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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 16405-2025

Replacing GB/T 16405-1996

**Acoustics - Measurement of insertion loss of ducted silencers
without flow - Laboratory survey method**

声学 管道消声器无气流下插入损失测量 实验室简易法

(English Translation)

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Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
4 Test setup and arrangement
5 Test Step
6 Measurement uncertainty
7 Recording content
8 Report Content
References

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document replaces GB/T 16405-1996 "Acoustic duct silencer insertion loss measurement in the absence of airflow laboratory simple Compared with GB/T 16405-1996, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Added relevant requirements for modal filters (see 4.3.3);
- Changed the content of measurement uncertainty (see Chapter 6, 1.2 of the 1996 edition);
- Deleted Appendix A (see Appendix A of the 1996 edition).

This document is equivalent to ISO 11691:2020 "Acoustic duct silencer - simple laboratory method for measuring insertion loss in the absence of airflow".

Introduction

Generally, when the flow velocity at the narrowest cross section of the resistive muffler does not exceed 20m/s, the insertion loss of the muffler is not affected by the airflow.

In practical applications, the uneven distribution of airflow needs to be considered, so the

upper limit speed of 20m/s is equivalent to the design speed of 10m/s~15m/s.

Insertion loss measurement of acoustic duct muffler without airflow Simple laboratory method

1 Scope

This document describes a method for determining the resistance of circular and rectangular resistive silencers and other duct elements used in ventilation and air conditioning systems.

Laboratory surrogate tube measurement method for insertion loss in the absence of airflow.

NOTE: ISO 7235 describes a laboratory method for the measurement of the insertion loss of duct silencers with airflow.

This document is applicable to silencers with a design flow rate not exceeding 15 m/s. This method does not consider the impact of airflow regeneration noise and is only applicable to air the flow regeneration noise does not have a significant impact on the performance of the muffler. Since the design flow rate of most mufflers used in offices and homes is Below 15 m/s, this document provides a more economical method compared to ISO 7235.

Due to different sound sources and the existence of pipeline flow fields, the insertion loss value obtained by this measurement method may be different from the on-site measurement results.

Different acoustic fields and flow fields in the pipeline will lead to different results. In this paper, the acoustic field is mainly a plane wave mode.

The test was carried out and it was found that the measurement results had a definite upper limit of insertion loss due to the influence of lateral sound transmission caused by the vibration of the pipe wall structure.

This document is applicable to circular silencers with a diameter of 80 mm to 2000 mm, or rectangular silencers with a cross-sectional area in the same range.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

ISO 3741 Acoustics-Determining the sound power level and sound energy level of noise sources by sound pressure method - Reverberation chamber precision method Note. GB/T

6881-2023 Acoustics - Determination of sound power level and sound energy level of noise source by sound pressure method - Reverberation chamber precision method (ISO 3741:2010, IDT) Note. GB/T 27025-2019 General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2017, IDT) ISO/IEC Guide 98-3 Uncertainty of measurement Part 3: Guide to the expression of uncertainty in measurement Note. GB/T 27418-2017 Evaluation and expression of measurement uncertainty (ISO/IEC Guide 98-3:2008, MOD) IEC 60942 Electroacoustics-Soundcalibrators Note. GB/T 15173-2010 Electroacoustic sound calibrator (IEC 60942:2003, IDT) IEC 61183 Electroacoustics-Random-incidence and diffuse-field calibration of electroacoustic sound level meters Note. GB/T 17312-1998 Random incidence and diffuse field calibration of sound level meters (IEC 61183:1994, eqv) IEC 61260-1 Electroacoustics - Octave-band and fractional-octave-band filters - Part 1: Specifications IEC 61672-1 Electroacoustics-Soundlevelmeters-Part 1: Specification