
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NIOSH/TC/P-006

INDUSTRIAL SOUND LEVEL METER INTERNAL NOISE IN DBA TEST

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15. Supplementary Notes

16. Abstracts

A test procedure is given to determine the internal noise dBA of industrial sound level meters. Included is a list of the equipment needed to perform the test, the configuration in which the equipment is to be used, and a procedure for determining the internal noise in dBA.

17. Key Words and Document Analysis. 17a. Descriptors

Sound
Noise

17b. Identifiers/Open-Ended Terms

Sound Level Meter
Internal Noise

17c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
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PREFACE

Appreciation is given to all present and past NIOSH employees who have contributed to the development of this test procedure.

The use of the listed equipment does not constitute an endorsement of the equipment or of the manufacturer by the National Institute for Occupational Safety and Health. Equivalent equipment may be used.

TABLE OF CONTENTS

*Industrial Sound Level Meter

LIST OF ILLUSTRATIONS

I. INTRODUCTION

The measuring capability of the industrial sound level meter (ISLM) is influenced by the internal noise of the meter itself. Internal noise levels may affect sound level meter readings when measuring low sound levels. This test procedure determines whether the internal noise dBA of the sound level meter is below a certain maximum value.

II. REFERENCE TEST REQUIREMENTS

Test requirements are derived from the following sources:

A. NIOSH regulations which give a program for certifying industrial sound level meter sets (42 CFR 82, FEDERAL REGISTER, Vol. 40, No. 74, pp. 17029-36).

B. American National Standards Institute's (ANSI) S1.4-1971 "Specification for Sound Level Meters".

Excerpts from each of these documents are as follows:

A. 42 CFR 82.64 (f): In an acoustic environment in which the sound level is less than 30 dBA, the industrial sound level meter reading shall not exceed 55 dBA if the industrial sound level meter has a sensitivity range attenuator setting to allow such a measurement within the fully graduated scale. If such a sensitivity range attenuator setting is not provided, the industrial sound level meter, when placed on its most sensitive range attenuator setting, shall indicate a reading less than 1 dBA above the lower limit of the fully graduated scale.

B. ANSI S1.4-1971 (3.3.2): When the microphone is replaced by an equivalent electrical impedance, the background noise level presented to the indicating instrument shall be at least 5 decibels below the lowest sound level that the sound level meter is intended to measure. The rated lowest level may be different for each weighting.

III. ISLM INTERNAL NOISE DBA TEST

A. Apparatus Required

1. Anechoic chamber.
2. Soundproof enclosure.

3. Precision sound level meter, Bruel & Kjaer (B&K) 2606.
   a. Input preamplifier, Bruel & Kjaer 2627.
   b. One-inch condenser microphone, Bruel & Kjaer 4145.
   c. Scale SA0039.
4. ISLM under test.

B. Test Procedure

1. Assemble test equipment as shown in Figure 1.
2. Calibrate B&K 2606 precision sound level meter according to manufacturer's instructions.
3. Calibrate industrial sound level meter according to manufacturer's instructions.
4. If necessary, set industrial sound level meter to A-weighting and SLOW response.
5. Select industrial sound level meter measurement setting according to the following conditions:
   a. If meter has a range attenuator switch, select range so that 55 dBA may be read on the scale.
   b. Select the most sensitive range attenuator setting if none of the range attenuator settings are capable of reading 55 dBA.
   c. If meter has no range attenuator switch, continue procedure at step 6.
6. With observer in place and anechoic chamber door closed, record ambient dBA sound level in anechoic chamber with the B&K 2606.
7. If ambient sound level was over 30 dBA, it is also necessary to measure the ambient sound level inside the soundproof enclosure. This may be done by placing B&K 2627 preamp with B&K 4145 microphone inside the soundproof enclosure. Then with the observer present and anechoic chamber door closed, read ambient dBA sound level. It must be under 30 dBA.
8. Place industrial sound level meter in the soundproof enclosure and read industrial sound level meter as follows:
   a. If industrial sound level meter has a range attenuator setting capable of reading 55 dBA, record reading and record whether it is below 55 dBA.
   b. If range attenuator setting is not capable of reading 55 dBA, record reading and record whether it is less than 1 dBA above the lower limit of the scale.

c. If there is no range attenuator switch, record reading and record whether it is less than 1 dBA above the lower limit of the scale.

The observer should refrain from disturbing the soundproof enclosure during the test.

IV. CALCULATIONS AND ANALYSIS

Industrial sound level meter with a range attenuator setting capable of reading 55 dBA:

A. Internal noise reading should not exceed 55 dBA.

Industrial sound level meter with a range attenuator setting not capable of reading 55 dBA:

A. Internal noise reading should be less than 1 dBA above the lower limit of the scale.

Industrial sound level meter with no range attenuator switch:

A. Internal noise reading should be less than 1 dBA above the lower limit of the scale.

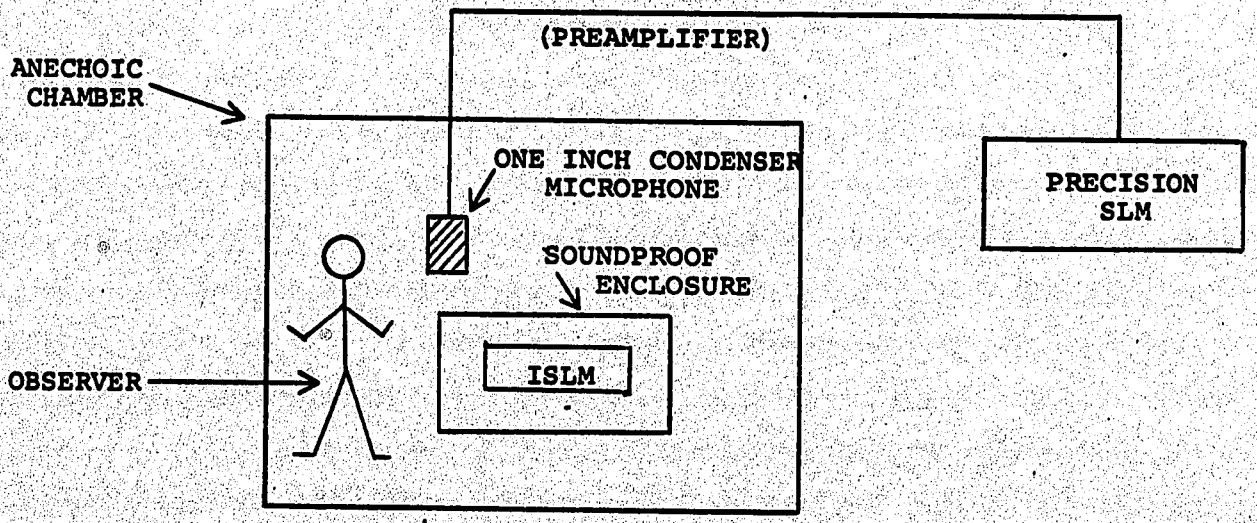

Figure 1. ISLM INTERNAL NOISE IN DBA TEST

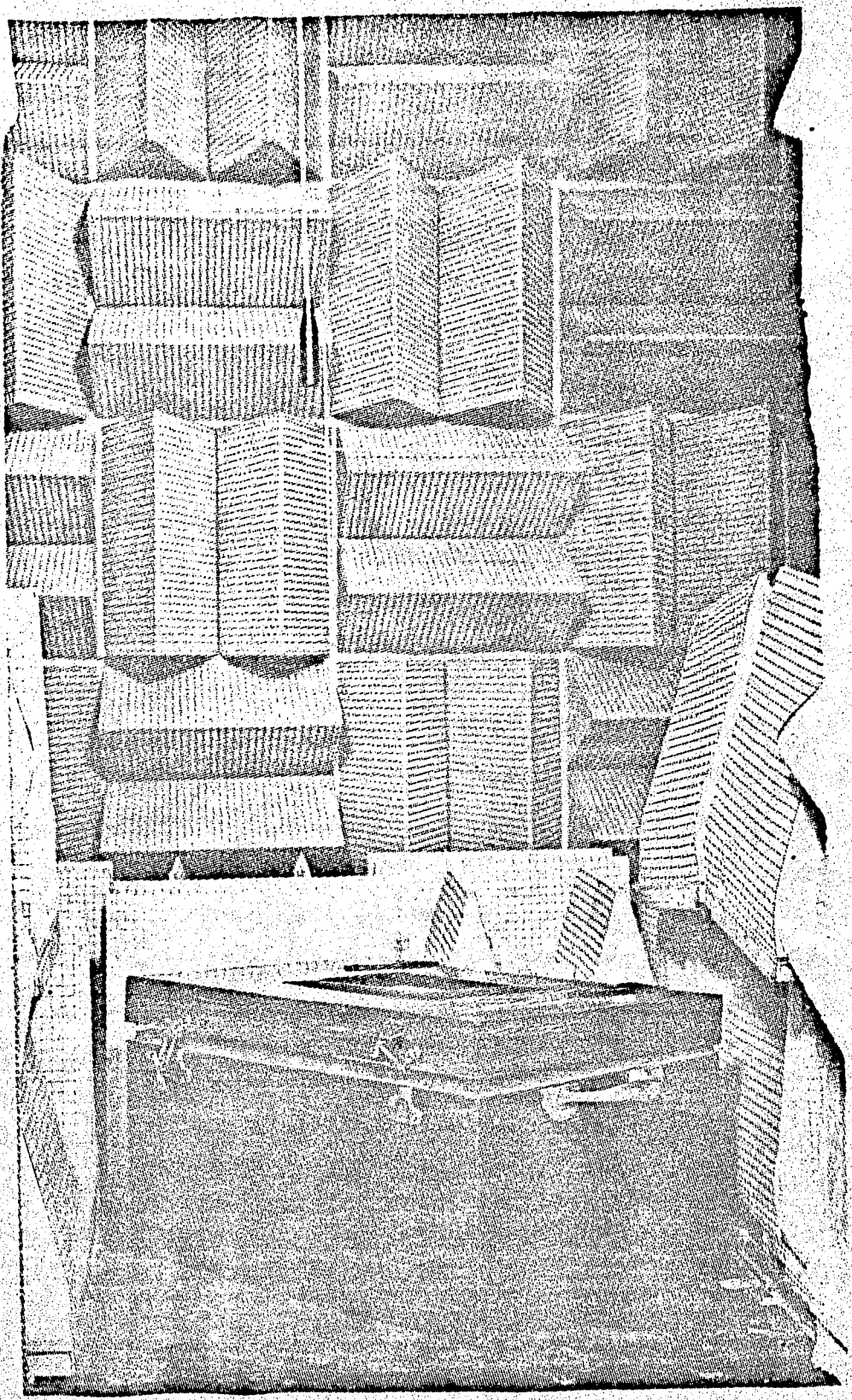

Figure 2. ISLM Internal Noise in dBA Test Set-Up

APPENDIX

A-1 DATA SHEET: ISLM Internal Noise dBA Test

A-2 DATA SHEET: Test Equipment Serial Numbers

DATA SHEET

Manufacturer_____ Date_____

ISLM Model No._____ Tester_____

ISLM Serial No._____

Calibrator Model No._____

Calibrator Serial No._____

Step Number

6 Ambient sound level in anechoic chamber:_____dBA

7 Ambient sound level in soundproof enclosure:_____dBA

8 ISLM with range attenuator setting capable of reading 55 dBA: Reading_____dBA

Reading under 55 dBA? _____Yes _____No

ISLM with range attenuator setting not capable of reading 55 dBA: Reading_____dBA

Reading less than 1 dBA above lower limit of scale?

_____Yes _____No

ISLM with no range attenuator switch: Reading_____dBA

Reading less than 1 dBA above lower limit of scale?

_____Yes _____No

DATA SHEET

ISLM INTERNAL NOISE IN DBA

TEST EQUIPMENT SERIAL NUMBERS

1. Precision sound level meter, Bruel & Kjaer 2606_____

2. Preamplifier, Bruel & Kjaer 2627_____

3. One-inch condenser microphone, Bruel & Kjaer 4145_____

BIBLIOGRAPHY

1. 42 CFR Part 82 "Certification of Industrial Sound Level Meter Sets", FEDERAL REGISTER 40 No. 74 (April 16, 1975) 17029-36.

2. ANSI S1.4-1971 "Specification For Sound Level Meters", available from American National Standards Institute, Inc., 1430 Broadway, New York, N. Y. 10018.