

DOMESTIC GAS STOVE BURNER – OLD & NEW – A CASE STUDY

FOCUS AREA – The domestic LPG gas burner head in the stove can be treated as a consumable and replacing the burner head from old to new, the potential for LPG saving is huge by this specific quick exercise. This is worth trying now and the result will be obtained instantaneously. This can be an instant shot in the arm of LPG savings campaign conducted nationally at the time of LPG supply demand crisis.

CASE STUDY – BRIEF DETAILS:-

- The burner head in the existing three year old branded gas stove in kitchen was replaced by a new burner head and testing was done. The old burner head was taking about average 20 % more time to boil 2 liters of water compared to the new burner head.

PICTURES OF OLD BURNER HEAD



BACKGROUND OF CASE STUDY:-

- The 3 burner gas stove was bought in April 2006 from one of the leading brands for Rs.3300/-. The spec shows gas consumption in the large burner is 221 grams / hr i.e.2412 Kcal /hr. The gas stove is being used by a family of four and spread over two years our average time of refill of gas cylinder is 47 days. The family is aware of economical usage of LPG in gas stove and good kitchen practices are followed.
- Recently, it was observed that when burning, the gas color was blue and the burning was from burner holes and burning slightly from the gap between the top burner head and bottom cup. Hence it was decided to replace the burner head only and the burner bottom cup assembly was retained as such.
- On Lens viewing the old burner, the holes on the top of burner head remain the same hole size, but at the inside of burner head, the holes are reduced in size and the soot protruding at each burner inside hole. Also this burner lost its brass color and looked black. The soot at the inside holes of burner does not allow free flow of gas thro the holes at entry but this is not happening in the new burner head.
- When flame was ON, flame was seen from burner holes & a slight flame was seen between the old burner head and bottom cup. But when the new burner head was put on the old bottom cup and

tried, the flame was very slightly seen thro the gap and less than that seen at the old burner head. In spite of the above condition, only blue flame was seen all along with the old burner head.

PICTURES OF NEW BURNER HEAD



DETAILS OF CASE STUDY& OBSERVATIONS:-

- Exactly 2 liters of Siruvani river water (the water is good) was taken for each study of the old and new burner heads and heated the water from 24°C to 84 °C to boiling position and readings taken in seconds. The study was done on the same vessel, a Sauce pan of bottom width 9 inches. For both the burners, the burner knob was kept at maximum burning position - vertical line. It was observed that at the max burner position, flame was at the bottom only and not at the sides of vessel.
- MECO make non contact laser type infra red thermal gun was used to take water temperature readings inside the vessel by pointing at a fixed point into the water in the vessel. The top lid of the vessel was not closed and it was kept open during the study. The outside ambient temp was 26°C and initial water temperature in vessel was 24* C. While heating with both the burners, the test was started with cold state of burner only. Infra red gun thermal measurement though inaccurate due to emissivity, but still the repeatability was maintained there in all the above readings.

TABLE – HEATING TEMP VS TIME OF OLD & NEW BURNER:-

Sl. no.	Heated Water temperature *C	Heating time with old burner – sec.	Heating time with New burner – sec.	Less time taken in new burner in %
1	24	00	00	0
2	34	70	60	14
3	44	200	170	15
4	54	310	270	13
5	64	440	380	14
6	74	590	500	15
7	79	670	550	18
8	84	740	580	22
9	Boiling	780	600	23
	60* C range			Band :-16 – 23 %

- The new burner head took 16 to 23 % average less time to heat up 2 liters of water from 24 to 84 °C and further to boiling condition. Here it is inferentially assumed that reduction in heating time is also an indicator of LPG savings. Since no other component is changed in the stove, it is assumed

the other parameters as neutral to both the burner heads and hence say around 20 % reduction in heating time with this new burner head is directly co-related to 20 % LPG savings.

- This case study looks like an isolated case of saving. This much saving may be possible. The exercise can be done in many brands of stoves with ordinary brass burners at the user kitchens and the people can share their views. Even if we achieve 10 % savings of LPG on an average after replacing the burner head, it is still worth an exercise to think of now immediately to act. This observation is commonly seen by many and it can happen to anyone after few years of usage of the gas stove.

DETAILS OF TECHNO ECONOMICS:-

- The cost of the new burner head locally available is Rs.50/- only. The cost of subsidized domestic cylinder refill is Rs.320/- here locally. Assuming we are getting an average around 16 % savings only as in the minimum case study, Rs.51 /- is the value, the payback is within a month for a consumer who does monthly refill of LPG cylinder. This is good savings to consumer, and it is easy to convince him to change only this burner head to visualize the LPG savings. Take the case of commercial LPG consumer and because of LPG costing of more than Rs.1080/-, he can replace the burner immediately now to achieve simple pay back in few days only.
- Taking into account the national energy security considerations, the change from old to new burner head brings in this case study, minimum of 16 % of 221 grams /hr consumption is 35 grams /hour and considering millions of households using LPG gas daily, this may be the one of the focus area for national energy conservation & it can give thrust to consumer to adopt this one time exercise to achieve big savings. This is available as commodity and can be easily replaced by any common man in a day.

THE EXERCISE IS WORTH IMPLEMENTING TODAY:-

- The mind set in the user is that no change need to be done in the stove as long as it works ok and flame color is blue. The same mind set needs to be changed that burner is a consumable compared to the purchase of stove which is capital expenditure. Based on condition monitoring of old burner head, the same can be replaced with a new burner head and used alternatively & efficiently.
- Similarly, at the time of winter & Electricity crisis, we face the problem of higher heating time with hard water in our storage water heater. First, buy today one Spare Heating element for just Rs.200/- and swap it to the existing element and do this exercise twice a year and you will find 10 % savings in heating in time & power. When you buy storage water heater, buy a spare heating element too for longer & efficient usage by using alternatively once in six months over the life period of storage water heater.
- As an analogy, for any form of energy transfer, the transmission loss is less and the distribution loss is always more. Taking EB utility for instance, transmission loss is just less than quarter of distribution loss in the national T & D survey of break up of losses. This can be seen in heat energy transfer here too.
- The reason that we have to focus this area specifically is that, gas from cylinder is transmitted up to the nozzle behind the LPG knob and the transmission loss is less. But the distribution loss is more as it starts only at the 140 holes at the burner head, where in premixed LPG & air to flame up with more air as it needs 25 times the volume of air. There is ample scope for the consumer to save easily in this area and energy experts to enlighten us the Indian Public more in this exercise.

CONCLUSION:-

- Today the house wife can buy a spare burner head for Rs.50/- only and swap this with her existing burner every month depending on usage. Now she has the time & effort later, to clean the removed burner leisurely not in a hurry, thoroughly and effectively. She can later dip & rinse it for an hour in the solvent and with nylon brush, clean the holes & scales with suitable detergent etc. and keep it ready to reuse. This can give savings in her LPG up to 10 % & more and her cooking time is less now!
- So please buy a spare burner head for your existing stove today and experience the LPG savings. And when you have achieved less time in cooking & LPG savings, kindly pass on this message to others for their benefit & it is our National priority too. When you are buying a new stove, then and there itself please buy a spare burner head for longer & efficient usage by using alternatively monthly over the gas stove life period.
 - **S.ASHOK, BEE certified Energy Auditor/Coimbatore/ Mail - Call - 94437 20220;**
 - **Pls. visit site www.energymeasuretosave.com for practical energy saving tips.**

Sharing knowledge to SAVE OUR ENERGY !

Conserving Energy is OUR Collective Responsibility, for a Better Tomorrow!