

TATA REFRACTORIES LIMITED (BELPAHAR)

AT/POST - BELPAHAR, DIST - JHARSUGUDA, PIN CODE - 768218, ORISSA

(i) **Unit Profile**

Tata Refractories Limited (TRL), established in 1958, is the pioneer refractory manufacturer in India. The company is a subsidiary of Tata Steel. The main plant and the registered office of the company is located at Belpahar in the state of Orissa. The other production facility, located at Karuppur, near Saalem in Tamil Nadu is engaged in calcining of raw magnesite, which is then used as raw material for making refractories at Belpahar Works. TRL, an ISO-9002 company, is in the business of manufacturing and sale of Basic, Silica, High Alumina, Dolomite & Flow Control refractory bricks and mortars which are used for high temperature applications in all ferrous & non-ferrous industries. The annual installed capacity of the plant is 1, 72, 400 MT. The company has been making profits over the years and is the no-1 refractory manufacturer in India in terms of Annual Turnover. The turnover for the year 2004-05 was Rs. 404 Crore.

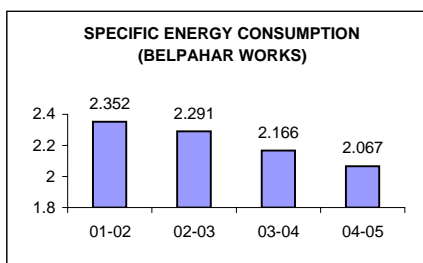
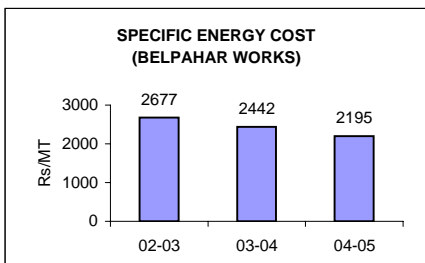
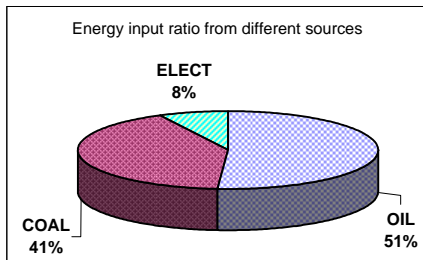
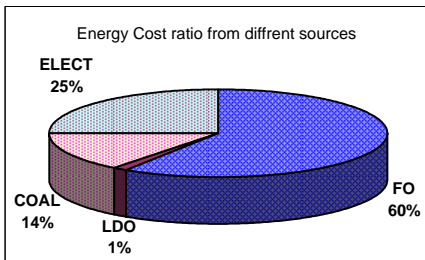


An Overview of Tata Refractories Limited

(ii) Energy Consumption

Include information on total energy consumption (i.e. coal, oil, gas, electricity and money value). Information on energy consumption in terms of percentage of manufacturing cost should also be presented. Also, it should highlight the specific energy consumption for the period 2002-2003, 2003-2004 & 2004-2005 Good Computer Graphic Presentation related to Specific Energy Consumption may also be incorporated.

The refractory manufacturing process is energy intensive in nature. The major forms of energy used at Tata Refractories Limited are Petroleum fuels (Furnace Oil), coal & Electricity. While the petroleum fuels are used directly for firing in various kilns/furnaces, the coal is used to manufacture producer gas, which, in turn, is used as fuel in thermal units. Electricity is used to run various material handling & conveying equipment. Electricity is purchased from Orissa State Electricity Board. The DG sets installed inside the plant only back up power supply during the main power failure. The annual captive generation from DG set is less than 1% of the total electricity requirement of the plant. The total energy bill of the company (inclusive of both thermal as well as electrical) is to the tune of Rs. 32-34 crore per annum which is around 8-9% of the total annual turn over. The proportion of energy contribution from various sources is depicted below.



Total Energy Consumption (04-05)	
	Mkcal
OIL	162447
COAL	131200
ELECT	24106
TOTAL	317753

Total Energy Cost (04-05)	
	Rs. Lac
OIL	2039
COAL	489
ELECT	846
TOTAL	3374

- (iii) Energy Conservation Commitment, Policy and Organizational Set up
(Please include a photo copy of unit's Energy Conservation Policy, if decided)

TRL recognises the importance of energy conservation and is committed to continuously improve its energy performance in terms of specific energy consumption per tonne of its product. This has helped the company to maintain its total energy bill within control in spite of the ever increasing prices of petroleum fuel, coal & electricity. TRL also proactively look forward to and is everyday to try out any technology innovation on the front of energy conservation. Use of oil saver additives in furnace oil, replacing fuel oil firing with lean producer gas firing etc. are some example of its avidity to conserve energy. In order to have a focussed attention on various energy related issues, TRL formed separate Energy Management Cell in 1997 whose objectives are well defined and are as follows;

- # Reduction of specific energy consumption & specific energy cost in various energy intensive units.
- # Phasing out energy inefficient technology & replacing it with upgraded one.
- # Conduct need base training programme to develop energy conscious workforce.
- # Setting of norms & result oriented targets.
- # Service to operation departments for continuous improvement & achieving higher standards.

The Energy Management Cell is headed by a Manager and it has laboratory facilities for monitoring fuel quality, flue gas composition and other allied parameters. As a part of its strategy, an Energy plan has been prepared and the same was presented to the Managing Director. Based on these plans, various actions have been initiated and a no. of energy saving projects were taken up and implemented. The other important responsibility of this cell is to monitor the day to day energy consumption figures throughout the plant and analyse them. These inputs are discussed in the Daily Production meeting chaired by the General Manager(Operations). It also forms a part of Monthly Plant Performance report which is reviewed by the Managing Director. He also chairs the monthly energy meeting in which current status and future plans are discussed and finalised.

Diagnosis studies are conducted from time to time in the plant by the Energy Management Cell and suitable recommendations are made for achieving energy saving objectives. Special attention is given to any capital project to ensure that the energy efficient systems are installed right from the beginning. In order to create awareness amongst all employees on importance of energy conservation and the role of each individual, regular training classes are conducted by the Energy Conservation Cell, relevant posters are displayed at strategic locations inside the plant.

In order to reduce the fuel oil consumption, a strategic decision has been taken to maximise the use of Producer gas in all thermal units to the extent possible.

Energy Conservation Achievements

Include one paragraph write-up on each major energy conservation project implemented during the year 2004-2005 only.

Elimination of Producer gas firing in FCP Dryer by the utilisation of waste heat from Tunnel Kilns.

	Before	After
Dryer Temp (⁰ C)	100	100
Type of fuel	Producer gas (Coal)	Waste heat
Coal cons. (MT)	240	Nil
Elect. cons. (LK _{wh})	0.944	0.744
Investment	Rs. 3.0 Lac	
Savings	Rs. 5.1 Lac/Annum	



Minimisation of Producer gas consumption in Tempering Kiln (Basic) by the utilisation of waste heat from Tunnel Kilns (FTK-2).

	Before	After
Tempering Temp (⁰ C)	240±20	240±20
Type of fuel	Producer gas (Coal)	Producer gas (Coal) + Waste heat
Coal cons. (MT)	1000	880
Investment	Rs.0.1 Lac	
Savings	Rs.2.2 Lac/Annum	



Elimination of L.D.Oil firing in Tempering (Dolomite) by Producer gas firing & improved designed burner.

	Before	After
Tempering Temp (⁰ C)	300±20	300±20
Type of fuel	Light Diesel Oil	Producer gas (Coal)
LDO cons. (KL)	240	Nil
Coal cons. (MT)	Nil	501
Investment	Rs. 5 Lac	
Savings	Rs.20.0 Lac/Annum	



Installation of LP & HP Screw Compressors replacing reciprocating compressors.

	Before	After
Type of compressor	Reciprocating	Screw
User point pressure (Kg/Cm ²)	6.0 (High) 3.0 (Low)	6.0 (High) 3.0 (Low)
	Single compressor for High & low pressure	Separate compressor for high & low pr.
Elect. cons. (LKwh)	33.5	24
Investment	Rs.80.0 Lac	
Savings	Rs.30.0 Lac/Annum	



Use of C.F. Lamps (18W) replacing fluorescent tube lights (40W).

	Before	After
Type of Lamp	Fluorescent	CFL
Power Cons. (KW)	40	18
Elect. cons. (LKwh)	480	479.8
Investment	Rs.2.0 Lac	
Savings	Rs.0.54 Lac/Annum	



Use of Variable Speed Drives in all exhaust fans of Kilns.

	Before	After
Type of exhaust control	Damper	VF drive
Elect. cons. (LKwh)	47	22.0
Investment	Rs. 66.5 Lac	
Savings	Rs. 75 Lac/Annum	



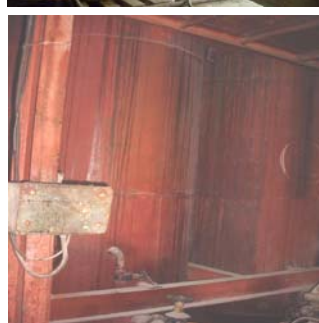
Use of FRP blades in 19nos. man Coolers.

	Before	After
Type of blade	Metallic	FRP
Elect. cons. (LKwh)	1.09	0.95
Investment	Rs. 2.7 Lac/Annum	
Savings	Rs.0.44 Lac/Annum	



Installation of ON-OFF Timer control system for Silica dextrine tank for reduction of compressed air consumption.

	Before	After
Compressed air cons. (LNm ³ /annum)	5.84	0.584
Type of agitation	By continuous blowing of compressed air	By intermittant blowing of compressed air
Elect. cons. (LKwh)	1	0.1
Investment	Rs. 1.0 Lac	
Savings	Rs.2.7 Lac/Annum	



Elimination of Compressed air usage for bearing cooling in Dolomite Tunnel Kiln.

	Before	After
Compressed air cons. (LNm ³ /annum)	23.7	Nil
Fan Location	Kiln roof top	Shifted from roof to a cooler place
Bearing temp	300	80
Elect. cons. (LKwh)	2.74	Nil
Investment	Rs. 10.0 Lac	
Savings	Rs. 9.47 Lac/Annum	



Replacement of inefficient fan by efficient fan in Fire Bricks Tunnel Kiln No-2

	Before	After
Type of fan	Centrifugal forward	Centrifugal backward
Elect. cons. (Kwh/hr)	9.3	8.1
Investment	Rs.0.4 Lac/Annum	
Savings	Rs.0.36 Lac/Annum	



Reduction of Specific energy consumption of High Temperature Tunnel Kiln by improving the operational efficiency.

	Before	After
Productivity (MT/Day)	34	38
Type of fuel	F.oil + P.gas	F.oil
Temp (^o C)	1580 - 1730	1580 - 1730
Sp.Energy cons. (Kcal/Kg)	1484	1097
Investment	Rs.0.4 Lac/Annum	
Savings	Rs.19.62 Lac/Annum	



Productivity enhancement of Fire Bricks Tunnel Kiln from 70MT to 90MT/day by changing the setting pattern.

	Before	After
Productivity/day (MT)	70	90
Type of fuel	Furnace Oil + Producer gas	Furnace Oil + Producer gas
Temp (^o C)	1480	1480
Sp.Energy cons. (Kcal/Kg)	1433	1345
Car pushing type	Continuous	Gap
Investment	Nil	
Savings	Rs. 36 Lac/annum	



Reduction of Specific energy consumption of Gas Ring Kiln by increasing the capacity utilisation.

	Before	After
Productivity (MT/annum)	4556	12174
Type of fuel	Producer gas (Coal)	Producer gas (Coal)
Sp.Energy cons. (Kcal/Kg)	5650	5485
Investment	Nil	
Savings	Rs.7.49 Lac/Annum	

(v) Energy Conservation Plans and Targets

In pursuit of meeting its energy objectives, TRL has set up an ENCON cell which is working according to the jobs decided in the ENCON meeting (Monthly meeting). A few examples of plans and targets are shown below.

Plans & Targets

Sl.No	Name of the project	Investment Rs. Lac	Savings / Annum Rs. Lac	Target
1	Thermal efficiency improvement & use of low pressure compressed air for Shaft Kilns.	10	6	2005-06
2	Use of flue gas from Shuttle Kiln in Tunnel Dryer (Silica)	8	6	2005-06
3	Use of flue gas from High Temperature Tunnel Kiln in Tempering Kiln (Basic)	5	3	2005-06
4	Replacement of Low efficiency pump by High efficiency pump.	5	8	2005-06
5	Replacement of Old inefficient filters by High efficiency filter.	70	30	2005-06
6	Automation of High Temperature Tunnel Kiln	150	50	2005-06
7	Productivity enhancement of Fire Bricks Tunnel Kilns from 90MT to 110MT/day by removal of binder birks for car setting.	--	5	2005-06
6	Use of Steam heating replacing Electrical heating.	130	65	2006-07
7	Waste heat recuperation from Rotary Kiln & use it for power generation.	450	200	2007-08

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and it works towards meeting these commitments. TRL is in the process of implementation of ISO 14001. TRL's endeavour to continuously improve its environmental performance has been suitably recognised in the past by different agencies. Some of the Environment awards won by TRL is given below. **(1)** Govt. of Orissa declared TRL as the 'Best Environment Management Company' for the year 1997 **(2)** Golden peacock Environment Management Award for 2002 **(3)** Greentech Environment Excellence Award for 2003-04 **(4)** TERI Corporate Environmental Awards for 2001-02. Similarly on the front of Safety, the Safety Engineering Dept. continuously strive to ensure that the plant remains accident free by regularly training the employees, displaying posters, conducting surveys and providing various Personal Protective equipment etc. The company has also declared a comprehensive Safety & Occupational Policy. Like in Environment Protection, the company has received a no. of prestigious safety awards in state & national levels. A few important ones include 'Best Occupational Health Care', 'Lowest Accident frequency Rate', 'Best Safety Officer, award etc. given by the state government.