

## REVIEW RESPONSE LETTER [33]

Dear Reviewers,

Thank you for reading our manuscript and reviewing it, which will help us improve it to a better scientific level. We revised our manuscript, and quite a lot of changes have taken place. So we have sent the revised manuscript, and a version containing all the changes to be visible.

At the following, the points mentioned by the reviewers will be discussed:

Reviewer 1:

**“The explanation that any other designs were ignored because of their complexity is unclear and insufficient, and should be extended (i.e.: why they were not considered?)”**

The introduction was edited to give an explanation on the reason of not investigating other designs. We mentioned that this is the design we consider, however other designs may be possible and even better! But they are not the subject of this investigation. Our objective was to give an explanation on the sources of the energy loss in this case, and we have done it.

**“The experimental part is very extensive, but not described enough.”**

We agree, so some explanations were added.

**“The weakest aspect of the paper is its lack of discussion on some of the results obtained. Explain what conclusions do you draw from the results (figures 6, 7, 8, 11).”**

The conclusion was written all over again, and some other parts were also added to give more discussion about the results.

**“Also, the effect of a number of parameters (type of balloon, its shape etc.) was neglected.”**

They were not neglected; this investigation was made in one specific condition. Investigation of the effect of all the parameters has not been an objective of this manuscript.

**“Equations should be centered in line.”**

Corrected.

**“First picture is unclear.”**

Changed.

**“The language is sometimes unclear or unspecific. In particular: “released energy its self”, “spent to fill”. You should write shorter sentences, and try to use non-hermetic phrases (“emptying diagrams”).”**

It was tried to be improved.

**“The authors use phrases that can be put in every solution to every task from the IYPT (“the physical experiments were also in charge to approve the theoretical assumptions). Be more specific.”**

We do not quite agree on this point. We still believe these classes of sentences are required, and indeed more specific detail has been provided after in the manuscript.

**“Figure 6: you are fitting a logarithmic function to your data. A linear fit to the same data would deliver a comparably high precision. Why did you choose the logarithmic fit?”**

The explanation was added to the manuscript. We want to use un-experimented points in the specific range that was experimented (and not out of this range). Thus the only thing that matters is how

accurately the interpolated function can predict these points. Since the logarithmic function had the highest regression, we used it.

**“What are the sources for the secondary peaks in figure 3 (top curve)?”**

Errors. The explanation is now added to the text:

*While measuring the Pressure, there were some errors caused by the dynamic motion of the water in the tube, particularly during the inflation process, in which the discharge could not be smaller than a specific amount. So at the beginning of the inflation process, where there is a maximum point for the pressure, the dynamic behaviour of the water would cause some oscillations in the water level; as visible in figure 3. However this error does not seem to be crucial since it is the integration of the P-V diagram which will be used later, and this oscillation does not have a significant effect.*

**“What is the relative velocity of the jet? What do you understand by “jet”?”**

Corrected in the text to clarify.

**“Add references, especially to the topics mentioned above in ”references” part of review.”**

References were added, and addressed in the text.

**“chapter (five sentences approx.) with a discussion of limitations of your solution (the description of limitations is scattered through the article)”**

Some explanation was added to the conclusion, describing the limitations.

**“sentence 1, paragraph 4 of introduction (“after when car is stopped...”) : The sentence is unclear. The reviewer understands the intention of using the energy conservation principle, but the description is not clear and should be changed or clarified.”**

Yes it was unclear; more explanation was added to clarify.

**“Describe your system and design. You use phrases “z-axis” without any description.”**

Figures were corrected to help.

**“Write a definition of efficiency that you use and clarify how the definition is understood.”**

a definition was added as the following:

We define efficiency as the ratio of the work done on the car by the motivational force to the energy needed to fill the balloon.

**“The manuscript is recommended for publication only after essential revisions.”**

Thank you, we hope this revision has been enough.

**Reviewer 2:**

**“Good structure. Very well presented. Please add references to the paper. I recommend this paper.”**

Thank you, references were added.

Best Regards,  
Parham Zendehtdel Nobari  
Reza Montazeri Namin  
Hossein Azizinaghsh