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for
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MICROPHONES**

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CONTENTS

1. Introduction	5
2. Scope	5
3. Definitions	5
4. Conditions of Measurement	5
5. Methods of Measurement	7
6. Additional Testing of Carbon Microphones	8
7. Special Measurements for Magnetic and Moving-Coil Microphones	9
Appendix I—Subjective Testing	10
—Test Conditions	10
Appendix II—Helmholtz Coil Assembly	12

Test Procedure for CLOSE-TALKING PRESSURE-TYPE MICROPHONES

1. INTRODUCTION

A close-talking pressure-type microphone is an acoustic transducer which is intended for use in close proximity to the lips of the talker and is either hand-held or boom-mounted. Various types of microphones are currently used for close-talking applications. These include carbon, dynamic, magnetic, piezoelectric, electrostrictive and condenser types. Each of these microphones has only one side of its diaphragm exposed to sound waves, and its electric output substantially corresponds to the instantaneous sound pressure of the impressed sound wave.

Since a close-talking microphone is used in the near sound field produced by a person's mouth, it is necessary when measuring the performance of such microphones to utilize a sound source which approximates the characteristics of the human sound generator.

2. SCOPE

This document describes a practical and reproducible method of evaluating the performance characteristics of a close-talking microphone by means of quantitative measurements of the microphone characteristics using a standard artificial voice. Terms associated with microphones and their testing are defined. Test procedures, methods of presentation of data, and a standard artificial voice are specified. The tests described in this document involve physical, steady-state measurements only. The data obtained should be sufficient to enable an evaluation of quality and performance of a given microphone in a speech communication system. However, since it is sometimes desirable to obtain a subjective evaluation of a microphone, a procedure for a qualitative performance test is described in Appendix I.

Several sections of the document specify experimental limits to account for the effect of the test procedures on the accuracy of the data. These limits have been chosen so that results within the range of normal engineering accuracy will be obtained.

3. DEFINITIONS

3.1 Artificial Voice

A sound source for microphone measurements consisting of a small loudspeaker mounted in a shaped baffle proportioned to simulate the acoustic constants of the human head.

3.2 Breathing

As applied to carbon microphones, the phenomenon manifested by a slow cyclic fluctuation of the electric output due to changes in resistance resulting

from thermal expansion and contraction of the carbon chamber.

3.3 Carbon Noise

As applied to carbon microphones, the inherent noise voltage of the carbon element.

3.4 Nonlinear Distortion

Distortion characterized by a deviation from a linear relationship between specified characteristics of the input and output of a system or transducer.

3.5 Positional Response

The frequency-response measurements conducted with the principal axis of a microphone collinear with the axis of the artificial voice and the combination of microphone and artificial voice placed at various angles to the horizontal plane.

Note: Variations in positional response of carbon microphones may be due to gravitational forces.

3.6 Power Response

The ratio of the power delivered by a microphone to its load, to the applied sound pressure as measured by a Laboratory Standard Microphone placed at a stated distance from the plane of the opening of the artificial voice.

Note: The power response is usually measured as a function of frequency in decibels (dB) above 1 mW/(N/m²) or 1 mW/10μbar. See paragraph 5.2.

3.7 Principal Axis

The axis of a microphone normal to the plane of the principal acoustic entrance of a microphone, and which passes through the center of the entrance.

3.8 Sensitivity

The voltage or power response of a microphone measured at a stated frequency.

3.9 Voltage Response

The ratio of the open-circuit output voltage to the applied sound pressure, measured by a Laboratory Standard Microphone placed at a stated distance from the plane of the opening of the artificial voice.

Note: The voltage response is usually measured as a function of frequency.

4. CONDITIONS OF MEASUREMENTS

4.1 Acoustic Environment

The acoustic environment in which microphone measurements are to be made shall be free of reflected waves that would affect the measured results by more than one decibel at any test frequency. The maximum permissible acoustic noise level of the environment should be such that the output which it