



TECHNICAL SPECIFICATION



**Ultrasonics – Methods for the characterization of the ultrasonic properties
of materials**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 List of symbols	10
5 Overview	12
5.1 General principles.....	12
5.2 Sample preparation.....	12
5.2.1 Fluid samples	12
5.2.2 Solid samples	13
5.2.3 Sample geometry.....	13
5.2.4 Sample stabilization.....	13
5.3 Source and receiver transducers.....	14
5.4 Transmission versus reflection measurements	14
5.5 Transducer excitation signal	15
5.5.1 Frequency dependence of quantities	15
5.5.2 CW and quasi-CW methods	15
5.5.3 Frequency modulated pulses and time delay spectrometry	16
5.5.4 Impulse methods	18
6 Insertion loss measurement.....	19
7 Longitudinal wave speed measurements.....	22
7.1 General.....	22
7.2 Transducers immersed within fluid material.....	22
7.3 Transducers and sample immersed in a coupling fluid	23
8 Absorption coefficient measurements	24
8.1 Single sample through transmission method	24
8.2 Double sample through transmission method	26
9 Echo reduction (<i>ER</i>) measurement.....	27
9.1 Normal incidence	27
9.2 Oblique incidence	29
10 Backscatter coefficient measurement.....	29
Bibliography.....	31
Figure 1 – Schematic showing diffractive spreading between source and receiving transducers.....	14
Figure 2 – Illustration of a typical TDS system	17
Figure 3 – Development and signal processing for a compensated frequency modulated signal.....	17
Figure 4 – Pulse dispersion in absorbing media	19
Figure 5 – The additional diffractive spreading encountered in through transmission measurements	21
Figure 6 – Source and receiving transducers immersed in a fluid medium to be characterized.....	22
Figure 7 – Source, receiver and sample all immersed in a coupling fluid.....	24

Figure 8 – Multiple echoes that are clearly separated in time	25
Figure 9 – Multiple reflection and transmission phenomena occurring at the surfaces of a sample	26
Figure 10 – Schematic presentation of a measurement set-up used to determine the echo reduction of a test material	27

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ULTRASONICS – METHODS FOR THE CHARACTERIZATION OF THE ULTRASONIC PROPERTIES OF MATERIALS

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Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards

IEC TS 63081, which is a Technical Specification, has been prepared by IEC technical committee 87: Ultrasonics

The text of this Technical Specification is based on the following documents:

DTS	Report on voting
87/718/DTS	87/725/RVDTS

Full information on the voting for the approval of this Technical Specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

Words in **bold** in the text are defined in Clause 3. Symbols and formulae are in *Times New Roman + Italic*.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

Many ultrasonic measurement standards contain requirements for the properties of acoustic materials to be used to construct the measurement equipment relied upon within those documents. The following are examples of such standards.

- IEC 61161 specifies amplitude reflection factor and acoustic energy absorption for reflecting targets and absorbing targets and specifies amplitude transmission coefficient for anti-streaming foils.
- IEC 61391-1 discusses reflection coefficient.
- IEC 61689 defines echo reduction and specifies limits upon its values. The terms reflection loss and transmission loss are also used, and values specified.
- IEC TS 62306 specifies transmission loss and reflection amplitude reduction.
- IEC 62359 specifies reflection coefficient and absorption.
- IEC 60601-2-37 specifies reflectance and absorption coefficient.

As the list above suggests, a wide range of terms is used to specify the properties of an acoustic material, and these terms are not used consistently across IEC documents. Furthermore, there is a degree of duplication with multiple names for the same quantity. This is further confused since there is no document within the IEC ultrasonics portfolio that defines the methods by which those properties are measured.

This document seeks to address the shortcomings by providing:

- a clear unambiguous definition of the key quantities of interest during materials characterization;
- a discussion of similar terms and how they may relate to the key quantities;
- recommended experimental methods for determining the values of key quantities.

ULTRASONICS – METHODS FOR THE CHARACTERIZATION OF THE ULTRASONIC PROPERTIES OF MATERIALS

1 Scope

This document:

- defines key quantities relevant to ultrasonic materials characterization;
- specifies methods for direct measurement of many key ultrasonic materials parameters.

This document is applicable to all measurements of properties of passive acoustic materials under drive conditions that are not subject to nonlinear acoustic propagation. Whilst there are materials properties that may be of interest in a nonlinear drive regime, these are currently outside the scope of this document.

2 Normative references

There are no normative references in this document.