

The default values considered for the energy consumption for thermal cracking and the subsequent polymerization have been adopted from the International Energy Agency's information paper on 'Potential best practice technology and other measures for improving energy efficiency for the Chemical and petrochemical sector, 2009' as it takes into consideration the best practice values for energy requirements and is the most conservative published source.

The production of PET is a three stage process. Firstly the thermal cracking of Naphtha yields Ethylene and Paraxylene which in turn produces Mono Ethylene Glycol (MEG) and Purified Terephthalic Acid (PTA) respectively. These are the raw materials for the production of solid state PET. The third and the final process involve the esterification and polymerization of PET from PTA and MEG. Adopting a conservative approach we have neglected the energy requirement for the production of PTA and MEG and considered the energy intrinsic process of steam cracking, esterification and polymerization only. However, in practice, the energy consumption in non Annex I countries will be much higher as compared to the best practice technologies. The sources of proposed default values are as tabulated below:

Sr. No	Parameter	Source	Value	Justification
1.	$SFC_{bl,i}$ Specific Fuel Consumption for production of virgin material	AMSIII AJ, Para 5.(i)	15GJ/t	The value for thermal cracking has been taken as 15 GJ/t as specified in the approved methodology for the production of Ethylene and paraxylene which are the key raw materials for manufacturing of MEG and PTA respectively.
2.	$SEC_{bl,i}$ Specific Electricity consumption for the production of virgin material	IEA (Potential best practice technology and other measures for improving energy efficiency for the Chemical and petrochemical sector)2009, Table 1,Primary energy terms	4 GJ/t	The specific electricity consumption for production of PET has been taken into consideration by adding up the total Specific energy consumption in primary energy terms. During the polymerization process there is heat required for the heat treatment of the amorphous chips which is provided by steam. However the energy requirement from steam is not mentioned in the table. Hence the energy provided by fuel is computed for the steam requirement of the process and finally is added upto to the electricity requirement of the process. The energy requirement computed as per the above process yields an electricity consumption of 5.9GJ/t however considering that state of the art technology (e.g., cogeneration using gas turbine) is used to produce heat and power using the

				energy input equivalent to 4 GJ/t. The values specified in the IEA paper are the Best practice values and hence considered as conservative.
3.	SEC _{proc} Specific electricity consumption for processing / manufacturing		0.65 MWh/t(2.34 GJ/t)	Since PET melts at a relatively higher temperature.

Intrinsic viscosity:-

The polymer chain length in PET determines the molecular weight of the material and with it the physical properties that make PET such a useful packaging material. Intrinsic Viscosity (IV) is a measure of the polymers molecular weight and therefore reflects the material's melting point, crystallinity and tensile strength. The IV is used as part of the specification to select the right grade of PET for a particular application. The standard method of measurement of intrinsic viscosity is as per ASTM D 4603 'Standard test method for determining Viscosity of Polyethylene Terephthalate. The value for the intrinsic viscosity can be compared with industry standards for different applications of PET manufactured from virgin inputs in order to establish that the recycled PET substitutes the use of Virgin PET.