

Specification for

Automotive synchronous belt drives

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Committees responsible for this British Standard

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- Agricultural Engineers' Association
- British Gear Association
- British Rubber Manufacturers' Association
- British Coal
- Society of Motor Manufacturers and Traders Limited

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Foreword

This British Standard has been prepared under the direction of the Automobile Standards and Machinery and Components Standards Committees.

Synchronous belt drives are commonly used on internal combustion engines, whether mobile or static, for the purpose of driving timing and valve mechanisms and can be used, in certain circumstances, for driving engine auxiliaries.

The standard specifies requirements for tooth forms for pulleys and belts, and dimensions and tolerances for pulleys and belts of the kind that have become established in general use by the automotive industry and following practical experiences of both manufacturers and users.

In addition, a fatigue test is described that can provide a basis for quality control or product verification procedures. This and other tests described do not necessarily replace normal needs for engine rig or field testing in order to prove the overall efficiency of any drive system. Further assistance is provided for users in Appendix L which gives recommendations for the design of synchronous drive systems for automotive purposes.

Particular account has been taken of proposals from the British Rubber Manufacturers' Association and the outcome of discussions by the International Organization for Standardization (ISO). In particular this standard embodies the technical provisions of ISO 155, ISO 254, ISO 5288, ISO 5294, ISO 5295 and ISO 5296.

It is noted that the term "tooth space" is used in the ISO standards but the synonymous term "groove" has been retained in this standard to conform to established UK practice.

The standard does not apply to industrial synchronous belt drives which are specified in BS 4548.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 24, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1.1 Scope

This British Standard specifies requirements for synchronous pulleys and endless synchronous belts for use in automotive applications and designated by the pitch code ZA.

A flex fatigue test designed to provide a basis for quality control or product verification procedures is described in Appendix A. Appendix L gives guidance on the design of synchronous belt systems for automotive use.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Definitions

For the purposes of this British Standard, the definitions given in Table 1 apply. Where appropriate, diagrams are included further to define specific features.

Table 1 — Terms and definitions

Term	Symbol	Definition
<i>Term relating to drives using synchronous belts</i> synchronous belt drive ^a	—	A system composed of a synchronous belt and two or more synchronous pulleys. Synchronized motion and/or power is transmitted through the engagement of teeth on the belt with grooves on the pulleys
<i>Terms relating to synchronous belts</i> synchronous belt	—	A belt, the cross section of which is in the general form of a rectangle, but with transverse teeth extending from the lower base at regularly spaced intervals
belt pitch	P_b	The linear distance between the axes of two consecutive teeth in a section of belt loaded to the prescribed measuring force
pitch length	L_p	The length of the pitch line of a belt
pitch line	—	Any circumferential line in the belt that keeps the same length when the belt is bent perpendicularly to its base

^a This belt drive has been known in the past by various terms such as timing belt drive, positive belt drive, or gear belt drive.

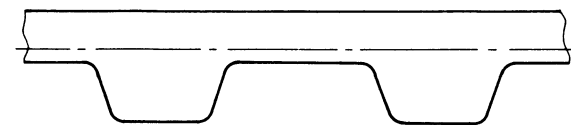
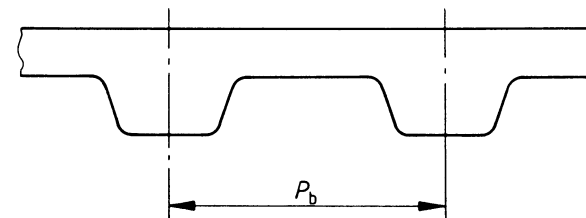
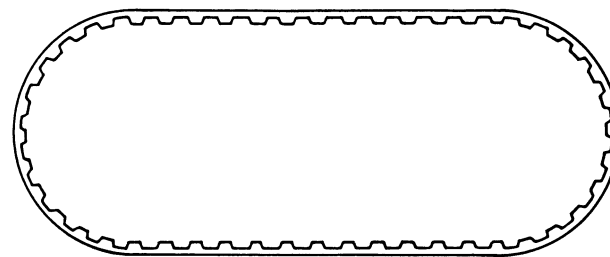


Table 1 — Terms and definitions

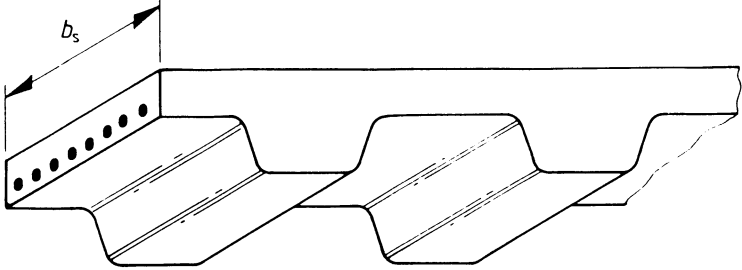
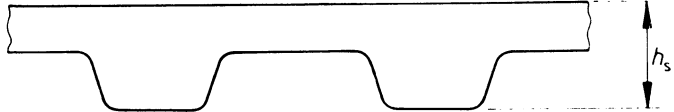
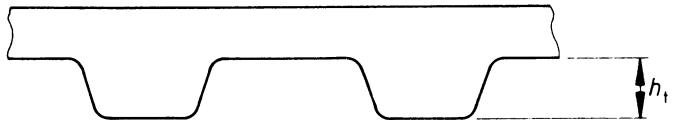
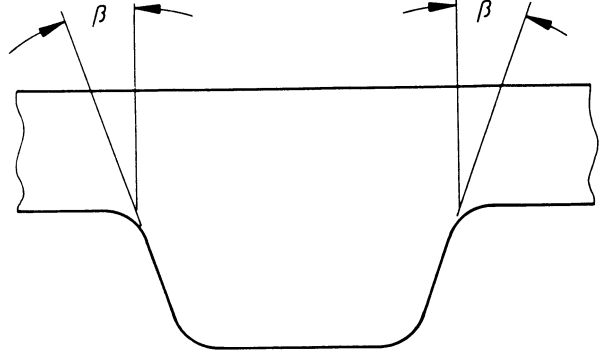
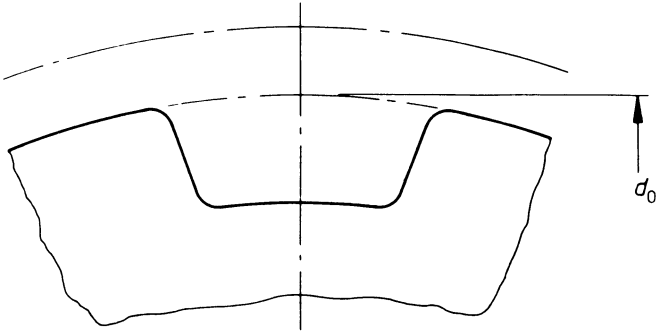
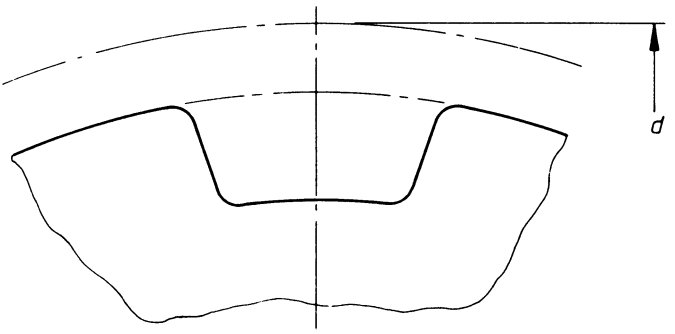
Term	Symbol	Definition
width	b_s	The transverse dimension of the belt that can be used to transmit power 
height	h_s	The total height of the belt 
<i>Terms relating to synchronous belt teeth</i> tooth height	h_t	The distance between the tip line and the root line 
tooth angle	2β	The included angle between the flanks of the belt tooth 

Table 1 — Terms and definitions

Term	Symbol	Definition
<i>Terms relating to synchronous pulleys</i> outside diameter	d_o	The diameter of the tip circle 
pitch diameter	d	The diameter of the pitch circle, i.e. the outside diameter plus twice the pitch line differential 
pitch line differential	a	The radial distance between the pitch circle and the tip circle 