP Steam Enthalpy	Annual	kcal/kg						
xvii	MP Steam Consumption	Annual	Tonne						

xviii	HP Steam Temperature	Annual	^{o}C						
xix	HP steam Pressure	Annual	kg/cm2						
xx	HP Steam Enthalpy	Annual	kcal/kg						
xxi	HP Steam Consumption		Tonne						
xxii	Specific Steam Consumption for Evaporation	Annual	Tonne of Steam/ Tonne of Hydrate Alumina						
xxiii	Specific Power Consumption for Evaporation	Annual	kWh/Tonne of hydrate Alumina						
xxiv	Weighted average of Enthalpy	Annual weighted with steam consumption	kcal/kg						
c	**Calcined Alumina**								
i	Opening stock of Calcined alumina cintegrated process	Annual	Tonne						
ii	Closing stock of Calcined alumina cintegrated process	Annual	Tonne						
iii	Type of Calciner Technology	Annual	Technology						
iv	Calcination Temperature	Annual	^{o}C						
v	Specific Power Consumption for calciner	Annual	kWh/T						
vi	Specific Thermal Consumption for calciner	Annual	kcal/T						
vii	Running Hrs	Annual	Hrs						

viii	Calcined Alumina Exported (Integrated Process)	Annual	Tonne						
ix	Calcined Alumina Imported (Integrated Process)	Annual	Tonne						
x	Specific Thermal Energy Consumption of Calcined Alumina (upto)	Annual	Mkcal/ Tonne						
xi	Specific Electrical Energy Consumption of Calcined Alumina (upto)	Annual	kWh/Tonne						
d	**Special Hydrate (Course)**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
e	**Special Hydrate (Micro Fined)**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
f	**Special Hydrate (Milled)**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						

iii	Thermal SEC	Annual	Mcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
g	**Special Alumina (Course)**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
h	**Special Alumina (Micro Fined)**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
i	**Special Alumina (Milled)**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
j	**Carbon Black Production**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						

iv	Electrical SEC	Annual	kWh/Tonne						
k	**Carbon Paste Production**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
l	**Zeolite Production**								
i	Installed Capacity	Annual	Tonne						
ii	Actual Production	Annual	Tonne						
iii	Thermal SEC	Annual	Mkcal/ Tonne						
iv	Electrical SEC	Annual	kWh/Tonne						
m	**Other Production**								
i	Product name		Name						
ii	Installed Capacity	Annual	Tonne						
iii	Actual Production	Annual	Tonne						
iv	Thermal SEC	Annual	Mkcal/ Tonne						
v	Electrical SEC	Annual	kWh/Tonne						
n	**Major Product (Calciner/Major product) section start/ stop**								
i	Equivalent Major Production during Cold Start	Annual	Tonne						

ii	Calciner Operating Thermal SEC (Up to section product)	Annual	kcal/kg equivalent Major product						
iii	Calciner Operating Electrical SEC (Up to section product)	Annual	kWh/t equivalent Major product						
iv	Calciner Running Hrs	Annual	Hrs						
v	Calciner Hot to Cold stop due to external factor	Annual	Hrs						
vi	Calciner Hot to Cold stop due to external factor	Annual	Nos						
vii	Calciner Hot to Cold stop due to external factor (Electrical Energy Consumption)	Annual	Lakh kWh						
viii	Calciner Cold to Hot start due to external factors	Annual	Hrs						
ix	Calciner Cold to Hot start due to external factors	Annual	Nos						
x	Calciner Cold to Hot start due to external factors taking production into account (Electrical Energy Consumption)	Annual	Lakh kWh						
xi	Calciner Cold to Hot start due to external factors taking production into account (Thermal Energy Consumption)	Annual	Million kcal						

xii	Calciner Cold to Hot start due to internal factors	Annual	Nos						
A3.2	**Smelter Process**								
a	**Molten Aluminum Production**								
i	Thermal SEC up to molten Aluminium	Annual	kcal/Tonne Molten Aluminium						
ii	Electrical SEC up to molten Aluminium	Annual	kWh/Tonne Molten Aluminium						
iii	Total Calcined Alumina Consumed	Annual	Tonne						
iv	Running Hrs	Annual	Hrs						
b	**Smelter Process Operating Parameters**								
b.1	**Line 1**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						

vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.2	**Line 2**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						

iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						

b.3	**Line 3**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						

xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.4	**Line 4**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						

xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.5	**Line 5**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						

xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.6	**Line 6**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						

ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.7	**Line 7**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						

vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.8	**Line 8**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						

iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/Tonne of Molten Aluminum						

b.9	**Line 9**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						

xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.10	**Line 10**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						
xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						

xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
b.11	**Line 11**								
i	Rated Capacity	Annual	Tonne						
ii	Total Molten Aluminium Production	Annual	Tonne						
iii	Smelting Technology	Annual	Technology						
iv	No of Operating Pots (NOP) [based on operating pots weighted with the time]	Annual	No.						
v	No of Pots/Potline (NOPP)	Annual	No.						
vi	Dead pot voltage (DPV)	Annual	Volts						
vii	Design Pot Voltage (DnPV)	Annual	Volts						
viii	Design Bus Bar Voltage Drop (DnBV)	Annual	Volts						
ix	Design Current Efficiency of Pots (CE)	Annual	Fraction						
x	DC Current Design	Annual	Kilo Amp						
xi	DC Current Actual	Annual	Kilo Amp						
xii	Anode Effect	Annual	No./Pot/ Cell/day						

xiii	Design DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xiv	Actual DC Specific Power Consumption of pots	Annual	kWh/Tonne						
xv	Alumina Consumption Factor	Annual	Tonne of Alumina/ Tonne of Molten Aluminum						
xvi	Carbon Consumption Factor	Annual	Tonne of Carbon/ Tonne of Molten Aluminum						
c	**Carbon Anodes Production**								
(i)	Installed Capacity	Annual	Tonne						
(ii)	Actual Carbon Anode Production	Annual	Tonne						
(iii)	Capacity Utilization		%						
(iv)	Electrical SEC upto Carbon Anode Production	Annual	kWh/Tonne of Carbon Anode Production						
(v)	Thermal SEC upto Carbon Anode Production	Annual	kcal/Tonne of Carbon Anode production						
vi	Opening Stock of Carbon Anode	Annual	Tonne						
vii	Closing Stock of Carbon Anode	Annual	Tonne						
viii	Imported Anode	Annual	Tonne						

ix	Exported Anode	Annual	Tonne						
d	**Cast House Production**								
d.1	**Billets**								
(i)	Capacity	Annual	Tonne						
(ii)	Production	Annual	Tonne						
(iii)	Thermal SEC of Billets	Annual	kcal/Tonne						
(iv)	Electrical SEC of Billtes	Annual	kWh/Tonne						
d.2	**Ingot**								
(i)	Capacity	Annual	Tonne						
(ii)	Production	Annual	Tonne						
(iii)	Thermal SEC of Ingots	Annual	kcal/Tonne						
(iv)	Electrical SEC of Ingots	Annual	kWh/Tonne						
d.3	**Bars**								
(i)	Capacity	Annual	Tonne						
(ii)	Production	Annual	Tonne						
(iii)	Thermal SEC of Bars	Annual	kcal/Tonne						
(iv)	Electrical SEC of Bars	Annual	kWh/Tonne						
d.4	**Primary Foundry Alloys**								
(i)	Capacity	Annual	Tonne						
(ii)	Production	Annual	Tonne						
(iii)	Thermal SEC of Alloys	Annual	kcal/Tonne						
(iv)	Electrical SEC of Alloys	Annual	kWh/Tonne						
d.5	**Wire Rod**								
(i)	Capacity	Annual	Tonne						

(ii)	Production	Annual	Tonne						
(iii)	Thermal SEC of Wire Rod	Annual	kcal/Tonne						
(iv)	Electrical SEC of Wire Rod	Annual	kWh/Tonne						
d.6	**Strips**								
(i)	Capacity	Annual	Tonne						
(ii)	Production	Annual	Tonne						
(iii)	Thermal SEC of Strips	Annual	kcal/Tonne						
(iv)	Electrical SEC of Strips	Annual	kWh/Tonne						
d.7	**Others , if Any**								
(i)	Product name	Annual	Name						
(ii)	Capacity	Annual	Tonne						
(iii)	Production	Annual	Tonne						
(iv)	Thermal SEC	Annual	kcal/Tonne						
(v)	Electrical SEC	Annual	kWh/Tonne						
d.8	**Scrap**								
(i)	Scrap Purchased	Annual	Tonne						
(ii)	Scrap Generated	Annual	Tonne						
(iii)	Scrap Used in Cast House	Annual	Tonne						
(iv)	Scrap %	Annual	%						
e	**Boiler Details**								
e1	**For Steam Generation**								
e1.1	**Boiler 1**	**For Steam Generation (Process Boiler)**							
(i)	Type								
(ii)	Rated Capacity	Annual	TPH						
(iii)	Total Steam Generation	Annual	Tonne						

(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^0C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm^2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^0C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						
(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/(iii)	kcal/kg of Steam						
(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						

e1.2	Boiler 2	For Steam Generation (Process Boiler)							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						
(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)	kcal/kg of Steam						

(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/ [(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e1.3	**Boiler 3**	**For Steam Generation (Process Boiler)**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average							
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average							
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average							
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average							
(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						

(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)	kcal/kg of Steam						
(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/ [(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e.1.4	**Boiler 4**	**For Steam Generation (Process Boiler)**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						

(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						
(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)	kcal/kg of Steam						
(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/ [(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e1.5	**Boiler 5**	**For Steam Generation (Process Boiler)**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						

(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						
(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)	kcal/kg of Steam						
(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/ [(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e1.6	**Total Steam Generation (Process Boiler)**	**e.1.1(iii) + e.1.2(iii) + e.1.3(iii) + e.1.4(iii) + e.1.5.(iii)**	**Tonnes**						
e1.7	**Total Operating Efficiency of Boiler (Process Boiler)**	**Weighted average of all 5 boilers**	%						
e1.8	**Total Operating Capacity of Boilers (Process Boiler)**	**e.1.1(xix) + e.1.2(xix) + e.1.3(xix) + e.1.4(xix) + e.1.5.(xix)**	**TPH**						
e1.9	**Weighted Specific Energy Consumption (Process Boiler)**	**Weighted average of all 5 boilers**	**kcal/kg of Steam**						
e1.10	**Weighted Percentage of Coal Energy Used in steam Generation (Process Boiler)**	**Weighted average of all 5 boilers**	%						

e2	Co-Gen Boiler used for Power generation								
e2.1	**Boiler 6**	**Co-Gen**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm^2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						
(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/(iii)	kcal/kg of Steam						

(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/ [(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e2.2	**Boiler 7**	**Co-Gen**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm^2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						

(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/(iii)	kcal/kg of Steam						
(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e2.3	**Boiler 8**	**Co-Gen**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^0C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm^2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^0C						

(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	Operating Capacity	(iii)/(iv)	TPH						
(xx)	Specific Energy Consumption	[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)	kcal/kg of Steam						
(xxi)	Percentage of Coal Energy Used in steam Generation	[(v)x(vi)]/ [(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]	%						
e2.4	**Boiler 9**	**Co-Gen**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						
(xiii)	Feed water Temperature	Annual	^0C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm^2						

(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	°C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	**Operating Capacity**	**(iii)/(iv)**	**TPH**						
(xx)	**Specific Energy Consumption**	**[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)**	**kcal/kg of Steam**						
(xxi)	**Percentage of Coal Energy Used in steam Generation**	**[(v)x(vi)]/[(v) x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]**	%						
e2.5	**Boiler 10**	**Co-Gen**							
(i)	Type								
(ii)	Rated Capacity		TPH						
(iii)	Total Steam Generation	Annual	Tonne						
(iv)	Running Hrs	Annual	Hrs						
(v)	Coal Consumption	Annual	Tonne						
(vi)	GCV of Coal	Annual Average	kcal/kg						
(vii)	Type of Fuel - 2 Name : Consumption	Annual	Tonne						
(viii)	GCV of any Fuel -2	Annual Average	kcal/kg						
(ix)	Type of Fuel - 3 Name : Consumption	Annual	Tonne						
(x)	GCV of any Fuel -3	Annual Average	kcal/kg						
(xi)	Type of Fuel - 4 Name : Consumption	Annual	Tonne						
(xii)	GCV of any Fuel -4	Annual Average	kcal/kg						

(xiii)	Feed water Temperature	Annual	^{0}C						
(xiv)	Operating Efficiency	Annual Average	%						
(xv)	SH Steam outlet Pressure (Operating)	Annual Average	kg/cm^2						
(xvi)	SH Steam outlet Temperature (Operating)	Annual Average	^{0}C						
(xvii)	SH Steam Enthalpy (Operating)	Annual Average	kcal/kg						
(xviii)	Design Efficiency		%						
(xix)	**Operating Capacity**	**(iii)/(iv)**	**TPH**						
(xx)	**Specific Energy Consumption**	**[(v)x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]/ (iii)**	**kcal/kg of Steam**						
(xxi)	**Percentage of Coal Energy Used in steam Generation**	**[(v)x(vi)]/[(v) x(vi)+(vii) x(viii)+(ix) x(x)+(xi)x(xii)]**	%						
e3	Weighted Average Boiler 6-10	For Steam Generation Boiler							
e3.1	**Total Steam Generation (Co-Gen Boiler)**	**e.2.1(iii) + e.2.2(iii) + e.2.3(iii) + e.2.4(iii) + e.2.5.(iii)**	**Tonnes**						
e3.2	Total Operating Efficiency of Boiler (Co-Gen Boiler)	Weighted average of all 5 boilers	%						
e3.3	**Total Operating Capacity of Boilers (Co-Gen Boiler)**	**e.2.1(xix) + e.2.2(xix) + e.2.3(xix) + e.2.4(xix) + e.2.5.(xix)**	**TPH**						

e3.4	Weighted Specific Energy Consumption (Co-Gen Boiler)	Weighted average of all 5 boilers	kcal/kg of Steam						
e3.5	Weighted Percentage of Coal Energy Used in steam Generation (Co-Gen Boiler)	Weighted average of all 5 boilers	%						
e3.6	Weighted Boiler Efficiency for Boilers 1-10	Weighted average of all 10 boilers	%						
e4	**Note: DCs to provide separate Excel sheet in the Boiler format as specified above If no of boiler exceeds for additional nos of boilers for Co-Gen/Steam**								
B	**Electricity Consumption**								
B.1	**Electricity through Grid / Other (Including colony and others)**								
(i)	Purchased Electricity from grid (SEB)	Annual	Lakh kWh						
(ii)	Renewable Electricity (Through Wheeling)	Annual	Lakh kWh						
(iii)	Electricity from CPP located outside from plant boundary (Through Wheeling)	Annual	Lakh kWh						
(iv)	Renewable Purchase obligation of plant (RPO) (Solar & Non-Solar)	Annual	%						
(v)	Renewable Purchase obligation of plant (RPO) (Solar & Non-Solar)	Annual	Lakh kWh						

(vi)	Renewable Purchase obligation of plant (RPO) (Solar & Non-Solar)	Annual	MW						
(vii)	Renewable Energy generator as approved by MNRE	Annual	MW						
(viii)	Quantum of Renewable Energy Certificates (REC) obtained as a Renewal Energy Generator (Solar & Non-Solar)	Annual	MWh						
(ix)	Quantum of Energy sold under preferential tariff	Annual	MWh						
(x)	Plant Connected Load		kW						
(xi)	Contract Demand with utility		kVA						
(xii)	Notified Baseline Specific Energy Consumption		TOE/ Tonnes						
(xiii)	Notified Target Specific Energy Consumption		TOE/ Tonnes						
(xiv)	Saving Target in TOE/ Tonne of product as per PAT scheme Notification		TOE/ Tonnes						
(xv)	Equivalent Major Product Output in Tonnes as per PAT scheme Notification		Tonnes						
(xvi)	Total Electricity Purchased from grid/ Other	B.1 (i) + B.1 (ii) + B.1 (iii)	Lakh kWh						

(xvii)	Total Electricity Purchased from grid/ Other with out colony/construction power etc.	If(B.1(xvi)>b.5, B.1(xvi)-b.5 otherwise 0)	Lakh kWh						
(xviii)	Equivalent Thermal Energy of Purchased Electricity from Grid / Other without colony/ construction power etc.	B.1(xvii)x860/10	Million kcal						
B.2	**Own Generation**								
b.2.1	**Through DG sets**								
(i)	Grid Connected		Yes/No						
(ii)	Install Capacity	Annual	MW						
(iii)	Annual generation	Gross Unit Generation	Lakh kWh						
(iv)	Annual Fuel Consumption	(FO/LDO/HSD/ HSHS/LSHS)	Kilo Litre						
(v)	Average density of fuel	Annual	kg/lit						
(vi)	Auxiliary Power Consumption	Annual	%						
(vii)	Designed Gross Heat Rate of DG Set	Annual	kcal/kWh						
(viii)	Operating Heat Rate	Annual	kcal/kWh						
(ix)	Running Hrs	Annual	Hrs						
b.2.2	**Through Steam turbine/ generator (Please Fill Attachment)**								
(i)	Grid Connected		Yes/No						
(ii)	Install Capacity	Annual	MW						
(iii)	Gross Unit generation	Annual	Lakh kWh						

(iv)	Auxiliary Power Consumption	Annual	%						
(v)	Gross Design Heat Rate	Annual	kcal/ kWh						
(vi)	Operating Gross Heat Rate	Annual	kcal/ kWh						
b.2.3	**Through Gas turbine**								
(i)	Grid Connected		Yes/No						
(ii)	Install Capacity	Annual	MW						
(iii)	Gross Unit generation	Annual	Lakh kWh						
(iv)	Plant Load Factor (PLF)	Annual	%						
(v)	Auxiliary Power Consumption	Annual	%						
(vi)	Gross Design Heat Rate	Annual	kcal/ kWh						
(vi)	Running Hrs	Annual	Hrs						
b.2.4	**Through Waste Heat Recovery**								
(i)	WHR Capacity	Annual	MW						
(ii)	Annual Generation	Annual	Lakh kWh						
(iii)	WHR Running Hrs	Annual	Hrs						
b.2.5	**Through Co-Generation (Extraction/Back Pressure)**								
(i)	Grid Connected		Yes/No						
(ii)	Install Capacity	Annual	MW						
(iii)	Annual Gross Unit generation	Annual	Lakh kWh						

(iv)	Auxiliary Power Consumption	Annual	%						
(v)	Design Heat Rate	Annual	kcal/ kWh						
(vi)	Running Hrs	Annual	Hrs						
	Input Steam								
(vii)	Input Steam Enthalpy	Annual	kcal/kg						
(viii)	Input Steam Pressure	Annual	kg/cm^2						
(ix)	Input Steam Temperature	Annual	^{0}C						
(x)	Input Steam Flow	Annual	Tonnes						
	Steam Extraction 1								
(xi)	Steam Pressure	Annual	kg/cm^2						
(xii)	Steam Temperature	Annual	^{0}C						
(xiii)	Steam Enthalpy	Annual	kcal/kg						
(xiv)	Mass Flow	Annual	Tonnes						
	Steam Extraction 2								
(xv)	Steam Pressure	Annual	kg/cm^2						
(xvii)	Steam Temperature	Annual	^{0}C						
(xviii)	Steam Enthalpy	Annual	kcal/kg						
(xix)	Mass Flow	Annual	Tonnes						
(xx)	Thermal energy used in process	[b2.5 (xiii) x b2.5 (xiv) +b2.5 (xviii) x b2.5 (xix)]/1000	Million kcal						
(xxi)	Thermal energy used in Power	[b2.5 (vii) x b2.5 (x)]/1000 -b2.5 (xx)	Million kcal						
(xxii)	% of thermal energy in Process	b2.5(xx) x1000/ [b2.5 (vii) x b2.5 (x)]	Factor						
b.2.6	**Through Co-Generation (Extraction Cum Condensing)**								
(i)	Grid Connected		Yes/No						

(ii)	Install Capacity	Annual	MW						
(iii)	Annual Gross Unit generation	Annual	Lakh kWh						
(iv)	Auxiliary Power Consumption	Annual	%						
(v)	Design Heat Rate	Annual	kcal/ kWh						
(vi)	Running Hrs	Annual	Hrs						
	Input Steam								
(vii)	Input Steam Enthalpy	Annual	kcal/kg						
(viii)	Input Steam Pressure	Annual	kg/cm^2						
(ix)	Input Steam Temperature	Annual	^0C						
(x)	Input Steam Flow	Annual	Tonnes						
	Steam Extraction 1								
(xi)	Steam Pressure	Annual	kg/cm^2						
(xii)	Steam Temperature	Annual	^0C						
(xiii)	Steam Enthalpy	Annual	kcal/kg						
(xiv)	Mass Flow	Annual	Tonnes						
	Steam Extraction 2								
(xv)	Steam Pressure	Annual	kg/cm^2						
(xvii)	Steam Temperature	Annual	^0C						
(xviii)	Steam Enthalpy	Annual	kcal/kg						
(xix)	Mass Flow	Annual	Tonnes						
(xx)	Thermal energy used in process	[b2.6(xiii) x b2.6(xiv) +b2.6(xviii) x b2.6 (xix)]/1000	Million kcal						
(xxi)	Thermal energy used in Power	[b2.6 (vii) x b2.6 (x)]/1000 -b2.6 (xx)	Million kcal						
(xxii)	% of thermal energy in Process	b2.6(xx) x1000/ [b2.6 (vii) x b2.6 (x)]	Factor						

(xxiii)	Total % of thermal energy in Process from Co-Gen	[b2.5 (xx) +b.2.6 (xx)] / [{b.2.6 (xxi) + b.2.5 (xxi)} + {b2.5 (xx) + b.2.6 (xx)}]	Factor						
b.3	Total Own Generation of Electricity	B.2.1.(iii)+B.2.2.(iii)+B.2.3.(iii)+B.2.4.(ii)+B.2.5(iii)+B.2.6(iii)	Lakh kWh						
b.4	Electricity Supplied to Grid/others	Annual	Lakh kWh						
b.5	Electricity Supplied to Colony/others	Annual	Lakh kWh						
b.6	Electricity Supplied to Grid/Colony/ others	B.4+[If B.5 > B.1(xvi) then (B.5-B.1(xvi))]	Lakh kWh						
b.7	Equivalent Thermal Energy supplied to grid/others	B.6*2717/10	Million kcal						
b.8	Total Electricity Consumed in Process & Auxiliaries	if(b.5>B.1.(xvi) then (B.3-B.4)-(B.5-B.1.(xvi) otherwise B.1.(xvii)-b.3-b.4	Lakh kWh						
C	**Solid Fuel Consumption**								
C.1	**Coal (Indian)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Average Gross calorific value (As Fired Basis)	Annual	kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						

(iv)	Quantity purchased	Annual	Tonne						
(v)	Quantity used for power generation in CPP	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(v)x(ii)/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (co-gen)	(vi)x(ii)/1000	Million kcal						
(xi)	Thermal Energy Used in Process	(vii)x(ii)/1000	Million kcal						
C.2	**Pet coke/Carbon**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Average Gross calorific value (As fired basis)	Annual	kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						
(iv)	Quantity purchased	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						

(vii)	Quantity used for process	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(ii)x(v)/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (co-gen)	(ii)x(vi)/1000	Million kcal						
(xi)	Thermal Energy Used in Process	(ii)x(vii)/1000	Million kcal						
C.3	**Coal(Imported)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Average Gross calorific value (As fired Basis)		kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						
(iv)	Quantity purchased	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(ii)x(v)/1000	Million kcal						

(x)	Thermal Energy Used in Power Generation (co-gen)	(ii)x(vi)/1000	Million kcal						
(xi)	Thermal Energy Used in Process	(ii)x(vii)/1000	Million kcal						
C.4	**Coal (lignite)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Average Gross calorific value (As fired Basis)	Annual	kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						
(iv)	Quantity purchased	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(ii)x (v)/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (co-gen)	(ii)x(vi)/1000	Million kcal						
(xi)	Thermal Energy Used in Process	(ii)x(vii)/1000	Million kcal						

C.5	**Other Solid Fuels**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Average Gross calorific value (As fired basis)	Annual	kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						
(iv)	Quantity purchased	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(ii)x(v)/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (co-gen)	(ii)x(vi)/1000	Million kcal						
(xi)	Thermal Energy Used in Process	(vii)x(ii)/1000	Million kcal						
C.6	**Bio mass or Other purchased Renewable solid fuels (pl. specify) bagasse, rice husk, etc.**	**Thermal Energy Input through Biomass not to be taken into account**							
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						

(ii)	Average Gross calorific value as fired		kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						
(iv)	Quantity purchased	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(ii)x(v)/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (co-gen)	(ii)x(vi)/1000	Million kcal						
(xi)	Thermal Energy Used in Process	(vii)x(ii)/1000	Million kcal						
C.7	**Solid Waste (pl. specify and refer CPCB guidelines) rubber tyres chips, Municipal Solid waste etc.**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Average Gross calorific value as fired	Annual	kcal/ kg						
(iii)	Average Total Moisture in coal (As received Basis)	Annual	%						
(iv)	Quantity purchased	Annual	Tonne						

(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process heating	Annual	Tonne						
(viii)	Total Quantity Consumed	(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (CPP)	(ii)x(v)/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (co-gen)	(ii)x(vi)/1000	Million kcal						
(xi)	**Thermal Energy Used in Process**	**(vii)x(ii)/1000**	**Million kcal**						
C.8	**Thermal Energy Used in Power Generation (CPP)**	**C.1(ix) + C.2(ix) + C.3(ix) + C.4(ix) + C.5(ix) + C.6(ix) + C.7(ix)**	**Million kcal**						
C.9	**Thermal Energy Used in Power Generation (co-gen)**	**if, b.2.5 (i) or b.2.6 (i) is yes then C.1(x) + C.2(x) + C.3(x) + C.4(x) + C.5(x) + [C.6(x) x (1-b.2.6 (xxiii)] + [C.7(x) x (1-b.2.6 (xxiii)] otherwsie C.1(x) + C.2(x) + C.3(x) + C.4(x) + C.5(x)**	**Million kcal**						
C.10	**Total Solid Energy Used in Process**	**C.1(xi) + C.2(xi) + C.3(xi) + C.4(xi) + C.5(xi)**	**Million kcal**						

D	**Liquid Fuel Consumption**								
D.1	**Furnace Oil**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Gross calorific value	Annual	kcal/ kg						
(iii)	Quantity purchased	Annual	kilolitre						
(iv)	Average Density		kg/Litre						
(v)	Quantity used for power generation (DG Set)	Annual	kilolitre						
(vi)	Quantity used for power generation (CPP)	Annual	kilolitre						
(vii)	Quantity used for power generation (Co-Gen)	Annual	kilolitre						
(viii)	Quantity used for process	Annual	kilolitre						
(ix)	Total F. Oil Consumption as fuel	((v) + (vi) + (vii) + (viii)) x (iv)	Tonne						
(x)	Thermal Energy Used in Power Generation (DG Set)	[((v))x(ii)] x(iv)/1000	Million kcal						
(xi)	Thermal Energy Used in Power Generation (CPP)	[((vi))x(ii)] x(iv)/1000	Million kcal						
(xii)	Thermal Energy Used in Power Generation (co-gen)	[((vii))x(ii)] x(iv)/1000	Million kcal						
(xiii)	Thermal Energy Used in Process	[((viii))x(ii)] x(iv)/1000	Million kcal						

D.2	**Low Sulphur Heavy Stock (LSHS)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Gross calorific value	Annual	kcal/ kg						
(iii)	Quantity purchased	Annual	Tonne						
(iv)	Quantity used for power generation (DG Set)	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process heating	Annual	Tonne						
(viii)	Total LSHS Consumption as fuel	(iv)+(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (DG Set)	[((iv))x(ii)]/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (CPP)	[((v))x(ii)]/1000	Million kcal						
(xi)	Thermal Energy Used in Power Generation (co-gen)	[((vi))x(ii)]/1000	Million kcal						
(xii)	Thermal Energy Used in Process	[((vii))x(ii)]/1000	Million kcal						
D.3	**High Sulphur Heavy Stock (HSHS)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						

(ii)	Gross calorific value	Annual	kcal/ kg						
(iii)	Quantity purchased	Annual	Tonne						
(iv)	Quantity used for power generation (DG Set)	Annual	Tonne						
(v)	Quantity used for power generation (CPP)	Annual	Tonne						
(vi)	Quantity used for power generation (Co-Gen)	Annual	Tonne						
(vii)	Quantity used for process heating	Annual	Tonne						
(viii)	Total HSHS Consumption as fuel	(iv)+(v)+(vi)+(vii)	Tonne						
(ix)	Thermal Energy Used in Power Generation (DG Set)	[((iv))x(ii)]/1000	Million kcal						
(x)	Thermal Energy Used in Power Generation (CPP)	[((v))x(ii)]/1000	Million kcal						
(xi)	Thermal Energy Used in Power Generation (co-gen)	[((vi))x(ii)]/1000	Million kcal						
(xii)	Thermal Energy Used in Process	[((vii))x(ii)]/1000	Million kcal						
D.4	**High Speed Diesel (HSD)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Gross calorific value		kcal/ kg						
(iii)	Quantity purchased	Annual	kilolitre						
(iv)	Average Density	Annual	kg/Litre						

(v)	Quantity used for power generation (DG Set)	Annual	kilolitre						
(vi)	Quantity used for power generation (CPP)	Annual	kilolitre						
(vii)	Quantity used for power generation (Co-Gen)	Annual	kilolitre						
(viii)	Quantity used for material handling / Transportation (Raw material handling, Loco, etc.)	Annual	kilolitre						
(ix)	Quantity used for process heating	Annual	kilolitre						
(x)	Total HSD Consumption as fuel	[(v) + (vi) + (vii) + (viii) + (ix)] x (iv)	Tonne						
(xi)	Thermal Energy Used in Power Generation (DG Set)	[((v))x(iv)] x(ii)/1000	Million kcal						
(xii)	Thermal Energy Used in Power Generation (CPP)	[((vi))x(iv)] x(ii)/1000	Million kcal						
(xiii)	Thermal Energy Used in Power Generation (Co-Gen)	[((vii))x(iv)] x(ii)/1000	Million kcal						
(xiv)	Thermal Energy Used in Process	[[((viii)+(ix))x(iv) x(ii)/1000	Million kcal						
D.5	**Light Diesel Oil (LDO)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Gross calorific value		kcal/ kg						

(iii)	Quantity purchased	Annual	kilolitre						
(iv)	Average Density		kg/Litre						
(v)	Quantity used for power generation (DG Set)	Annual	kilolitre						
(vi)	Quantity used for power generation (CPP)	Annual	kilolitre						
(vii)	Quantity used for power generation (Co-Gen)	Annual	kilolitre						
(viii)	Quantity used for material handling / Transportation (Raw material handling, Loco, etc.)	Annual	kilolitre						
(ix)	Quantity used for process heating	Annual	kilolitre						
(x)	Total LDO Consumption as fuel	[(v) + (vi) + (vii) + (viii) + (ix)] x (iv)	Tonne						
(xi)	Thermal Energy Used in Power Generation (DG Set)	[((v))x(iv)] x(ii)/1000	Million kcal						
(xii)	Thermal Energy Used in Power Generation (CPP)	[((vi))x(iv)] x(ii)/1000	Million kcal						
(xiii)	Thermal Energy Used in Power Generation (Co-Gen)	[((vii))x(iv)] x(ii)/1000	Million kcal						
(xiv)	Thermal Energy Used in Process	[((viii)+(ix))x(iv) x(ii)/1000	Million kcal						

D.6	**Liquid Waste (pl. specify and refer CPCB guidelines, enclosed)**	**Thermal Energy Input through Liquid waste, mentioned in CPCB guidelines, not to be taken into account**							
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	Gross calorific value		kcal/ kg						
(iii)	Quantity purchased	Annual	kilolitre						
(iv)	Average Density		kg/Litre						
(v)	Quantity used for power generation (DG Set)	Annual	kilolitre						
(vi)	Quantity used for power generation (CPP)	Annual	kilolitre						
(vii)	Quantity used for power generation (Co-Gen)	Annual	kilolitre						
(viii)	Quantity used for process	Annual	kilolitre						
(ix)	Total Liquid waste Consumption as fuel	[(v) + (vi) + (vii) + (viii)] x (iv)	Tonne						
(x)	Thermal Energy Used in Power Generation (DG Set)	[((v))x(iv)] x(ii)/1000	Million kcal						
(xi)	Thermal Energy Used in Power Generation (CPP)	[((vi))x(iv)] x(ii)/1000	Million kcal						
(xii)	Thermal Energy Used in Power Generation (Co-Gen)	[((vii))x(iv)] x(ii)/1000	Million kcal						
(xiii)	Thermal Energy Used in Process	[((ix))x(iv)] x(ii)/1000	Million kcal						

D.7	**Total Liquid Energy Used in Power Generation (DG Set)**	**D.1.(x) + D.2.(ix) + D.3.(ix) + D.4.(xi) + D.5.(xi) + D.6.(x)**	**Million kcal**						
D.8	**Total Liquid Energy Used in Power Generation (CPP)**	**D.1.(xi) + D.2.(x) + D.3.(x) + D.4.(xii) + D.5.(xii) + D.6.(xi)**	**Million kcal**						
D.9	**Total Liquid Energy Used in Power Generation (Co-Gen)**	**D.1.(xii) + D.2.(xi) + D.3.(xi) + D.4.(xiii) + D.5.(xiii) + [D.6.(xii) x (1-b.2.6 (xxiii)]**	**Million kcal**						
D.10	**Total Liquid Energy Used in Process**	**D.1.(xiii) + D.2.(xii) + D.3.(xii) + D.4.(xiv) + D.5.(xiv)**	**Million kcal**						
E	**Gaseous Fuel**								
E.1	**Compressed Natural Gas (CNG/NG/PNG/ LNG)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/SCM						
(ii)	Gross calorific value		kcal/SCM						
(iii)	Quantity purchased	Annual	Million SCM						
(iv)	Quantity used for power generation	Annual	Million SCM						
(v)	Quantity used for transportation, if any	Annual	Million SCM						
(vi)	Quantity used for process heating	Annual	Million SCM						

(vii)	Total CNG Consumption as fuel	(iv)+(v) + (vi)	Million SCM						
(viii)	Thermal Energy Used in Power Generation	(iv)x(i)	Million kcal						
(ix)	Thermal Energy Used in Process	((v)+(vi))x(i)	Million kcal						
E.2	**Liquefied Petroleum Gas (LPG)**								
(i)	Landed Cost of fuel (Last purchase)	Basic Cost + Taxes + Freight	Rs/kg						
(ii)	Gross calorific value		kcal/ kg						
(iii)	Quantity purchased	Annual	Million kg						
(iv)	Quantity used for power generation	Annual	Million kg						
(v)	Quantity used for process heating	Annual	Million kg						
(vi)	Total LPG Consumption as fuel	(iv) + (v)	Million kg						
(vii)	Thermal Energy Used in Power Generation	(iv)x(ii)	Million kcal						
(viii)	Thermal Energy Used in Process	(v)x(ii)	Million kcal						
E.3	Total Gaseous Energy Used in Power Generation	E.1.(viii) + E.2.(vii)	Million kcal						
E.4	Total Gaseous Energy Used in Process	E.1.(ixi) + E.2.(viii)	Million kcal						
F.5	**Steam Import/Export**								
F.5.1	**Steam Import**								
F.5.1.1	**LP Steam Import**								
(i)	Landed Cost of steam (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						

(ii)	LP Steam Energy	Annual	kcal/kg						
(iii)	LP Steam Quantity purchased	Annual	Tonnes						
(iv)	Average Temperature	Annual	^{0}C						
(v)	Average Pressure	Annual	bar						
(vi)	Thermal Energy Imported for LP Steam	(ii)x(iii)/1000	Million kcal						
F.5.1.2	**HP Steam Import**								
(i)	Landed Cost of steam (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	HP Steam Energy	Annual	kcal/kg						
(iii)	HP Steam Quantity purchased	Annual	Tonnes						
(iv)	Average Temperature	Annual	^{0}C						
(v)	Average Pressure	Annual	bar						
(vi)	Thermal Energy Imported for HP Steam	(ii)x(iii)/1000	Million kcal						
F.5.1.3	Thermal Energy Imported for LP & HP Steam	K.8.1.1.(vi) + K.8.1.2.(vi)	Million kcal						
F.5.2.1	LP Steam Export								
(i)	Landed Cost of steam (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						
(ii)	LP Steam Enthalpy	Annual	kcal/kg						
(iii)	LP Steam Quantity purchased	Annual	Tonnes						
(iv)	Average Temperature	Annual	^{0}C						
(v)	Average Pressure	Annual	bar						
(vi)	Thermal Energy Exported for LP Steam	(ii)x(iii)/1000	Million kcal						
F.5.2.2	**HP Steam Export**								
(i)	Landed Cost of steam (Last purchase)	Basic Cost + Taxes + Freight	Rs/Tonne						

(ii)	HP Steam Enthalpy	Annual	kcal/kg						
(iii)	HP Steam Quantity purchased	Annual	Tonnes						
(iv)	Average Temperature	Annual	⁰C						
(v)	Average Pressure	Annual	bar						
(vi)	Thermal Energy Exported for HP Steam	(ii)x(iii)/1000	Million kcal						
F.5.2.3	Thermal Energy Exported for LP and HP Steam	F.5.2.2.(vi) + F.5.2.1.(vi)	Million kcal						
F.5.2.4	Weighted Average Boiler Efficiency (Boiler 1-10)		%						
F.5.2.5	Total Thermal Energy Exported for Steam	(F.5.2.3/F.5.2.4) x100	Million kcal						
F.5.3	Total Thermal Energy for Steam (Import-Export)	F.%.1.3-F.5.2.5	Million kcal						
G	**Total Thermal Energy**								
G1	Total Thermal Energy Used in Power Generation	C.8 + C.9 + D.7 + D.8 + D.9 + E.3	Million kcal						
G2	Total Thermal Energy Used in Process	C.8 + D.9 + E.4	Million kcal						
G3	Total Thermal Energy Input through all Fuels	G.1 + G.2 + F.5.3	Million kcal						
H	**Gross Heat Rate**								
H1	Gross Heat Rate of DG Set	D.6 (x) x 10/B.2.1.(ii)	kcal/kWh						
H2	Gross Heat Rate of CPP (Steam Turbine)	Heat rate with Fuel	kcal/kWh						
H3	Gross Heat Rate of CPP (Gas Turbine)	E.3/B.2.3.(iii)	kcal/kWh						

H4	Gross Heat Rate of Co-Gen (Extraction cum condensing)	Heat Rate with enthalpy	kcal/kWh						
H5	Gross Heat Rate of Co-Gen(Extraction/ Backpressure)	Heat Rate with enthalpy	kcal/kWh						
H6	Weighted Heat Rate	Weighted Heat Rate with Generatiuon	kcal/kWh						
I	**Coal Analysis in Co-Gen (As Fired Basis)**								
i	Gross Calorific Value	Annual	kcal/kg						
ii	Ash	Annual	%						
iii	Hydrogen	Annual	%						
iv	Moisture	Annual	%						
J	**Bauxite Quality**								
i	Total Bauxite Consumed	Annual	Tonne						
ii	Type of Bauxite	Annual	Type						
iii	Total Al_2O_3 /SiO_2 Ratio	Annual	Ratio						
iv	Bauxite Total Available Alumina (TAA)	Annual	%						
v	Bauxite Monohydrate Alumina (MHA)	Annual	%						
vi	Bauxite Trihydrate Alumina (THA)	Annual	%						
vii	Bauxite Silica	Annual	%						
viii	Bauxite Moisture	Annual	%						
ix	Overall Recovery	Annual	%						
x	Wash Water	Annual	t/t						

xi	Steam Economy	Annual	t/t						
xii	Fe in Bauxite	Annual	%						
xiii	Fe in Mud	Annual	%						
xiv	Actual Steam Enthalpy	Annual	kcal/kg						
xv	Boiler Efficiency	Annual	%						
K	**Miscellaneous Data** [$]								
K.1	**Additional Equipment installation after baseline year due to Environmental Concern**								
(i)	Additional Electrical Energy Consumed	Annual	Lakh kWh						
(ii)	Additional Thermal Energy Consumed	Annual	Million kcal						
K.2	**Biomass/ Alternate Fuel availability (as per Sr. No C.5/C.6/D.6)**								
(i)	Biomass replacement with Fossil fuel due to Biomass un-availability (used in the process)	Annual	Tonne						
(ii)	Alternate Solid Fuel replacement with Fossil fuel due to Alternate Solid Fuel un-availability (used in the process)	Annual	Tonne						

(iii)	Alternate Liquid Fuel replacement with Fossil fuel due to Alternate Liquid Fuel un-availability (used in the process)	Annual	Tonne						
K.3	**Project Activities (Construction Phase)**								
(i)	Electrical Energy Consumed due to commissioning of Equipment	Annual	Lakh kWh						
(ii)	Thermal Energy Consumed due to commissioning of Equipment	Annual	Million kcal						
K.4	**New Line/Unit Commissioning**								
(i)	Electrical Energy Consumed due to commissioning of New process Line/Unit till it attains 70% of Capacity Utilization	Annual	Lakh kWh						
(ii)	Thermal Energy Consumed due to commissioning of New Process Line/Unit till it attains 70% of Capacity Utilization	Annual	Million kcal						
(iii)	Calcined Alumina Production till new line attains 70% of Capacity utilization (Refinery)	Annual	Tonne						

(iv)	Molten Aluminum Production till new line attains 70% of Capacity utilization (Smelter & Integrated)	Annual	Tonne						
(v)	Date of Commissioning (70% Capacity Utilization)	Date							
(vi)	Electrical Energy Consumed from external source due to commissioning of New Line/Unit till it attains 70% of Capacity Utilization in Power generation	Annual	Lakh kWh						
(vii)	Thermal Energy Consumed due to commissioning of New Line/Unit till it attains 70% of Capacity Utilization in Power generation	Annual	Million kcal						
(viii)	Net Electricity Generation till new line/unit attains 70% Capacity Utilization	Annual	Lakh kWh						
(ix)	Steam Generation From Co-Gen till new line/Unit attains 70% of Capacity Utilization	Annual	Tonne						
(x)	Date of Commissioning (70% Capacity Utilization)	Date							

K.5	**Unforeseen Circumstances**								
(i)	Electrical Energy to be Normalized	Annual	Lakh kWh						
(ii)	Thermal Energy to be Normalized	Annual	Million kWh						
$ Authentic documents in support of claim in Thermal and Electrical Energy is required									
L	**Documentation for Normalization**								
(i)	Bauxite Quality-Document Available for Normalization		Yes/No						
(ii)	Smelter Capacity Utilization-Document Available for Normalization		Yes/No						
(iii)	Fuel Quality in CPP & Co-Gen -Document Available for Normalization		Yes/No						
(iv)	CPP PLF- Document Available for Normalization		Yes/No						
(v)	Power Mix-Document Available for Normalization		Yes/No						
(vi)	Product Mix-Document Available for Normalization		Yes/No						
(vii)	Carbon Anode Production- Document Available for Normalization		Yes/No						
(viii)	Other Factors - Document Available for Normalization		Yes/No						

M	**Energy Saving and Investment**	**Annual**	**Million Rs**						
(i)	Investment made for achieving target	Annual	Million Rs						
(ii)	Thermal Energy Saving during the year								
a	**Solid Fuel**								
a.1	Coal	Annual	Million kcal						
a.2	Lignite	Annual	Million kcal						
a.3	Petro Coke	Annual	Million kcal						
a.4	Biomass/Waste	Annual	Million kcal						
b	**Liquid Fuel (FO/HSD/ LDO/LSHS/HSHS)**	**Annual**	**Million kcal**						
c	**Gaseous Fuel**	**Annual**	**Million kcal**						
(iii)	Electrical energy Saving during the year	Annual	Lakh kWh						
N	**Process Flow Diagram Attached**	**Yes/No**							

Form- Sa_1 Captive Power Plant Details

Name of the Unit

1. OEM Curve / HBD data

1.a	Units	Design Capacity	As Provided by Original Equipment Manufacturer (OEM)			Curve Equation / (R2)					Load Vs Heat Rate or HBD Curve (at 100% Load)	Source of Data	Remarks
			Boiler Efficiency	Turbine Heat Rate	Unit Heat Rate *	OEM Curve OR HBD data curve		Cons - tant 1	Cons - tant 2	Cons - tant 3	Turbine Heat Rate		
		MW	%	kcal/ kWh	kcal/ kWh	y=ax2- bx+c	R2	a	b	c	kcal/kWh		
i	Unit-1												
ii	Unit-2												
iii.	Unit-3												
iv.	Unit-4												
v.	Unit-5												
vi.	Unit-6												
vii.	Unit-7												
viii.	Unit-8												
ix.	Unit-9												
x.	Unit-10												
1.b	**Station Design Data Details *****												

*** Station Design Heat Rate = [(DGHR 1 x Capacity 1 + DGHR 2 x Capacity2 + -----------) / (Total Capacity of Station)]

** To be indicated only if OEM certified design or PG Test report is available and the same can be produced as documentary proof, whenever required. If gas/liquid fuel is used, the Design/PG value for gas/liquid fuel may be given separately.

* Unit Heat Rate (kcal/kWh) = [Turbine Heat Rate (kcal/kWh) / Boiler Efficiency (%)]

2. Unit wise Operating Data Details

2.a	Units	Baseline Year (Average of Year 1 to Year 3)				Assessment/Current/Target Year				Source of Data
		Operating Load	ULF	Gross Generation	Unit Gross Heat Rate #	Operating Load	ULF	Gross Generation	Unit Gross Heat Rate #	
		MW	%	Lakh Units	kcal/kWh	MW	%	Lakh Units	kcal/kWh	
i	Unit-1									
ii	Unit-2									
iii.	Unit-3									
iv.	Unit-4									
v	Unit-5									
vi	Unit-6									
vii	Unit-7									
viii	Unit-8									
ix	Unit-9									
x	Unit-10									
2.b	Station Operating Data Details ##									
2.c	**Station Auxiliary Power Consumption %**									

 # Unit Heat Rate (kcal/kWh) = [Turbine Heat Rate (kcal/kWh) / Boiler Efficiency (%)]

Station Operating Gross Heat Rate = [(OGHR 1 x Generation 1 + OGHR 2 x Generation 2 + -----------) / (Total Generation of Station)]