
International Standard



6621/3

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Internal combustion engines — Piston rings — Part 3: Material specifications

Moteurs à combustion interne — Segments de piston — Partie 3: Spécifications des matériaux

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Descriptors : road vehicles, internal combustion engines, piston rings, material specifications, mechanical properties.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6621/3 was developed by Technical Committee ISO/TC 22, *Road vehicles*, and was circulated to the member bodies in March 1982.

It has been approved by the member bodies of the following countries:

Australia	Hungary	Romania
Austria	Iran	South Africa, Rep. of
Belgium	Ireland	Spain
Brazil	Italy	Sweden
China	Japan	United Kingdom
Czechoslovakia	Korea, Dem. P. Rep. of	USA
Egypt, Arab Rep. of	Korea, Rep. of	USSR
France	Netherlands	
Germany, F.R.	Poland	

No member body expressed disapproval of the document.

Internal combustion engines — Piston rings — Part 3: Material specifications

0 Introduction

ISO 6621 is one of a series being developed dealing with piston rings for reciprocating internal combustion engines:

ISO 6621, *Internal combustion engines — Piston rings —*

Part 1: Vocabulary.

Part 2: Measuring principles.

Part 3: Material specifications.

Part 4: General specifications.

Part 5: Quality requirements.

ISO 6622, *Internal combustion engines — Piston rings —*

Part 1: Rectangular rings.

Part 2: Rectangular rings with narrow ring width.

ISO 6623, *Internal combustion engines — Piston rings — Scraper rings.*

ISO 6624, *Internal combustion engines — Piston rings —*

Part 1: Keystone rings.

Part 2: Half keystone rings.

ISO 6625, *Internal combustion engines — Piston rings — Oil control rings.*

ISO 6626, *Internal combustion engines — Coil spring loaded oil control rings.*

This part of ISO 6621 provides a user's guide to the types of materials available for piston rings.

There are many such materials made by different manufacturers using different casting and machining techniques, all suited to their application. In many instances the chemical com-

positions differ but the method of manufacture and heat treatment, if used, result in materials with similar mechanical properties from different manufacturers. The performance of rings made from two different materials will therefore be very similar; i.e. several subclasses of materials may meet a given requirement. The final choice of material and subclass shall therefore be agreed between the customer and supplier.

Choice of material made in accordance with the mechanical strength criteria in the table shall also take into account the final coating of rings, engine characteristics (rating, liner surface, etc.) and microstructural features such as graphite, cementite and ferrite.

For ring manufacture, it is convenient to group the materials into classes according to their moduli since for a ring of given dimensions, the pressure exerted by the ring on the cylinder wall is determined only by the modulus. The material strength is also generally related to modulus, i.e. the higher the modulus the higher the strength, although there are some exceptions depending on method of manufacture. Material hardness on the other hand is determined by both chemical composition and heat treatment; this is made clear from the division of classes into subclasses.

1 Scope and field of application

This part of ISO 6621 establishes a classification of materials intended for the manufacture of piston rings, based on mechanical properties and the stresses that these materials are capable of withstanding.

This part of ISO 6621 applies to the manufacture of piston rings up to and including 200 mm diameter for reciprocating internal combustion engines. It also applies to piston rings for compressors working under similar conditions.

2 Reference

ISO/R 80, *Rockwell hardness test (B and C scales) for steel.*