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Reciprocating internal combustion engines — Measurement method for exhaust silencers — Sound power level of exhaust noise and insertion loss using sound pressure and power loss ratio

Moteurs alternatifs à combustion interne — Méthode de mesure pour silencieux d'échappement — Niveau de puissance acoustique du bruit à l'échappement et perte par insertion à partir de la pression acoustique et du rapport de perte de puissance

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Foreword

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This document was prepared by Technical Committee ISO/TC 70, *Internal Combustion Engines*.

This second edition cancels and replaces the first edition (ISO 15619:2013), which has been technically revised.

The main changes are as follows:

— added sources for terms and definitions cited in clause 3.

— deleted 4.2.1.2 of the original document;

— described the use of the instrument in the 7.1 as a separate subclause, 5.3;

— removed duplicate descriptions mentioned in ISO 3046-1 and revised the text appropriately in 6.4 and 7.3.2;

— moved 1.1 in the original document to 7.2;

— revised descriptions in A.3.3;

— bibliography supplement.

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Introduction

This document specifies methods for measuring the sound power level of exhaust noise and the insertion loss of exhaust silencers installed on reciprocating internal combustion engines and a method for measuring the power loss ratio of reciprocating internal combustion engines.

Sound power level of exhaust noise, insertion loss, and transmission loss are parameters to characterize the acoustic performance of exhaust silencers. Sound power levels of exhaust noise and insertion loss are important parameters to characterize the acoustic matching performance of exhaust silencers and reciprocating internal combustion engines. Transmission loss is the difference in sound power level of exhaust noise between the noise before and after transmitting through the exhaust silencer, which is the parameter to characterize the acoustic performance of the exhaust silencer itself and not relevant to the reciprocating internal combustion engine. Power loss ratio and pressure loss are parameters to characterize the aerodynamic performance of exhaust silencers. Power loss ratio is an important parameter to characterize the aerodynamic matching performance of exhaust silencers and reciprocating internal combustion engines, whereas resistance coefficient which is closely related to pressure loss is to characterize the aerodynamic performance of the exhaust silencer itself and is irrelevant with the reciprocating internal combustion engine on which the exhaust silencer is installed. The matching parameters of the sound power level of exhaust noise, the insertion loss, and the power loss ratio are used in this document as the measurement parameters.

For sound power level of exhaust noise, the measurement results at 90° direction and 45° direction can be different. The measurement results at 45° direction is slightly greater than the actual value, the measurement results at 90° direction is much closer to the actual results. For insertion loss, the measurement results at 90° direction and 45° direction may be different, but the measurement uncertainty at 90° direction is smaller than that at 45° direction. Measurement at 90° direction is used for the laboratory measurement (engineering method). The measurement at 90° or 45° direction is used for laboratory measurement (survey method). The measurement at 45° direction is used for site measurement.