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TODAYS TOPICS

- ENERGY EFFICIENCY
- COAL FURNACES
- GAS FURNACES

WHAT IS ENERGY EFFICIENCY

- Energy efficiency means to produce more with less energy or with the use of same energy produce more with minimum usage of resources which can improve our productivity and saves time and money.
- Our today's main aim is to compare coal furnace and gas furnace and understand why gas furnaces are more efficient.

COAL FURNACES



ADVANTAGES OF COAL FURNACE

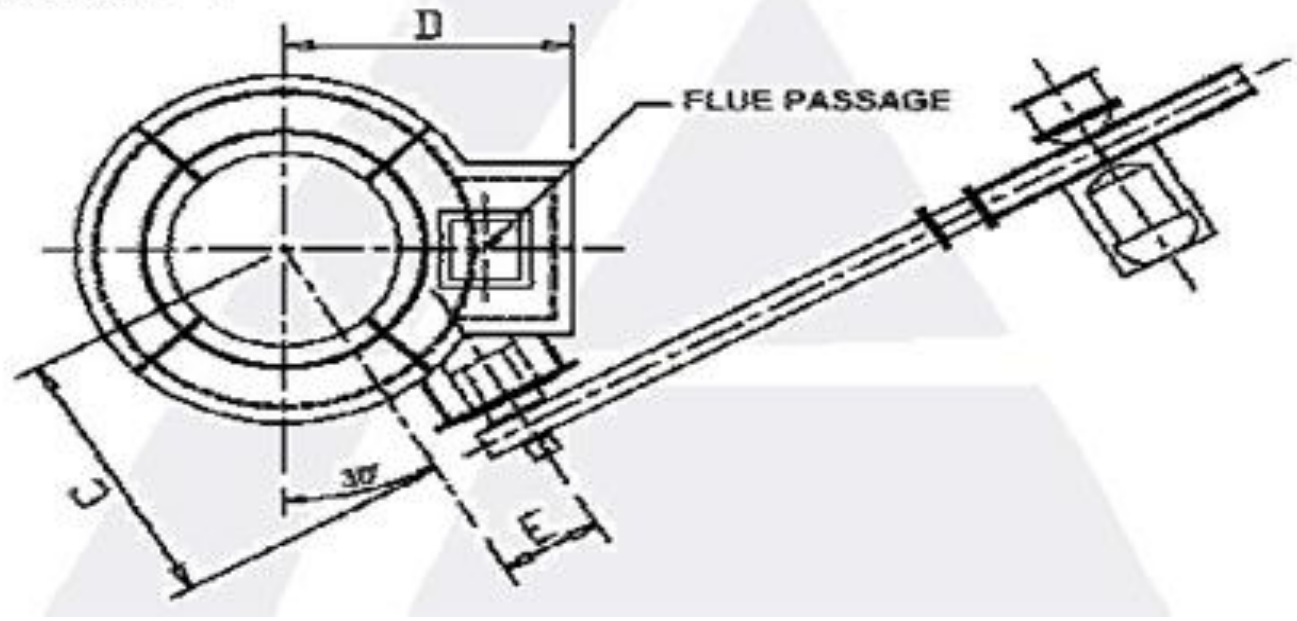
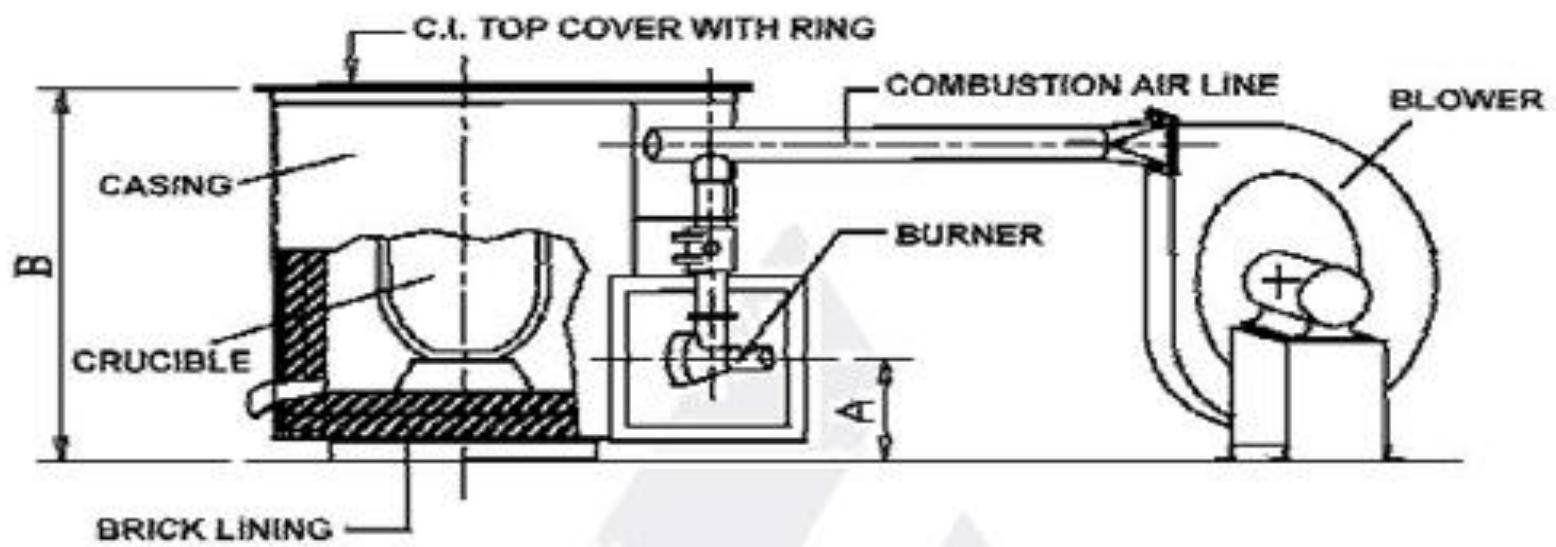
- Very old and proven technology
- Cost effective most of the time
- Man power and labor easily available
- Less skills are required
- Most of the time the calorific value for coal from the similar source remains the same
- Easy availability of coal

GAS FURNACE pit type



Tilting furnace



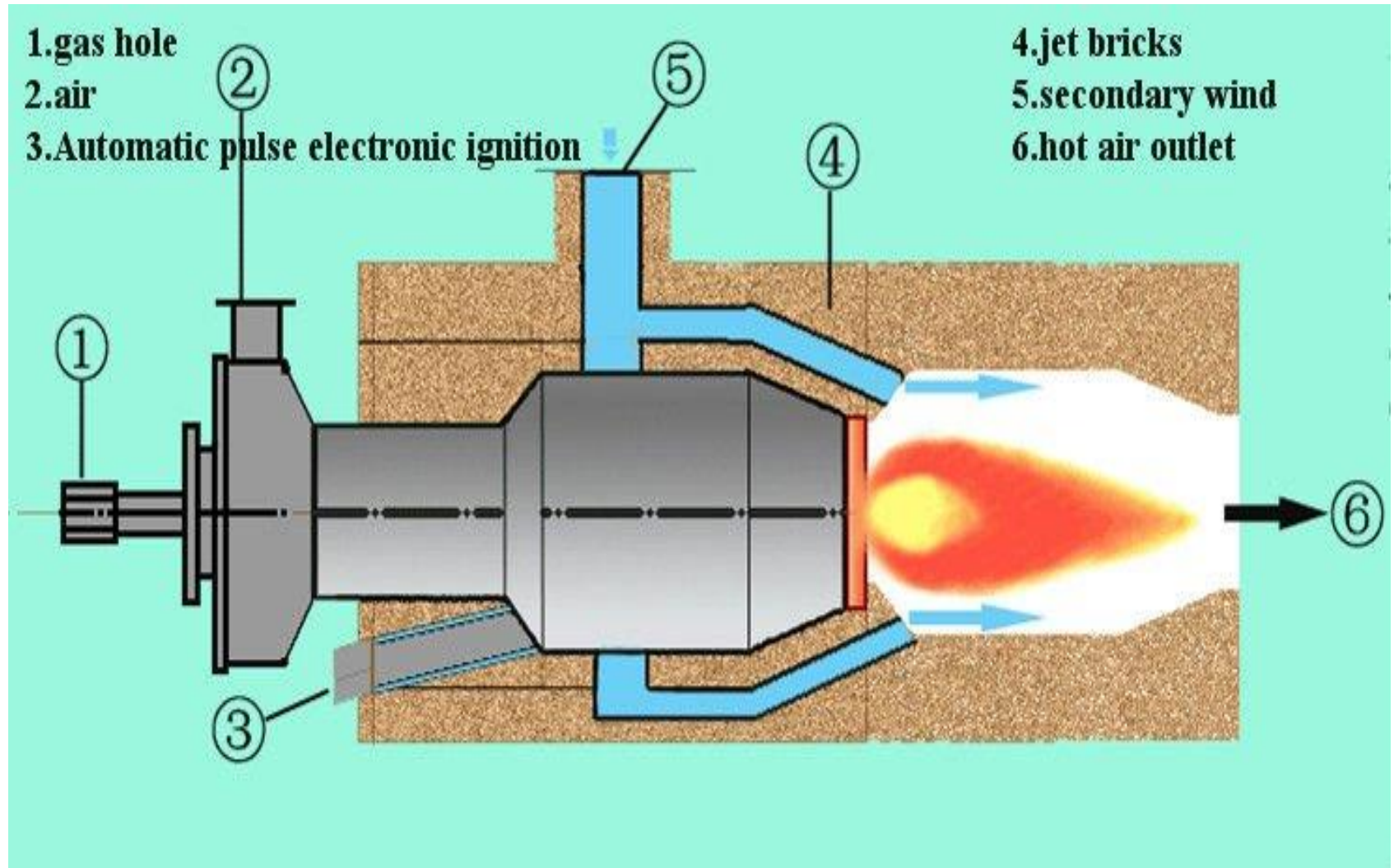


COMPONENTS OF GAS FURNACE

- Main Shell
- Insulation
- Crucible
- Burner Mounting Arrangement
- Top Cover
- Burner
- Blower
- PRV
- Limiting Orifice Valve
- Thermocouple
- Control Panel
- Hydraulic Cylinders for tilting furnace
- Hydraulic Power Pack
- Set of valves for tilting furnace
- Hose pipe for gas
- Pipe Line between blower and burner
- Control vales for air



BURNER GAS FIRED



GAS BURNER



CRUCIBLE SILICON CARBIDE



COMPARISION OF COAL FURNACE AND GAS FURNACE

Sr No.	Details	Coal Furnace	Gas Furnace
01	Calorific Value of fuel	6500 Kcal/kgc	8500 Kcal / kg c
02	Fuel Combustion	Partial	Complete
03	Air / fuel ratio control	No	Yes
04	Operation	Laborious	Easy
05	Working Environment	Very Dusty	Very Clean
06	Pollution	Very High	Very Leass
07	Manitenance	High	Very Less
08	Operation Cost	High	Low
09	Radiation Losses	High	Low
10	Time for first melt	3 to 4 hrs	2 to 2.5 hrs
11	Furnace efficiency	12 to 20%	35 to 45%
12	Calorific value difference		1.315 time higher
13	Consumption of fuel / ton	135 Kg	102 Nm3

COST – COAL FURNACE

- With present experience it is found that the coal consumption to produce 1 MT of brass by coal furnace is about 135 Kg
- So With the present rate of coal as 35.00 INR per Kg
- The cost will be $135 \times 35 = 4725.00$ INR

GAS CONSUMPTION CALCULATION

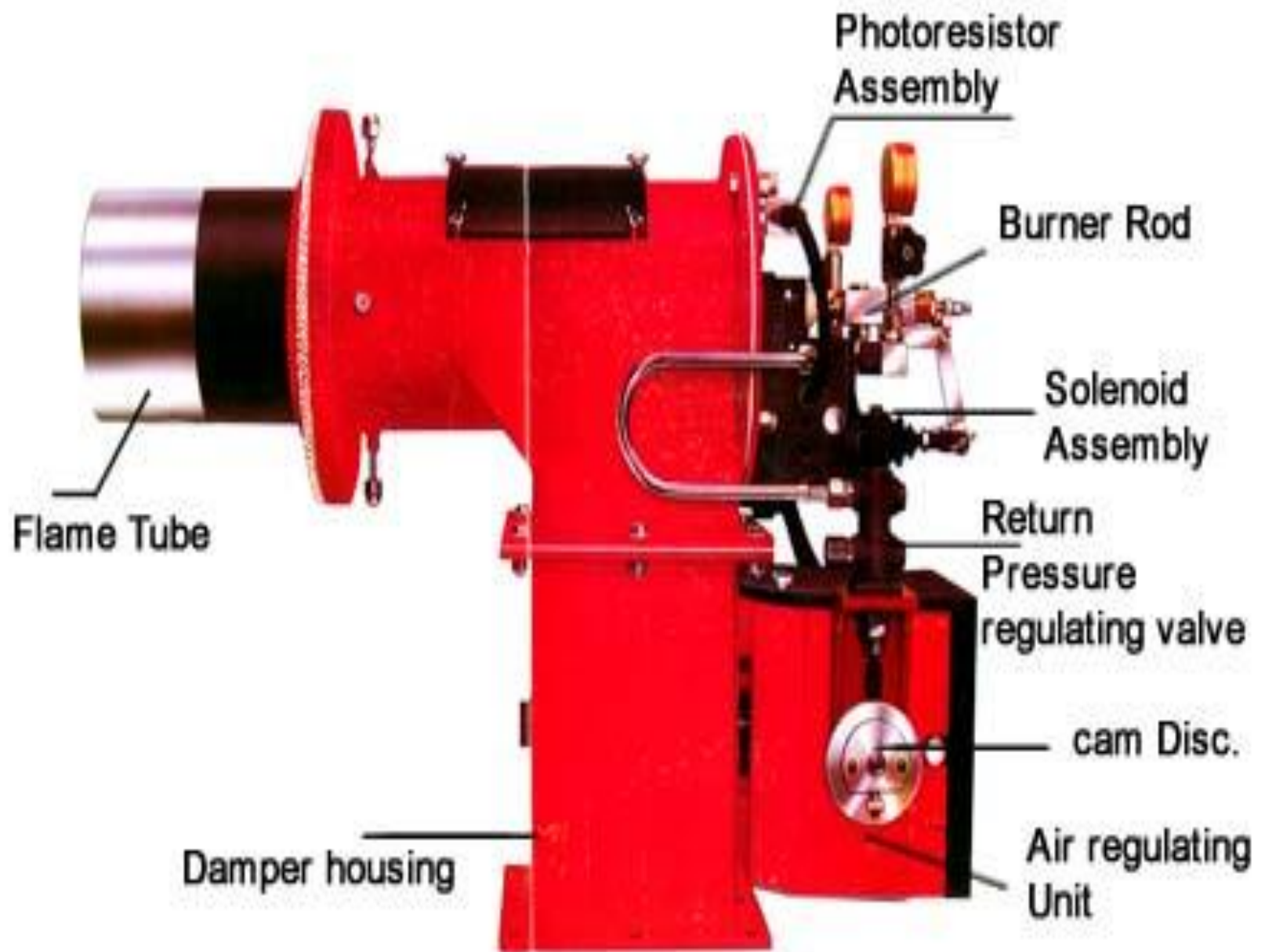
- Theoretically the calorific value of gas (8550 Kcal / Kg) is 1.315 times higher than the calorific value of coal (6500 Kcal / Kg)
- 135 Kg of coal will produce energy of $135 \times 6500 = 877500$ Kcal
- To produce 877500 Kcal gas required will be $877500 / 8550 = 102.6$ Nm³ of gas required
- Considering gas prices of 35 INR per m³
- $102.6 \times 35 = 3591.00$ INR

SAVINGS

- So savings per ton $3591 - 4725 = 1134.00$ INR
- Power cost is not considered as blower is required in either furnace for combustion air.
- With automatic burners there is certainly saving of power when the burner gets switched off on achieving the temperature.

PAY BACK PERIOD

- Let say for example the gas fired melting furnace cost is 3.5 lacs
- Now daily production 1200 Kg of brass
- So total cost of production with coal furnace 162 Kg coal X 35 Rs. = 5670.00
- For gas furnace for 1200 Kg production gas consumption 124 m³ X 35 = 4340.00
- Difference 5670 – 4340=1330.00 INR
- Working days in a month 25, so total saving in a month = 1330 X 25 = 33250.00 INR
- Payback period = 350000 / 33250 = 10 .5 Months



CONTROL PANEL



PIT FURNACE 350 KG BRASS





Sr No.	Details	Before	Now	Remarks
01	Batch Weight	300Kg	350 Kg	50 Kg Plus
02	No of batchess per day	02	02	100 Kg more
03	Time for first melt	4 hours	2.5 – 3 hrs	1 hour saving
04	No of labor	07	04	03 labor less
05	Coal Consp. Per day	175 Kg	135 m3	
06	Earlier cost	175 x 35 = 6125	135 x 35 = 4725	1400 Rs saving

THANK YOU