INTERNATIONAL STANDARD

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**AMENDMENT 1**
2007-11-15

# Plastics — Determination of dynamic mechanical properties —

## Part 9: Tensile vibration — Sonic-pulse propagation method

## AMENDMENT 1 Precision



*Plastiques — Détermination des propriétés mécaniques dynamiques —*



*Partie 9: Vibration en traction — Méthode de propagation de signaux acoustiques*

*AMENDEMENT 1: Fiabilité*

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## Foreword

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Amendment 1 to ISO 6721-9:1997 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

# Plastics — Determination of dynamic mechanical properties —

## Part 9:
## Tensile vibration — Sonic-pulse propagation method

## AMENDMENT 1: Precision

*Page 5, Clause 11*

Replace the text of this clause by the following text:

> The precision of this test method is not known because interlaboratory data are not available due to the difficulty in finding laboratories with test equipment capable of operating at the same frequency. It should be recognized that the properties of thermoplastics are time-dependent, and the pulse propagation time and hence the dynamic modulus depend closely on the frequency of the sonic pulse used. For information purposes, however, the within-laboratory standard deviation has been determined using data from one laboratory which tested four different materials (see Annex A).



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Add the following annex:

# Annex A
(informative)

# Precision

**A.1** For the reasons outlined in Clause 11, the precision of this method is not known. However, Table A.1 gives repeatability data based on testing performed on identical test pieces in the same laboratory under the same conditions by the same operator using the same equipment within short intervals of time. It can be seen that a coefficient of variation of up to about 3 % can be expected within a particular laboratory.

**Table A.1 — Repeatability data for tensile storage modulus $E'$ measured at 10 kHz**

| Material | Average value of $E'$ GPa | Standard deviation | Coefficient of variation % |
|---|---|---|---|
| PE-UHMW | 1,762 | 0,009 3 | 0,53 |
| Polypropylene | 2,811 | 0,054 2 | 1,93 |
| Uniaxially stretched PP | 11,10 | 0,28 | 2,5 |
| PEEK | 4,232 | 0,032 8 | 0,77 |



**A.2** When this method is used with certain materials, consideration should be given to various factors that can lead to a decrease in the repeatability of the measured values. Such factors include the following:



a) poor contact between the specimen and the transducers, which may give rise to a low amplitude of the sonic pulse and associated errors in determining the pulse propagation time;

b) anisotropy in the properties of the material, caused by molecular orientation, which will give rise to a dependence of the pulse propagation time on direction in the specimen;

c) the presence of filler or reinforcement in the material such that the distribution or orientation of the filler or reinforcement affects the pulse propagation time.

Note that, since the properties of thermoplastics are time-dependent, the pulse propagation time and hence the dynamic modulus depend closely on the frequency of the sonic pulse used. It is therefore not possible to make accurate comparisons of results obtained using different frequencies.

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