

IEEE Standards Interpretation for IEEE Std 841™-1994 IEEE Standard for the Petroleum and Chemical Industry-Severe Duty Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors-Up to and Including 500 hp

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Interpretation Request #1

Topic: Unfiltered and Filtered Vibration **Relevant Clause:** Sub-clause 6.9, and Paragraphs a) and b).

1) Definitions needed for the terms unfiltered and filtered as they relate to subclause 6.9. 2) Referring to paragraph a), "Motor unfiltered vibration at rated voltage and frequency shall not exceed 0.08 in/s peak velocity for 2-, 4-, and 6-pole machines . . ." Does the 0.08 in/s apply to one axis at a time or is it a combination or all axis?

Is 0.08 in/s the total of all energy on one axis from 0 to n MHz while it is running at rated frequency and voltage?

3) Referring to paragraph b),

Does the 0.05 in/s apply to one axis at a time or is it a combination of all axis?

Is 0.05 in/s the total of all energy on one axis from 0 to n MHz while it is running at twice its' rated frequency and voltage?

Interpretation Response #1

1) Unfiltered means the overall Fourier sum of all the frequencies that the vibration instrument responds to. Filtered means the vibration instrument is tuned to a specific narrow band of frequency components. Frequency components outside the band are not

measured.

2) The unfiltered vibration (at rated voltage and frequency) shall not exceed 0.08 in/sec peak velocity for 2-, 4-, or 6-pole machines (0.06 in/s for 6 pole) when measured in any axis on the bearing housing. The limits for each axis are for that axis only.

3) The filtered vibration (at rated voltage and frequency) at both twice the speed ($2n$) and twice the frequency ($2f$) must not exceed 0.05 in/s peak velocity. These are two independent measurements at different frequencies. The limit must be met at both frequencies when measured in any axis on the bearing housing.

Interpretation Request #2

Topic: Sealed Bearings.

IEEE Std 841-1994 specifies regreasable bearings. What is the advantage, and is there evidence that it contributes significantly to motor life?

Interpretation Response #2

Some of the reasons why IEEE Std 841 specifies regreasable bearings are:

1. Sealed bearings have a finite life. When that life is expended, the bearing fails unexpectedly. There is no way to extend the life without taking the motor out of service and replacing the bearing. Programmed replacement of all sealed motor bearings at a time period less than the start of early bearing failures is generally required if you want to minimize production loss due to sealed bearing failure.
2. The life of a regreasable bearing can be increased significantly by proper relubrication. One of the main enemies of bearings is grease contamination. IEEE Std 841 specification requires inner bearing caps and seals that significantly reduce the grease contamination problem. Also, if a motor bearing starts to become noisy, many times relubrication will allow the bearing to continue operating until a convenient time can be found to take the motor out of service without loss of production.
3. The amount of grease contained in the chamber surrounding the regreasable bearing is significantly more than is contained in a sealed bearing. As a result, if the grease is not contaminated, generally the life of the bearing is longer than for a sealed bearing.
4. Sealed bearings are generally recommended for smaller motors and would not normally be recommended for the larger frame sizes.