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JAPANESE INDUSTRIAL STANDARD

**Test methods for
vibration-damping property
in laminated damping steel
sheets of constrained type**

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Test methods for vibration-damping
property in laminated damping
steel sheets of constrained type

G 0602-1993

1. Scope This Japanese Industrial Standard specifies the test methods for vibration-damping property relating to bending vibration of a beam unfixed both ends and a cantilever of laminated damping steel sheets.

- Remarks
1. The laminated damping steel sheets mentioned in this Standard are the laminated damping steel sheets of constrained type of which a resin film is cladded between two steel sheets.
 2. For the damping material of other metallic sheets other than steel sheets, tests for the laminated damping steel sheets may be applied with mutatis mutandis.
 3. The vibration-damping property of laminated damping steel sheets shall be expressed by using loss factor.
 4. The following standards are cited in this Standard:
JIS B 0153 Glossary of terms used in mechanical vibration and shock
JIS H 7002 Glossary of terms used in damping materials
JIS Z 8106 Glossary of acoustical terms (general)

2. Definitions For the main terms used in this Standard, the definitions in JIS B 0153, JIS H 7002, and JIS Z 8106 apply, and the rest of the terms are as follows:

- (1) exciting force External force or input force applied to a test piece. F is used as a quantifier.
- (2) impulse hammer A hammer wherein a force gage is attached to its tip. Magnitude of exciting force can be regulated in accordance with the weight of the tip of the hammer and bringing-down speed.
Further, the exciting frequency range can be regulated by changing the material of the tip.
- (3) force gage A transducer which generates a voltage output in proportion to input force. A piezoelectric sensor is used.
- (4) non-contact displacement gage A transducer which generates output in proportion to its input displacement without being fixed to a test piece. There are a laser type, an electrostatic capacitance type, an eddy-current type, etc.
- (5) non-contact speedometer A transducer which generates output in proportion to its input speed without being fixed to a test piece. There are a laser type, an electromagnetic type, etc.

- (6) accelerometer A transducer which generates voltage output in proportion to input acceleration. There are a piezoelectric type, a strain gage sensor system, etc.
- (7) response displacement Displacement obtained by applying input to a test piece in the case of an impact exciting method, a steady exciting method, etc. X is used as a quantifier.
- (8) response speed Speed obtained by applying input to a test piece in the case of an impact exciting method, a steady exciting method, etc. V is used as a quantifier.
- (9) response acceleration Acceleration obtained by applying input to a test piece in the case of an impact exciting method, a steady exciting method, etc. A is used as a quantifier.
- (10) charge amplifier An amplifier which converts charge output of a piezoelectric type sensor to voltage output.
- (11) inertance A complex number ratio of acceleration (A) at a certain point in a mechanical system of simple harmonic motion to force (F) at the same point or a different point.

3. Classification of test methods The test methods shall be classified in accordance with the holding system of a test piece, the exciting method of a test piece, and the calculating method of a loss factor as given in Table 1.

Table 1. Classification of test methods

Holding system of a test piece		Exciting method of a test piece	
		Steady exciting method	Impact exciting method
One-end-fixing	Exciting	Electromagnetic exciting device	Hammer
	Holding	To be fixed to a vise	To be fixed to a vise
	Loss factor calculating method	Half-power bandwidth method	Vibration decay method
	Reference figure	Fig. 1	Fig. 4.
Center-supporting	Exciting	Electromagnetic exciting device	—
	Holding	To be equipped to an exciting device	
	Loss factor calculating method	Half-power bandwidth method	
	Reference figure	Fig. 2	