

POINTS TO LOOK AT IN THE FUTURE REVISION OF BIS GROSS ALPHA & GROSS BETA PROCEDURES

[IS 14194 (part 2) : 2022 & IS14194 (Part 1 : 2023)]

BIS has revised the Gross Beta [IS 14194 (part 1) : 2023] procedure during 2023 and improved in some of the aspects. However, it still had unacceptable errors in a national standard, like pressure half time (PHT). It could have been a Paralysis Time Unit (PTU) or any other like Paralysis unit (PU). Mentioning of G.M. detector or gas flow type detector is also not warranted as they are not unique for beta measurement. Moreover G.M. tube and Gas flow type are not being manufactured in India. It is more than enough to mention the desired background (<2 cpm, efficiency >25%) and any low background beta counter based on any suitable detector. It has some more minor contradictions which needs rectifications. I wish to mention here that recently, a Laboratory from Bangaluru was not recommended the gross beta parameter as they do not have G.M. detector/Gas Flow based counting system as per BIS standard.

Now, the BIS may take up revision of Gross Alpha procedure in due course and I wish to mention following points which need to be incorporated or addressed. If not being considered for revision in near future, it is high time to undertake the revision at the earliest.

1. Efficiency of plated Pu-239 source : It should be replaced as plated Pu-239 or Am-241 source or any other mixed Pu-Am-Cm source. The activity should be preferably < 100 Bq (Not mandatory). Efficiency for this plated source should be > 25%.
2. MDA of 8.9 Bq & Sensitivity capable of detection below 0.1 Bq/l : This part should be refined by giving the upper boundary for background in terms of less than 10 counts per hour or 100 minutes. The MDA concentration can be mentioned as half of the permissible limit of 0.1 Bq/l for gross alpha in water. While giving this, conditions such as the MDA formula, volume of sample for both TDS < 100 pm and TDS >100ppm. MDA formula must be given at least as a note or as general formula as different accredited labs in India use different formulae (3 or 3.29 or 4.65 times the times error of background). The MDA formula of 4.65 times the error of background counts and other parameters should be mentioned clearly.
3. Counting time for background can be same for sample and background. The time of counting may be mentioned as range keeping the achievable MDA in view.
4. The standard should mention the reduction in efficiency when spread source is used as like the sample. One can not use the plated source efficiency of about 25% (near point or < 5 mm dia source) for samples which are spread over 20 mm diameter planchet. It has been observed that the efficiency reduces to < 10% or even less for spread source even for a sample of TDS of 50 ppm.
5. The point of variation in MDA when method 1 or 2 are used based on TDS and the difficulties in achieving the desired MDAs should be thoroughly looked into.

6. As like beta procedure (2023 version), absorption curve should be included for alpha.
7. Finally, it should be thoroughly checked for errors before the release as it is a national standard.
8. Inclusion of all the above points is essential as during audits for ISO 17025 accreditation, some of the auditors find it very easy to say that the standard is not being followed and may decline the parameter for recommendation.
9. It is also desirable to circulate the revised draft SOP to the accredited laboratories in India for their comments before releasing for use.
10. BIS standard operating procedure for gamma emitters measurement in food using NaI(Tl) detector based gamma spectrometer may also be taken up in the near future.
