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Belt drives — V-belts for the automotive industry — Fatigue test

Transmission par courroies — Courroies trapézoïdales pour l'industrie automobile — Essai de fatigue

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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This document was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 1, *Friction*.

This fourth edition cancels and replaces the third edition (ISO 5287:2003), which has been technically revised. The main changes compared to the previous edition are as follows:

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— symbols table has been added;

— cogged type has been added;

— fatigue test conditions of AV 17 type have been added;

— datum width of fatigue test pulley has been deleted.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Belt drives — V-belts for the automotive industry — Fatigue test

1 Scope

This document specifies a fatigue test for the quality control of V-belts (sections AV 10, AV 10X, AV 13, AV 13X, AV 17 and AV 17X) intended for driving the auxiliaries of internal combustion engines used for automotive purposes.

NOTE The dimensional characteristics of these belts and of the corresponding pulleys are the subject of ISO 2790.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 683-1, *Heat-treatable steels, alloy steels and free-cutting steels — Part 1: Non-alloy steels for quenching and tempering*

ISO 2790, *Belt drives — V-belts for the automotive industry and corresponding pulleys — Dimensions*

ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

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3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Symbols

For the purpose of this document, the following symbols apply.

Symbol	Definition	Unit
d_{e1}	effective diameter of both the driving and driven pulleys	mm
d_{e2}	effective diameter of the idler pulley	mm
E	centre distance between the driving and driven pulleys	mm
F	belt tensioning force	N
g	additional slip	%

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i_0	rotational frequency ratio at the initial	—
i_f	rotational frequency ratio at measurement of the additional slip	—
L_e	effective length of the belt	mm
K	factor for the belt tensioning force	N/kW
n_0	initial rotational frequency of the driven shaft	min^{-1}
n_f	final rotational frequency of the driven shaft	min^{-1}
N_0	initial rotational frequency of the driving shaft	min^{-1}
N_f	final rotational frequency of the driving shaft	min^{-1}
p	minimum groove depth	mm
P	transmitted power	kW
r	minimum curve radius of the sides as the top of the groove	mm
R_a	surface roughness	µm
w_e	effective width	mm
α	groove angle of the driving pulley and of the driven pulley	degree

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5 Principle

Determination of the performance of a belt under specified conditions on the two- or three-pulley test machine described in 6.1.

The shortest V-belt that can be tested on the three-pulley test machine is approximately 800 mm. Shorter belts should be tested on the two-pulley test machine, as described in Clauses 6 and 8.

A number of conditions shall be agreed between the manufacturer and the user, including the power to be transmitted, the effective diameter of the idler pulley and the number of times the belt can be re-tensioned, and the minimum acceptable belt life, in hours.

As a general rule, the power to be transmitted using the two-pulley test machine shall be approximately 70 % of the power transmitted using the three-pulley test machine.

Belt failure occurs when the belt no longer satisfies the agreed conditions.

6 Apparatus

6.1 Dynamic test machine

Dynamic test machine, of robust design so that all components withstand, with virtually no deflection, the stresses to which they are subjected.

6.1.1 Driving pulley and suitable mechanism for driving it.

6.1.2 Driven pulley, to which a suitable power-absorption unit is connected.

6.1.3 Power-absorption unit, accurate and capable of calibration, e.g. by dead weights.

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