

EIA STANDARD

EIA RS-405

*Recommended Test Method For
Flutter Measurement of
Instrumentation Magnetic
Tape Recorder/Reproducers*

RS-405



December 1972

Engineering Department

ELECTRONIC INDUSTRIES ASSOCIATION

NOTICE

EIA engineering standards are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such standards shall not in any respect preclude any member or non-member of EIA from manufacturing or selling products not conforming to such standards, nor shall the existence of such standards preclude their voluntary use by those other than EIA members whether the standard is to be used either domestically or internationally.

Recommended standards are adopted by EIA without regard to whether or not their adoption may involve patents on articles, materials, or processes. By such action, EIA does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the recommended standards.

Published by

ELECTRONIC INDUSTRIES ASSOCIATION

Engineering Department

2001 Eye Street, N. W., Washington, D. C. 20006

©Electronic Industries Association 1972

All rights reserved

Price \$3.00

Printed in U.S.A.



Documents

Document Sharing Hub

RECOMMENDED TEST METHOD FOR FLUTTER MEASUREMENT OF INSTRUMENTATION MAGNETIC TAPE RECORDER/REPRODUCERS

(From Standards Proposal No. 1123, formulated under the cognizance of EIA Working Group P-8.7 on Instrumentation Magnetic Recording Components & Equipment.)

1. SCOPE

This standard covers acceptable instrumentation and procedures for the measurement of flutter in instrumentation magnetic recording equipment. The purpose of this standard is to promote interchangeability and to eliminate misunderstandings between manufacturers and users by specifying standardized and reproducible flutter measurement techniques. In addition, it is intended to help the user ascertain the suitability of magnetic recording equipment for his requirements.

2. CONTENT

This standard includes methods for operational tests and acceptance tests. In addition, recommendations and guidelines are included for performing application information tests.

For purposes of this standard these three types of tests are defined as follows:

2.1 Acceptance Tests

Detailed tests to verify that the equipment meets specification.

2.2 Operational Tests

Basic tests suitable for field use to verify that equipment performance is within required limits.

2.3 Application Information Tests

Tests intended to determine specialized performance characteristics. Information from these tests is intended for systems analysis and design only. (See Appendix A.)

3. METHOD OF MEASUREMENT

Since instantaneous variations between the record and reproduce tape speeds result in modulation of the frequency of a recorded carrier, the basic method used to measure flutter is to determine the amount of frequency modulation caused by the record/reproduce process. Therefore, to measure flutter a precision reference carrier is recorded and subsequently reproduced. The reproduced signal is applied to an fm discriminator. The output of the discriminator is a continuous electrical signal proportional to the variation between the record and reproduce speeds.



4. EQUIPMENT REQUIRED TO MEASURE FLUTTER

The following are listed as separate components in order to indicate the required functions. It is recognized that these functions may be combined in one, or in several, instruments in actual practice.

4.1 Recorder/Reproducer

The recorder/reproducer to be measured shall be equipped with suitable record/reproduce amplifiers.

4.2 Precision Signal Generator

The generator must be capable of supplying a precise signal stable in amplitude and frequency and of the desired frequency and amplitude. A sine wave is preferred for recording with bias. The residual frequency-modulation must be negligible compared to the flutter amplitude anticipated.

4.3 Bandpass Filter, Carrier

A bandpass filter may be inserted in the system ahead of the discriminator to limit system noise. The response of this filter must be flat within 3.0 dB from $f_c - (af_c + f_f)$ to $f_c + (af_c + f_f)$; where f_c is the frequency of the reference carrier, f_f is the highest frequency flutter component to be measured, and a is the peak fractional flutter. If used, the filter response shall roll off at a rate of 18 dB per octave beyond the cut-off frequencies.

4.4 Frequency Discriminator

The discriminator must accept the reproduced reference carrier which has been modulated by flutter and produce an output signal proportional to the modulation. In general, 60 dB amplitude limiting must precede the frequency-sensitive portion of the discriminator in order to meet the dynamic range requirements of the system.

4.5 Bandpass Filter, Flutter

A bandpass filter follows the discriminator. Its purpose is to limit the frequency band of the flutter signal and to reject carrier frequency components. The filter response shall be flat within 3 dB from 0.5 Hz to the upper flutter frequency being measured and shall roll off at a rate of 18 dB per octave beyond the cut-off frequencies.

Flutter bandpass filter characteristics:

Tape Speed		Passband of the Flutter Bandpass Filter (Hz)	
cm/s	in/s		
2.38	15/16	0.5 to	156
4.76	1 7/8	0.5 to	313
9.52	3 3/4	0.5 to	625
19.05	7 1/2	0.5 to	1,250
38.1	15	0.5 to	2,500
76.2	30	0.5 to	5,000
152.4	60	0.5 to	10,000
304.8	120	0.5 to	10,000
609.6	240	0.5 to	10,000

