

SLOVENSKI STANDARD

SIST ISO 11749:2015

01-marec-2015

Nadomešča:
SIST ISO 11749:1997

Jermenski pogoni - Mnogoterni klinasti jermeni za avtomobilsko industrijo - Preskus utrujenosti

Belt drive - V-ribbed belts for the automotive industry - Fatigue test

iTeh STANDARD PREVIEW

Transmissions par courroies - (Courroies striées pour la construction automobile - Essai de fatigue)

[SIST ISO 11749:2015](https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-3b25b4140a22/sist-iso-11749-2015)

<https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-3b25b4140a22/sist-iso-11749-2015>

Ta slovenski standard je istoveten z: ISO 11749:2014

ICS:

21.220.10	Jermenski pogoni in njihovi deli	Belt drives and their components
43.060.10	Blok motorja in notranji deli motorja	Engine block and internal components

SIST ISO 11749:2015

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST ISO 11749:2015

<https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-911c08d8b25b/sist-iso-11749-2015>

INTERNATIONAL STANDARD

**ISO
11749**

Second edition
2014-01-15

Belt drive — V-ribbed belts for the automotive industry — Fatigue test

*Transmissions par courroies — Courroies striées pour la construction
automobile — Essai de fatigue*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST ISO 11749:2015](https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-911c08d8b25b/sist-iso-11749-2015)

[https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-
911c08d8b25b/sist-iso-11749-2015](https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-911c08d8b25b/sist-iso-11749-2015)



Reference number
ISO 11749:2014(E)

© ISO 2014

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST ISO 11749:2015

<https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-911c08d8b25b/sist-iso-11749-2015>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Principle	1
4 Apparatus	1
5 Test room conditions	2
6 Test method	3
6.1 Test conditions	3
6.2 Procedure	3
7 Test report	5
Bibliography	11

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST ISO 11749:2015

<https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-911c08d8b25b/sist-iso-11749-2015>

ISO 11749:2014(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 1, *Friction*.

This second edition cancels and replaces the first edition (ISO 11749:1995), which has been technically revised. It also incorporates Amendment ISO 11749:1995/Amd.1:2003.

Belt drive — V-ribbed belts for the automotive industry — Fatigue test

1 Scope

This International Standard specifies a dynamic test method for the quality control of V-ribbed belts (PK profile) which are used predominantly for accessory drive applications in the automotive industry.

The dimensional characteristics of the belts and of corresponding pulleys are the subject of ISO 9981.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

ISO 9981:1998, *Belt drives — Pulleys and V-ribbed belts for the automotive industry — PK profile: Dimensions*

3 Principle

<https://standards.iteh.ai/catalog/standards/sist/67dbff77-0f3d-49ce-89e3-911c08d8b25b/sist-iso-11749-2015>

Determination of the performance of a belt under specified conditions on a two-, three-, or four-pulley test machine as described in [Clause 4](#).

The shortest V-ribbed belt which can be tested on the four-pulley test machine (see [Figure 1](#)) is approximately 1 000 mm. Belts with lengths between 800 mm and 1 000 mm inclusive can be tested on the three-pulley test machine (see [Figure 2](#)). Shorter belts should be tested on the two-pulley test machine (see [Figure 3](#)) as described in [6.2.1.2](#).

A number of conditions shall be agreed between the manufacturer and user, including the power to be transmitted, the minimum acceptable life, in hours, and the number of times the belt can be retensioned.

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

4 Apparatus

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

The test machine shall consist of the following (see [Figures 1, 2, and 3](#)).

4.1.1 Driving pulley, and suitable mechanism for driving it.

4.1.2 Driven pulley, to which a suitable power-absorption unit is connected ([4.1.3](#)).

4.1.3 Power-absorption unit, accurate and capable of calibration.

ISO 11749:2014(E)

4.1.4 Temperature control system.**4.1.5 Reverse bending idler pulley**, only for four-pulley test machine (see [Figure 1](#)).**4.1.6 Device** through which tension may be applied to the belt

- a) in the case of the three- or four-pulley test machine layout, an idler and tensioner pulley (see [Figures 1](#) and [2](#)), or
- b) in the case of the two-pulley test machine layout, a movable pulley (see [Figure 3](#)).

4.1.7 Means of determining belt slip, to an accuracy of $\pm 0,1$ %. The layout of the pulley and the direction of rotation are shown in [Figures 1](#), [2](#), and [3](#).

In order to accommodate different lengths, the position of relevant driving and driven members, the position of the idler pulley and its support (in the case of the three-pulley test machine), and the position of the reverse bending idler pulley (in the case of the four-pulley test machine) shall be adjustable so that the test layout of the pulleys is attainable for each belt length.

So that the tension can be satisfactorily applied to the belt, and in order to allow for belt stretch, the idler pulley and its bearing assembly shall be free to slide, as necessary, in the support bracket along the line of application of the tensioning force.

For the four-pulley test machine in such a case, the line of action of the tensioning force shall bisect the belt layout at the idler pulley and at the reverse bending idler pulley, and shall lie in the plane through the centre of the pulleys (see [Figure 1](#)).

For the three-pulley test machine in such a case, the line of action of the tensioning force shall bisect the belt layout at the idler pulley, shall pass through the axis centre of the idler pulley, and shall lie in the plane through the centre of the idler pulley (see [Figure 2](#)).

The two-pulley test machine shall be constructed so that one of the units (driven or driving) can be moved to accommodate belt lengths of up to 800 mm. A method of locking the movable unit in position for a given tension in the belt shall be provided. So that the tension can be satisfactorily applied to the belt, and in order to allow for belt stretch, the line of action of the tensioning force shall pass through the axis centre of the driven and driving pulleys and shall lie in the plane through the centre of the same pulleys (see [Figure 3](#)).

4.2 Test pulleys, made from steel, as defined in ISO 683-1, with a surface hardness of 55 HRC, conforming to ISO 6508-1. The pulley groove shall have a surface roughness such that the arithmetical mean deviation of the profile R_a is lower than $0,8 \mu\text{m}$.

The characteristics of the test pulleys are given in [Figure 1](#) and the dimensions are given in Table 1 of ISO 9981:1998.

5 Test room conditions

The test temperature shall be

- a) in a test room, at an ambient temperature between 18°C and 32°C (the mean ambient temperature for the duration of the test shall be given with the test result and the atmosphere in the vicinity of the test drive shall be free of draughts from sources other than the belt drive itself), or
- b) in a thermostatically controlled enclosure, a high temperature of $(120 \pm 5)^\circ\text{C}$, or
- c) in a thermostatically controlled enclosure, a high temperature of $(85 \pm 5)^\circ\text{C}$.

6 Test method

6.1 Test conditions

The rotational frequency of the driving pulley shall be 4 900 min⁻¹ to within ±2 %. The power transmitted is fixed, in kilowatts, for a belt with three to five ribs, and shall be agreed between the manufacturer and user.

The driver pulley speed, in revolutions per minute, shall be used in the torque load calculation, and the torque load shall be kept constant without compensation for loss of driven pulley speed resulting from belt slippage.

The torque load, M , is given by Formula (1)

$$M = \frac{P_s}{N} \times 9\,549 \quad (1)$$

where

M is the torque load, in newton metres;

P_s is the specified power, in kilowatts;

N is the driver speed, in rotations per minute.

The test equipment shall be maintained so as to minimize parasitic loads due to bearing losses, lubricants, etc.

In the case of the three- or four-pulley test machine, the belt-tensioning force, F , in newtons, applied to the idler pulley, and in the case of the two-pulley test machine that applied to the driven unit, shall be such that

$$F = k \times P_s \quad (2)$$

where

k = 60 N/kW, in the case of the three- or four-pulley test machine;

k = 110 N/kW, in the case of the two-pulley test machine.

EXAMPLE For 10,3 kW, $F = 618$ N: for one belt with six ribs = 105 N/rib (in the case of the three- or four-pulley test).

6.2 Procedure

6.2.1 Preparation

6.2.1.1 Three- or four-pulley test machine

Method A: After mounting the belt on the pulleys, apply the specified belt-tensioning force (see 6.1) to the idler pulley and, leaving the idler pulley support bracket free to move in its slide, bring the drive up to the specified rotational frequency (see 6.1). Then apply the relevant load to the driven pulley as quickly as possible. Run the drive under these conditions for 5 min ± 15 s, not including the starting and stopping time. Stop the machine and leave it to stand for at least 10 min.

Then turn the drive manually for several revolutions of the belt and immediately lock the idler pulley support bracket in position.