RESPONSE TO THE REVIEWER’S COMMENTS

The present paper mainly covers the Airworthiness Certification and Production of an important, but a standard Aero Material used for many an applications. We fully agree with all the three Reviewers that the scientific content is low and the reviewers are right in their analysis that contributions and experimentations are inadequate. Unfortunately, as the members of certification, it is not appropriate for us to report or dwell at length on the science and development of the material. Keeping the nature of the paper and the technical contributions in the view, we tried to improve the scientific contents of the manuscript to the best of our ability and at the same time without losing the main emphasis on Airworthiness Certification and Production within the scope of investigation. Please find our responses to the reviewer comments, as below:

**Reviewer – A**

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| Sl.No | Comment | Response |
| 1. | Content: The manuscript suffers from establishing scientific correlation for the observed properties or parameters. For example, it has been mentioned in section 4.2, that the grain size of the produced alloy is higher than that of the imported alloy. However, the effect of this (higher grain size) in the properties of the alloy has not been interpreted. Similarly, the scientific justification for the obtained better mechanical properties of the alloy needs to be provided. | The imported and indigenously produced alloys have marginal differences in their grain size. This has resulted in similar properties in the two alloys. This has been clarified in the text at page 6 and at paragraph 1. |
| 2. | Figures: In Figure 2, the micron marker should be provided inside the micrograph and not beside the margin. | Suggestion incorporated. |
| 3. | Additional Comments for Author(s):   1. Since, this is a peer-reviewed journal and not just an internal report document of an organisation, the write up should be made much more general. For instance, the mention of the customer and producer as ADA or MIDHANI should better be avoided. 2. For Forging and Rolling steps in section 2.2 and Table 1, the strain rate used for forging as well as the % reduction during rolling need to be mentioned. 3. In Table 5, since two more alloys have been used for comparison purpose, the producer of these alloys and any compositional changes if present in these two alloys compared to the studied alloy should be mentioned. | As suggested, all the modifications were made at appropriate places in the text of the manuscript by deleting the suggested references to ADA etc.    Text accordingly modified to incorporate these details. Please see the details in page 4, Paragraph 1.  We would like to clarify that all the three alloys used for comparison purpose are similar in their chemistry. That has been clarified in the text at page 7, Paragraph 1. |

**Reviewer B:**

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| Sl.No | Comment | Response |
| 1. | Content:   1. It is seen that 3 to 5 heats have been processed and evaluated for the purpose of type certification. In this context, it is not clear if the chemical composition given in Table 2 is for one of those heats are represents average picture for all heats. Clarity is also required with reference to the mechanical and magnetic property data included in the paper does the data pertain to one of the heats / batches or does it represent average picture ?      1. For publication in defence Science journal, the paper should have more science content. For example, the authors should comment on (a) why alpha value over 20-100o C in Table 3 is lower than specified minimum, (b) how higher cobalt level leads to higher level of magnetic properties (First bullet in Section 5). 2. Physical properties are generally not specified. Further there should be a range, if the property is specified. The authors may verify if 8.15g/cc for the density (Section 4.3) is indeed specified value as stated by them. | The data obtained on chemical composition, magnetic properties and mechanical properties are for all the five heats and the data reported in table correspond to average values. This has been clarified at page 5 and para 2 for chemical composition, page 7 and para 1 for magnetic properties and at page 8 and para 3 for mechanical properties.  Please see our general comments at the beginning of our responses regarding scientific content.   1. The co-efficient of thermal expansion in 20-100o C is marginally lower than specified value. Further, the inputs for specified value are taken from the literature, for comparison purpose. 2. Most of the alloying additions made to iron lower its saturation induction (BS). However, the addition of cobalt results in increased saturation induction. This has been well documented in the published literature. This has been clarified in the text at page 7, Para 1.   In general, aeronautical standards specify only a range of values when the physical properties are refered. Hence the data obtained from the present alloy are compared with typical values, reported in product specification. This has been incorporated in the text page 6, para 2 and in Table 3. |
| 2. | Figures:   1. Indication of size and shape of material at appropriate places in the flow chart given in fig. 1 would be in the fitness of things. 2. The last sentence in section 2.2 states that ultrasonic testing is carried out at different stages of forging and rolling processes. But flow sheet given in Fig. 1 shows ultrasonic testing at only one stage. The discrepancy to be taken care of. 3. It was stated in section 4.5 on page 8 (second sentence under the heading ‘Tensile properties’) that the specified values are given in Fig. 4. But I do not find them.   References: At second bullet under section 5 it reads “Vanadium and the rare earth …. Ductile structure.” Reference to be given   1. Additional Comments for Author(s): First sentence in the last para under section 5 is to be rewritten as “However, Neither the cold rolled strip nor the component manufactured from the strip possesses the required magnetic properties”. 2. The last column in Table 5 on page 7 – the correct spelling is Vaccumschmelze 3. It is seen that hydrogen, oxygen and nitrogen are the three gases that have been analyzed. So the word “Particularly” in the last but one line on page 4 may be dropped. 4. In the last but one sentence in section4.3 on page 6 one of the two ‘Specified’ words to be dropped. 5. The last sentence in section 4.5 “Such data comparison… with confidence “ should be shifted to the discussion section. | Incorporated as suggested.  The flow sheet in Fig-1 is modified in line with the text at section 2.2, as suggested by the reviewer.  Figure-4 is modified by incorporating the specified value at RT and the data at other two temperatures are for record only.( Please see page 8, para 3, lines 2 and 3; And, also Fig. 4)  Suggestion incorporated and the appropriate reference is cited.  (1-5): As suggested, all the corrections without exception are incorporated. |

**Reviewer C**:

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| Sl.No | Comment | Response |
| 1. | Novelty: Nothing new | Please see our comments and remarks at the beginning of this response. |
| 2. | Introduction: Not sufficient and lacks prior literature coverage | Suggestion incorporated. Please see text in page 2. |
| 3. | Content: Satisfactory | -- |
| 4. | Figures: Insufficient. | Figures 1, 2 and 4 are modified to include more data and also, make them more technically appropriate. |
| 5. | References: Not adequate | We agree. Now, the references are modified to include a basic one at Reference No. 5. |
| 6. | Additional Comments for Authors(s): The Fe-49Co-2V is a technologically important alloy used in many power generation applications including aeronautics and aerospace. This alloy however is neither new nor novel and has been extensively investigated since 1960s. Apart from the commercial equivalents such as PERMANDUR 49 and VACUOFLUX 50 mentioned by the authors, M/S Carpenter also produces an equivalent alloy trade named Hiperco 50. With so much open literature and product & processing information available, I find the present work to be of extremely poor quality as a scientific article. The manuscript does a poor job of being either a detailed report or a through scientific investigation. Whether it is processing such as careful melting/ forging/heat treatment or a through magnetic characterisation such as complete hysteresis, core losses and so on are completely missing in detail. | Many thanks for this information, which we carefully note. We did our best to improve the quality of the manuscript (please see the comments on our limitations given in the beginning of this response) and improved the technical content, wherever it is possible. |