1 Scope

This standard covers dynamic pressure transducers, which are, primarily “those” used in measurements.

2 Purpose

This standard establishes guidelines for the preferred techniques and practices in the calibration of dynamic pressure transducers.

3 Table of symbols

a	gas speed of sound
A_e	outlet orifice area
$\hat{A}_e$	maximum exit area
A_i	inlet orifice area
A_r	amplification factor
c	damping
d	diameter
f	frequency
k	spring constant
K	steady-state sensitivity
l	piston position
L	length of cylindrical passage
m	mass
M_s	shock wave Mach number
N	number of oscillations
$\frac{OUT(s)}{IN(s)}$	transfer function
p	pressure
p_s	stagnation pressure of supply gas
p_a	absolute pressure
ΔP	pressure change
p_o	equilibrium pressure
$\overline{p}$	average chamber pressure
RC	time constant of R-C circuit
t_s	settling time
Δt_s	shock-wave transit time
t_r	rise time, transducer
T	temperature
v	chamber volume
V	voltage or volume
ΔV	peak incremental voltage
$\hat{V}$	peak voltage for any cycle
$\overline{V}$	average voltage
V_p	peak-output voltage
V_s	shock-wave velocity
$\propto$	modulation factor
γ	ratio of specific heats of constant pressure and volume
η	constant
ζ	damping ratio
λ	wavelength
τ	rise time, input
ω	frequency in radians per second
ω_d	ringing frequency
ω_o	natural frequency
ω_r	resonant frequency

4 Transducer properties

The transducer properties or characteristics of interest to a user will depend to a large extent on the application involved. This clause defines and discusses some of the properties most often required. These properties sometimes can be described in terms of the “transient” response of the device to a step input, or in terms of its “steady-state” response to sine-wave excitation, or both.

In defining transducer properties related to dynamic response, the transducer's transfer function provides valuable information. The transfer function is the ratio of output to input (expressed in the frequency domain), and forms the basis for the frequency response parameters. Once the transfer function is known, the input vs. time for any output can be determined. These topics have been treated by those working in the fields of servomechanisms and network theory, where it is often necessary to describe