

## Company Profile

HEG Ltd. is an ISO-9001: 2000 Company, having its Plant located at Mandideep near Bhopal, Set in the total Area of 100 Acres, HEG is one of the largest integrated Graphite Plant in India.



The company also having ISO-14001: 1996, the Company's facility at Mandideep has been regarded one of the cleanest Graphite plant in the World when seen in the light of material used and the product manufactured there.

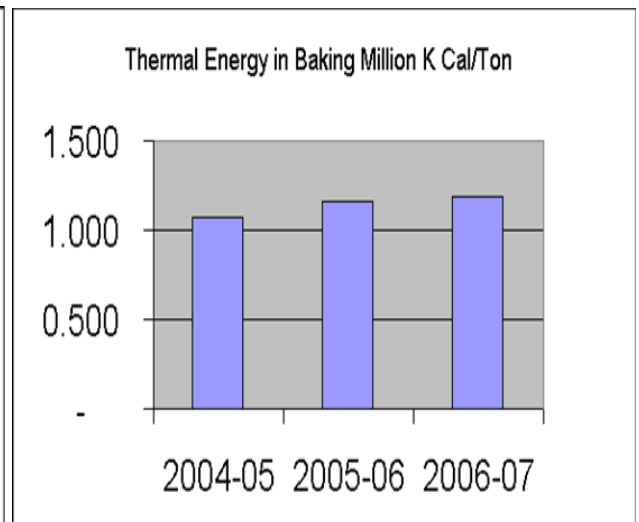
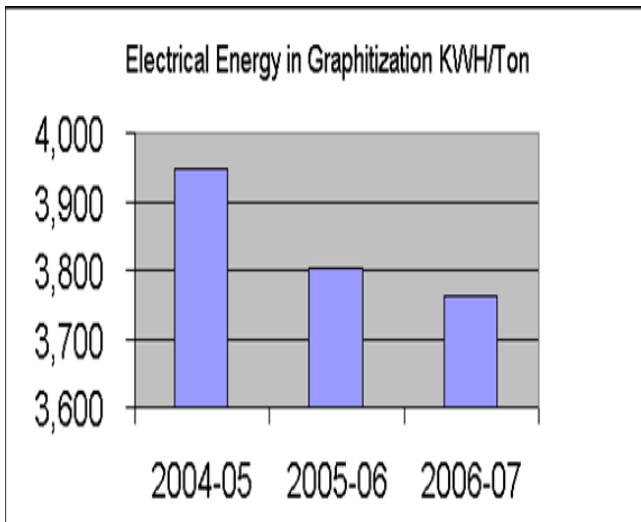
The company is regularly exporting since 1985 and today exports more than 80% of its production, winning the country's top export award (CAPWXIL) for several years. Having its own R & D center.



## **Energy consumption**

Graphite Electrodes manufacturing is very energy intensive process, the company in last 3-4 years has undergone major expansion process with heavy investment in new energy efficient technology, their effect is likely to be reflected in coming years as these systems gets stabilized.

Description	UNIT	2004-05	2005-06	2006-07
Electrical Energy in Graphitization	KWH/Ton	3,947	3,802	3,763
Thermal Energy in Baking	Million K Cal/Ton	1.074	1.159	1.190
Total Energy Bill	Rs. Lacs	10,487	11,869	14,993
Energy % to the total manufacturing cost		50.51%	51.73%	39.20%



## **Energy & Environment Conservation commitment, policy and setup**

HEG has formulated its integrated Health, Safety & Environment policy for its commitment towards society and its employee being ISO-14001: 1996 and ISO-9001: 2000 Company. Energy conservation is one of major aspect of the policy.



## **Manufacturing Process of Artificial Graphite**

The Industrial applications of Graphite are numerous applications as electrodes for Arc Furnaces and Anodes for Electrolysis, Graphite is also used in Chemical Industry, Misc. packing and lining materials for hot applications, carbons for Arc Lamps and Brushes for Electrical Machines etc.

### 1. GREEN ELECTRODE PREPARATION

Needle Coke is crushed screened & mixed with pitch in controlled proportion and extruded to make Green Electrodes.

### 2. BAKING

The baking process is the next step in converting green carbon into a commercially useable product. The Product is heated to the temperature of approximately 800 °C to remove the volatiles & convert it into Carbon form.

### 3. PITCH IMPREGNATION

Baked Electrodes are then impregnated by special Pitch to increase the Density and strength.

### 4. REBAKING

The Impregnated Electrodes needs to be Re-baked again to remove the volatiles. The similar Baking process is adopted for the Re-baking process.

### 5. GRAPHITISATION

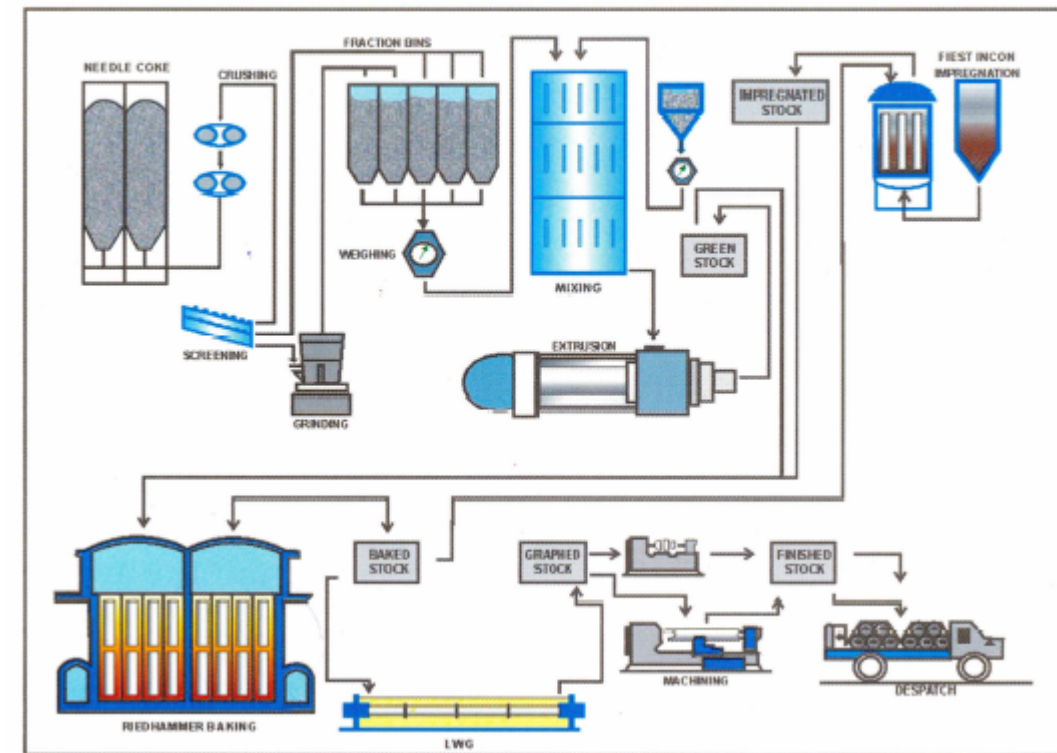
The baked Electrodes are heated to temperature of approximately 3000 °C. High amperage of current is passed through these columns to heat the mass efficiently. Two types of Electric Furnace are used for the Graphitization Process;

- ~ An electric furnace developed by and named for the late Dr. E.G. Acheson.
- ~ Lengthwise Graphitization furnaces (New Technology)

## 6. MACHINING OF GRAPHITE

After Graphitization the products are cleaned, inspected, machined to final dimensions and shipped. Graphite is easily machined and almost any desired shape or contour can be obtained by the use of woodworking and metal shaping equipment fitted with specially designed fixtures.

### Production Flow Chart



Main Constrain in Implementing Energy Audit Suggestion:

- ~ At present HEG is in major expansion phase which has resulted in several new Technologies which all the Plant personnel are not aware to handle, we are in learning mode at present, hence energy conservation suggestion will come to focus as & when the System gets stabilized.
- ~ As such manufacturing artificial Graphite has lot of variables right from the preparation of Green Electrodes unto Graphitization process; hence making any change in any process parameter needs a lot of review & understanding before implementation.