
**Reciprocating internal combustion
engines — Vocabulary of components
and systems —**

Part 3:
**Valves, camshaft drives and actuating
mechanisms**

*Moteurs alternatifs à combustion interne — Vocabulaire des
composants et des systèmes —*

Partie 3: Soupapes, arbres à cames et mécanismes de commande

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Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Camshaft.....	1
3.2 Camshaft drive.....	3
3.3 Valve.....	8
3.4 Actuating mechanism.....	10
Bibliography	18
Index	19

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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 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.

This document was prepared by Technical Committee ISO/TC 70, *Internal combustion engines*.

This third edition cancels and replaces the second edition (ISO 7967-3:2010), which has been technically revised.

The main changes are as follows:

- certain terms and definitions have been modified;
- new terms and definitions related to camshaft, valve, camshaft drive and drive mechanism have been added.

A list of all parts in the ISO 7967 series can be found on the ISO website.

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.

Introduction

This document establishes a vocabulary for components and systems of reciprocating internal combustion engines.

ISO 2710-1 gives a classification of reciprocating internal combustion engines and defines basic terms of such engines, their working and their characteristics.

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Reciprocating internal combustion engines — Vocabulary of components and systems —

Part 3: Valves, camshaft drives and actuating mechanisms

1 Scope

This document defines terms relating to the valves, camshaft drives and actuating mechanisms of reciprocating internal combustion engines.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology 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/>

3.1 Camshaft

3.1.1

camshaft

shaft incorporating *cams* (3.1.5) which control the events of the working cycle

Note 1 to entry: The working cycle includes *valve* (3.3.1) opening and closing timings, injection or ignition and accessory driving.

3.1.2

one-piece camshaft

camshaft (3.1.1) where *cams* (3.1.5), shaft and *camshaft signal wheel* (3.1.6) are of one piece

Note 1 to entry: Refer to [Figure 1](#).

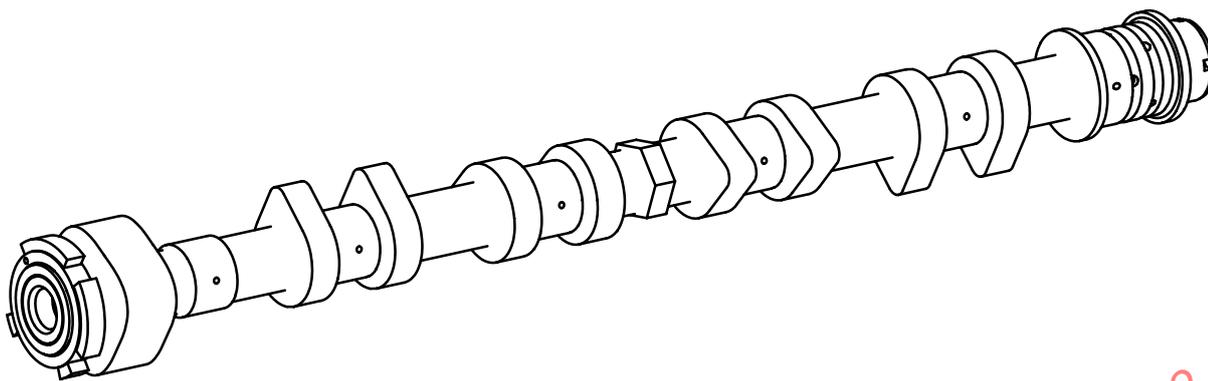


Figure 1 — One-piece camshaft

3.1.3

one-piece hollow camshaft

one-piece *camshaft* (3.1.2) where the shaft is hollow

Note 1 to entry: Refer to [Figure 2](#).

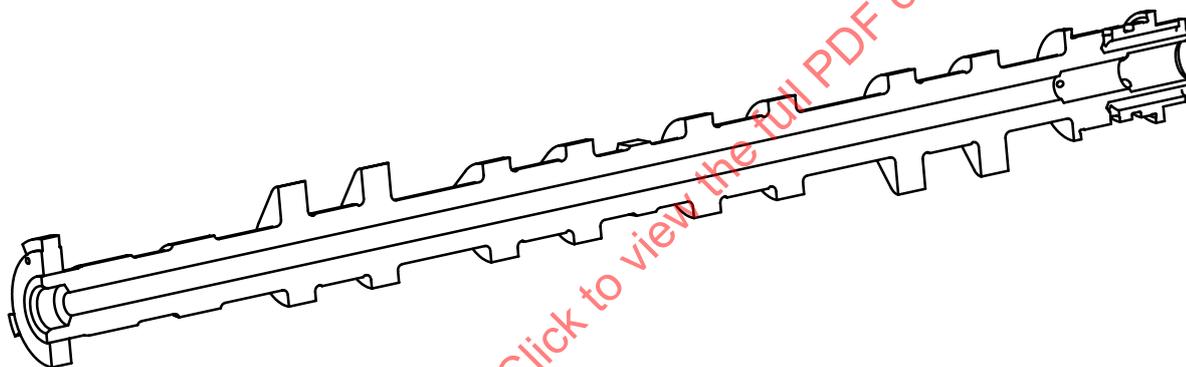


Figure 2 — One-piece hollow camshaft

3.1.4

assembled camshaft

camshaft (3.1.1) where *cams* (3.1.5), *camshaft signal wheel* (3.1.6) and flanges, among other things, are fitted onto the shaft

Note 1 to entry: Refer to [Figure 3](#).

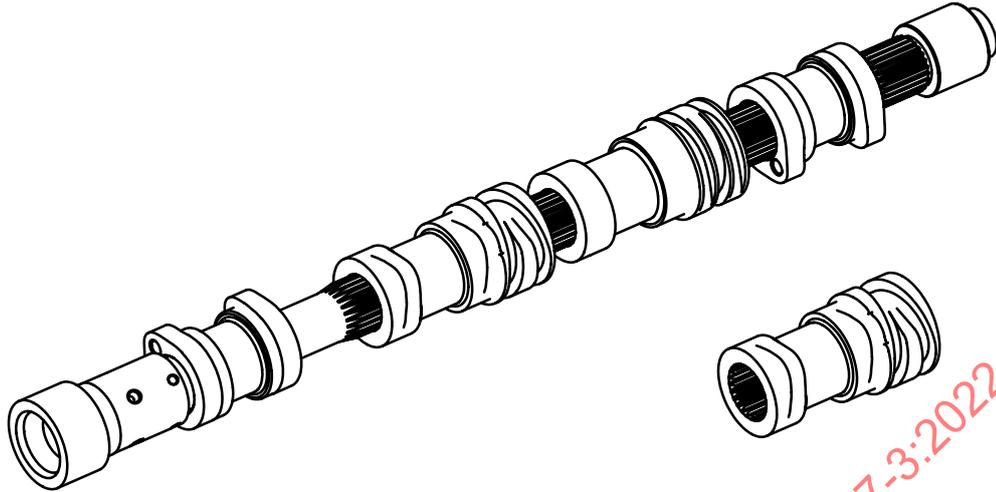


Figure 3 — Assembled camshaft

3.1.5

cam

component by which *valves* (3.3.1) or fuel injection pumps are operated

3.1.6

camshaft signal wheel

component for producing synchronization phase signal on the *camshaft* (3.1.1)

Note 1 to entry: Refer to [Figure 4](#).

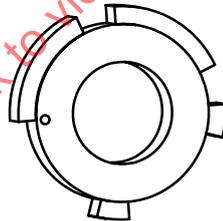


Figure 4 — Camshaft signal wheel

3.2 Camshaft drive

3.2.1

camshaft drive

mechanism by which the *camshaft* (3.1.1) is rotated

3.2.2

gear drive

crankshaft-to-camshaft driven by means of a series of gears

Note 1 to entry: Refer to [Figure 5](#).

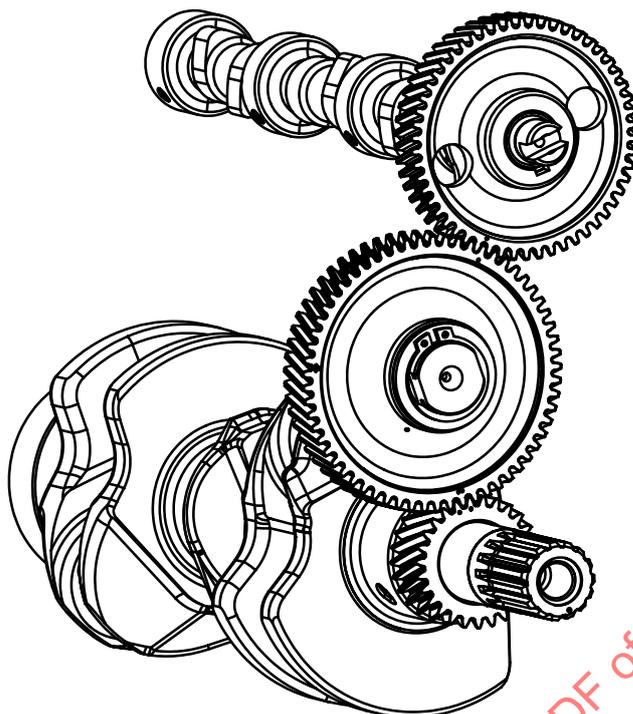


Figure 5 — Gear drive

3.2.3

camshaft timing gear

gear for driving the *camshaft* (3.1.1) and ensuring the phase

Note 1 to entry: Refer to [Figure 6](#).

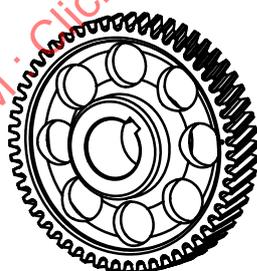


Figure 6 — Camshaft timing gear

3.2.4

chain drive

crankshaft-to-camshaft driven by means of *sprocket wheels* (3.2.5) and *timing chain* (3.2.6)

Note 1 to entry: Refer to [Figure 7](#).

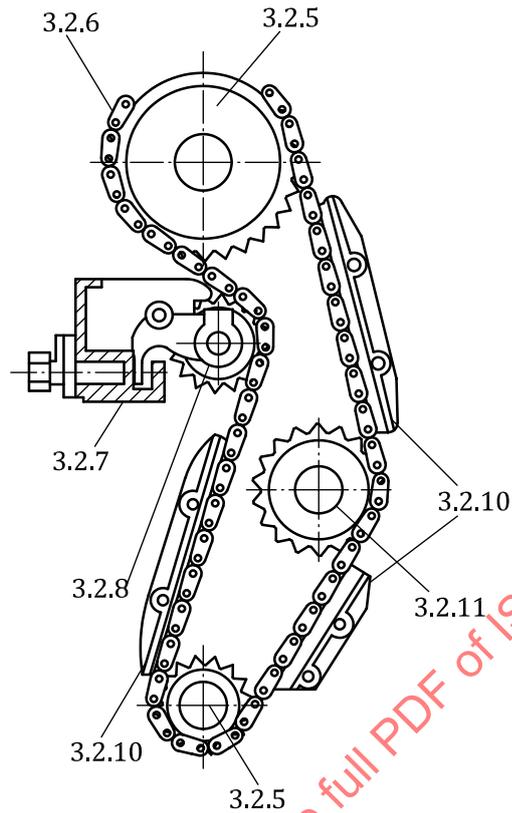


Figure 7 — Chain drive

**3.2.5
sprocket wheel**

wheel that drives or is driven by the *timing chain* (3.2.6)

Note 1 to entry: Refer to [Figure 7](#).

**3.2.6
timing chain**

component to transmit movement from the crankshaft to the *camshaft* (3.1.1)

Note 1 to entry: Refer to [Figure 7](#).

**3.2.7
chain tension adjuster assembly**

mechanism to compensate for the increase in length resulting from chain wear, using a *tensioning wheel* (3.2.8) or a *slide rail* (3.2.9)

Note 1 to entry: Actuation is by spring or hydraulic mechanism.

Note 2 to entry: Refer to [Figure 7](#).

**3.2.8
tensioning wheel**

wheel pressed against the chain to adjust its tension

Note 1 to entry: Refer to [Figure 7](#).

**3.2.9
slide rail**

rail pressed against the chain to adjust its tension

3.2.10
slide bars

pair of components to absorb vibrations and to guide the chain

Note 1 to entry: Refer to [Figure 7](#).

3.2.11
guide wheel

wheel to guide the chain

Note 1 to entry: Refer to [Figure 7](#).

3.2.12
synchronous belt drive

crankshaft-to-camshaft driven by means of *synchronous belt pulleys* ([3.2.13](#)) and belt

3.2.13
synchronous belt pulley

pulley that has teeth to mesh with the teeth of a *synchronous belt* ([3.2.14](#))

Note 1 to entry: Refer to [Figure 8](#).

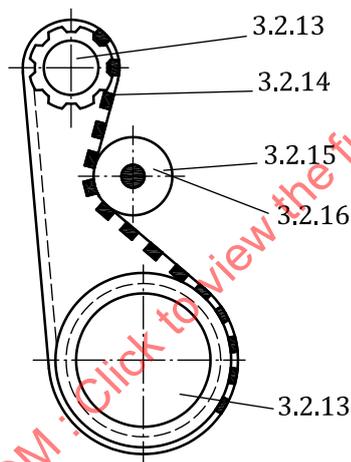


Figure 8 — Synchronous belt drive

3.2.14
synchronous belt

elastic endless toothed belt

Note 1 to entry: Refer to [Figure 8](#).

3.2.15
belt tensioner

mechanism to adjust tension in the belt

Note 1 to entry: Refer to [Figure 8](#).

3.2.16
tensioning pulley

pulley pressed against the belt to adjust its tension

Note 1 to entry: Refer to [Figure 8](#).

3.2.17**idler assembly**

pulley for coordinating the running of the *synchronous belt* (3.2.14)

Note 1 to entry: Refer to [Figure 9](#).

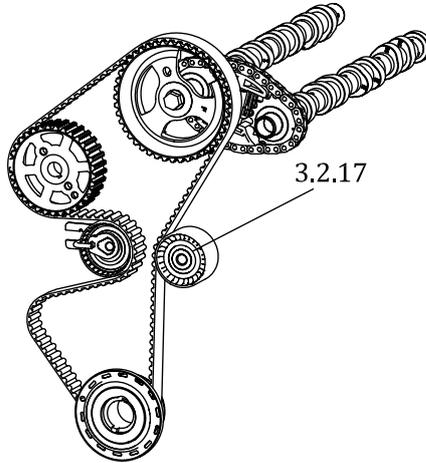


Figure 9 — Idler assembly

3.2.18**variable valve timing mechanism**

mechanism by which *valve* (3.3.1) timing is adjusted

Note 1 to entry: Refer to [Figure 10](#).

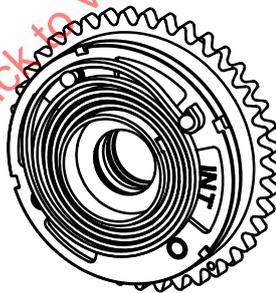


Figure 10 — Variable valve timing mechanism

3.2.19**control valve for variable valve timing mechanism**

component by which the *variable valve timing mechanism* (3.2.18) is controlled

Note 1 to entry: Refer to [Figure 11](#).

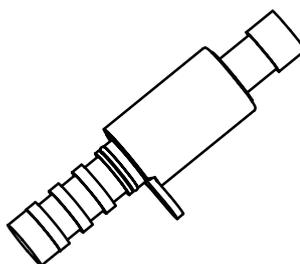


Figure 11 — Control valve for variable valve timing mechanism

3.3 Valve

3.3.1

valve

poppet valve

component consisting of stem, head and face (seat) which allows combustion gases to enter or leave the cylinder

3.3.2

inlet valve

valve (3.3.1) by which a fresh charge is admitted into the engine combustion chamber

Note 1 to entry: Refer to [Figure 12](#).

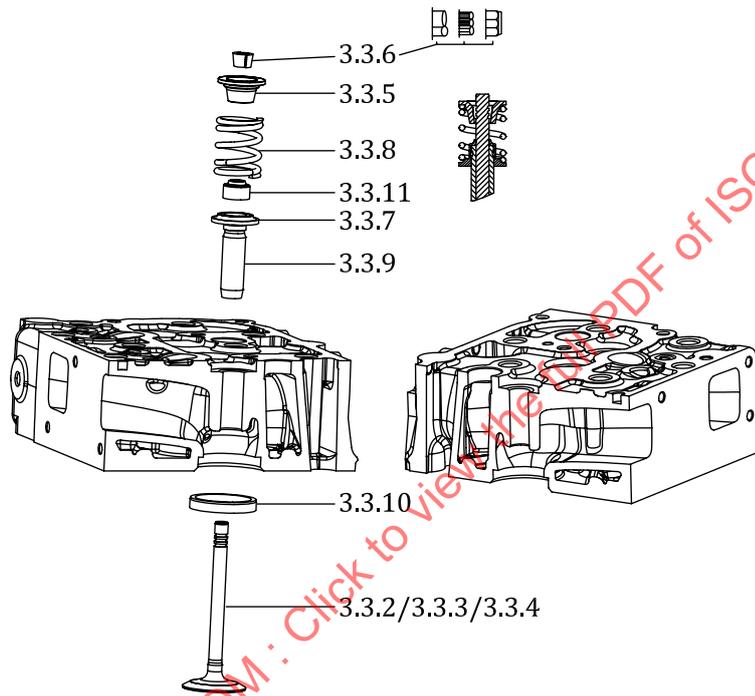


Figure 12 — Valve group

3.3.3

exhaust valve

valve (3.3.1) by which the exhaust gases are discharged from the engine combustion chamber

Note 1 to entry: Refer to [Figure 12](#).

3.3.4

hollow valve

valve (3.3.1) which is filled with metal in the valve hollow

Note 1 to entry: Refer to [Figure 12](#).

3.3.5

valve spring retainer

component used to hold the valve spring (3.3.8) and to transmit spring force to the valve (3.3.1) stem

Note 1 to entry: Refer to [Figure 12](#).

3.3.6**valve collet**

valve key

valve lock

pair of components that hold the *valve spring retainer* (3.3.5) on the *valve* (3.3.1) stemNote 1 to entry: Refer to [Figure 12](#).**3.3.7****valve spring washer**

washer that prevents damage to the cylinder head

Note 1 to entry: Refer to [Figure 12](#).**3.3.8****valve spring**spring that closes the *valve* (3.3.1)Note 1 to entry: Refer to [Figure 12](#).**3.3.9****valve guide**component that guides the *valve* (3.3.1)Note 1 to entry: Refer to [Figure 12](#).**3.3.10****valve seat insert**replaceable *valve* (3.3.1) seat in the cylinder headNote 1 to entry: Refer to [Figure 12](#).**3.3.11****valve stem seal**seal between *valve* (3.3.1) stem and *valve guide* (3.3.9) located at the upper and/or lower end of the valve guide to prevent oil entering the cylinder headNote 1 to entry: Refer to [Figure 12](#).**3.3.12****valve cage**component separate from the cylinder head into which the *valve* (3.3.1) is fitted

Note 1 to entry: Cooled valve cages have the additional notation "cooled".

Note 2 to entry: Refer to [Figure 13](#).

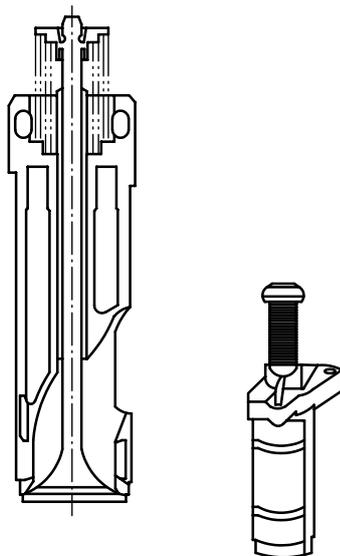


Figure 13 — Valve cage

3.4 Actuating mechanism

3.4.1 actuating mechanism

mechanism that provides or transmits power to other mechanisms by an electric, hydraulic or mechanical mechanism, such as a *cam* (3.1.5)

Note 1 to entry: Refer to [Figure 14](#).

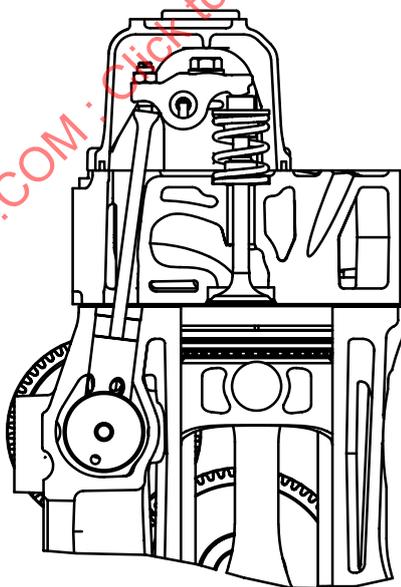


Figure 14 — Actuating mechanism

3.4.2 tappet

device that bears on the *cam* (3.1.5) and slides in a guide to transmit reciprocating motion

3.4.3**sliding tappet**

flat-faced *tappet* (3.4.2) in sliding contact with the *cam* (3.1.5)

Note 1 to entry: Refer to [Figure 15](#).

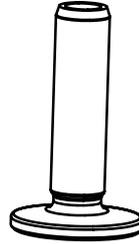


Figure 15 — Sliding tappet

3.4.4**roller tappet**

tappet (3.4.2) that carries a roller that runs in contact with the *cam* (3.1.5)

Note 1 to entry: Refer to [Figure 16](#).

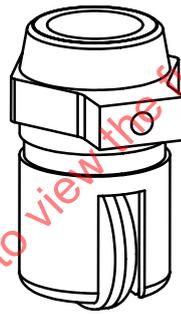


Figure 16 — Roller tappet

3.4.5**tappet roller**

part of the *roller tappet* (3.4.4) that is used to transfer *cam* (3.1.5) stroke to the *tappet* (3.4.2)

Note 1 to entry: Refer to [Figure 17](#).

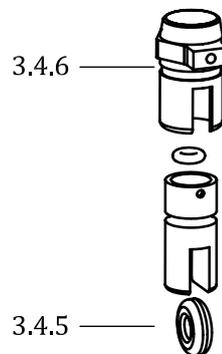


Figure 17 — Tappet roller group

3.4.6

tappet guide

component to guide the *tappet* (3.4.2)

Note 1 to entry: Refer to [Figure 17](#).

3.4.7

hydraulic tappet

tappet (3.4.2) driven by hydraulic force

Note 1 to entry: Refer to [Figure 18](#).



Figure 18 — Hydraulic tappet

3.4.8

cam follower

lever that bears on the *cam* (3.1.5) and transmits reciprocating motion

Note 1 to entry: Refer to [Figure 19](#).

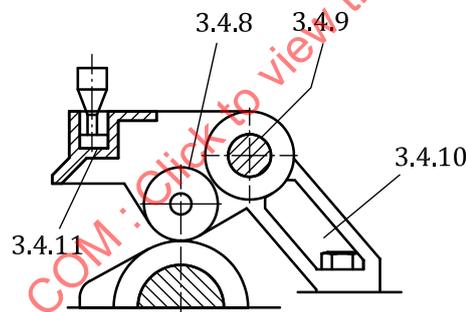


Figure 19 — Cam follow group

3.4.9

cam follower shaft

shaft about which the *cam follower* (3.4.8) pivots

Note 1 to entry: Refer to [Figure 19](#).

3.4.10

cam follower bracket

bracket that carries the *cam follower* (3.4.8)

Note 1 to entry: Refer to [Figure 19](#).

3.4.11

thrust cup

part of the *cam follower* (3.4.8) or the *rocker arm* (3.4.13) subjected to *push-rod* (3.4.12) pressure

Note 1 to entry: Refer to [Figure 19](#).

3.4.12**push-rod**

rod that transmits motion from the *tappet* (3.4.2) or *cam follower* (3.4.8) to the *rocker arm* (3.4.13)

Note 1 to entry: Refer to [Figure 20](#).

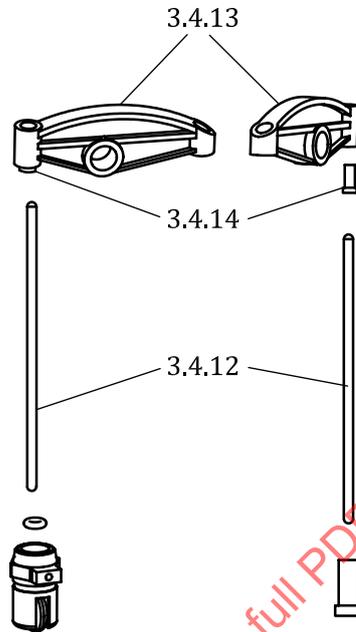


Figure 20 — Rocker arm group

3.4.13**rocker arm**

rocker

components used to reverse *push-rod* (3.4.12) movement

Note 1 to entry: Refer to [Figure 20](#).

3.4.14**valve adjuster**

screw to adjust *valve* (3.3.1) clearance

Note 1 to entry: Refer to [Figure 20](#).

3.4.15**rocker arm bracket**

rocker arm pedestal

component that supports the *rocker arm* (3.4.13)

Note 1 to entry: Refer to [Figure 21](#).

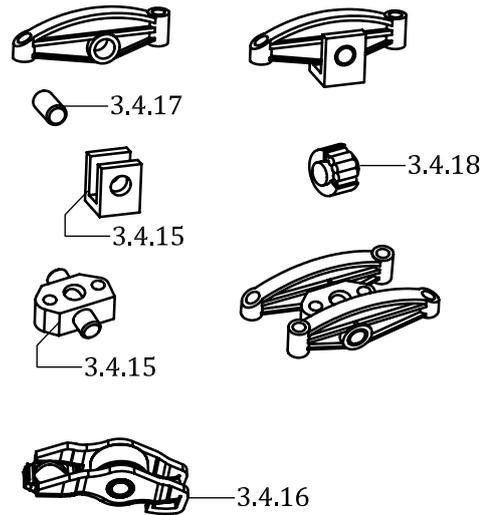


Figure 21 — Rocker arm bracket group

3.4.16

roller rocker arm

roller finger follower

component by which *cam* (3.1.5) movement is transmitted to the *valve* (3.3.1)

Note 1 to entry: Refer to [Figure 21](#).

3.4.17

rocker arm shaft

component on which the *rocker arm* (3.4.13) pivots

Note 1 to entry: Refer to [Figure 21](#).

3.4.18

rocker arm bearing

component that supports the *rocker arm* (3.4.13)

Note 1 to entry: Refer to [Figure 21](#).

3.4.19

valve bridge

bridge piece

component operating two or more *valves* (3.3.1) from a single force

Note 1 to entry: Refer to [Figure 22](#).

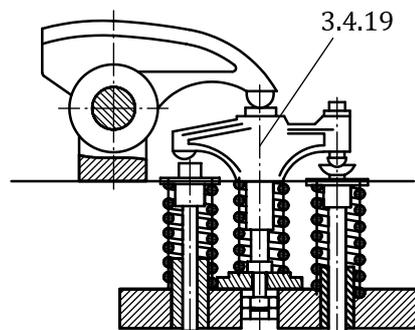


Figure 22 — Valve bridge

3.4.20
valve rotator

mechanism that rotates the *valve* (3.3.1)

Note 1 to entry: Refer to [Figure 23](#).

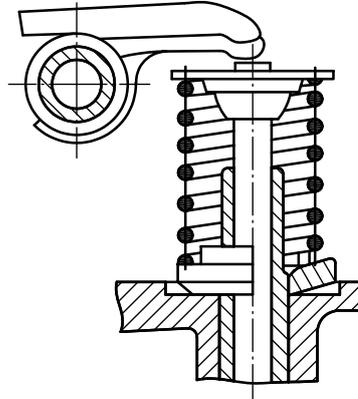


Figure 23 — Valve rotator

3.4.21
variable valve lift mechanism

mechanism by which *valve* (3.3.1) lift is adjusted

Note 1 to entry: Refer to [Figure 24](#).

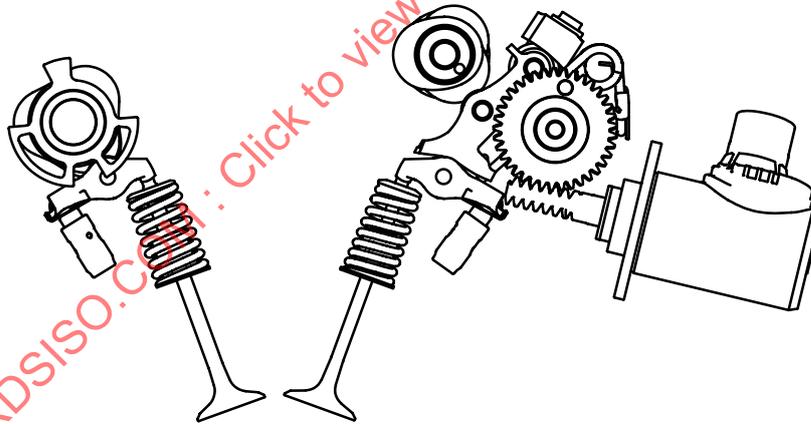


Figure 24 — Variable valve lift mechanism

3.4.22
exhaust valve brake rocker arm

rocker arm (3.4.13) to control the *exhaust valve* (3.3.3) for engine braking

Note 1 to entry: Refer to [Figure 25](#).

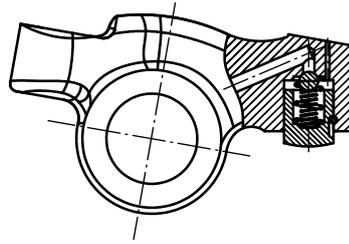


Figure 25 — Exhaust valve brake rocker arm

3.4.23

exhaust valve brake valve bridge

valve bridge (3.4.19) to control two or more *exhaust valves* (3.3.3) for engine braking

Note 1 to entry: Refer to [Figure 26](#).

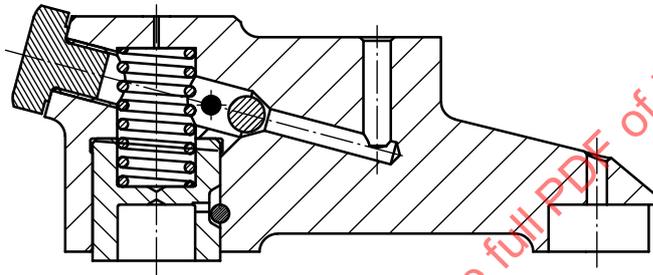


Figure 26 — Exhaust valve brake valve bridge

3.4.24

single overhead camshaft

SOHC

mechanism in which one *camshaft* (3.1.1) is located over the cylinder head to drive both intake and *exhaust valves* (3.3.3)

Note 1 to entry: Refer to [Figure 27](#).

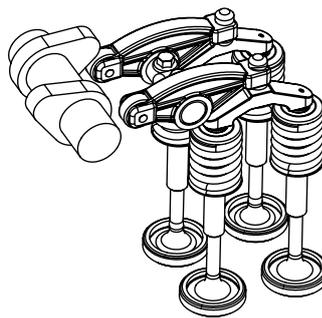


Figure 27 — Single overhead camshaft

3.4.25

double overhead camshaft

DOHC

mechanism in which two *camshafts* (3.1.1) are located over the cylinder head to drive, respectively, intake and *exhaust valves* (3.3.3)

Note 1 to entry: Refer to [Figure 28](#).