


# 汽车专业英语

## (第2版)

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● 主 编 陆红宏 孟思聪



 北京理工大学出版社  
BEIJING INSTITUTE OF TECHNOLOGY PRESS

# 汽车专业英语


(第2版)

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“互联网+”教材



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## 内 容 简 介

本教材内容具有实用性强、与企业实际岗位能力需求紧密结合的特点。本书共分为5部分28个教学单元,全面介绍了学生在今后工作过程中需要的汽车构造、汽车检修以及4S店等方面的英语知识。每单元都围绕一个主题进行选材和编写,各单元的基本内容包括:①课文;②词汇及注解;③短语及注解;④缩略词及注解;⑤练习(针对汽车构造及原理、汽车检测及汽车销售技巧);⑥全篇课文翻译。6块内容详细阐述每个单元的知识点,并通过课文详解,有效地帮助学生理解文章内容。

本书主要供高等学校汽车类专业的学生使用,也可以作为相关企业的培训教材,或供相关技术人员学习参考。

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## △ 汽车专业英语 (第2版)

近年来,随着汽车产业的迅速发展,国外各大汽车厂商争先抢占中国市场,致使品牌种类繁多、车型年年换,随之而来的使用说明书、维修手册、电脑诊断仪等材料及设备大多为英文版,而没能及时翻译成汉语。尤其是随着现代通信技术的迅猛发展,从网上接触的先进汽车技术信息的95%也都用英文来表达。因此,对汽车相关英文知识的缺乏,将会对学生今后从事汽车相关岗位的工作产生非常不利的影响。事实上,汽车英语已逐渐成为汽车相关企业选择人才的一项重要标准。编写本书是为了提高汽车专业学生和汽车从业人员的英语水平,为其能够更好地做好本职工作提供方便。

本书是一本以直观性和通俗性为特点,详细介绍汽车结构、汽车检测以及4S店等方面知识的英语教材。全书包括5部分,共28个单元,每个单元都采用图文并茂的形式,把教学内容直观地展现出来。同时,每篇文章都配有全文翻译、课后习题及答案详解等辅助教学内容,旨在强化学生对整篇文章的理解。本书另一大特点是实用性强、实效性强,教材内容不但包括汽车构造方面的专业英语知识,还广泛涉及包括CVT等在内的汽车新技术,以及包括V. A. G 1552在内的诊断仪器的使用方法,以便为学生今后就业打下良好基础。

本书可作为高职院校汽车类专业的专业英语教材及参考书,也非常适合从事汽车服务的专业技术人员和汽车爱好者学习参考。

本书由长春职业技术学院孟思聪、王扬老师和长春理工大学姜吉光老师主编,由长春职业技术学院刘金华主审。本书副主编有:朱艳丽、孙丽敏、马天博、吕兵、杨娜、朱宏;编委有:刘春妍、于兆佳、信建杰、刘春波、依志国、金鑫、李红岩、杨健。本书在编写过程中,参考、引用了大量的参考文献,在此,对文献的原作者表示诚挚的谢意!

由于编者水平有限、编写经验不足,本书中的缺点、错误在所难免,恳请广大师生和读者批评指正。

编者



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# 1

## Chapter One

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# Engine

## 1.1 Engine Assembly

### 1.1.1 Engine Classification

Engines can be classified in several methods. In general, engines can be divided into electric motors, steam engines and internal combustion engines. We can also follow other methods to divide engines.

#### Cylinder Arrangement

Generally, the cylinder arrangements are as follows (Fig. 1. 1. 1-1 to Fig. 1. 1. 1-3).



Fig. 1. 1. 1-1 In-line 4

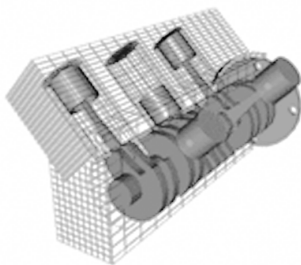


Fig. 1. 1. 1-2 V6

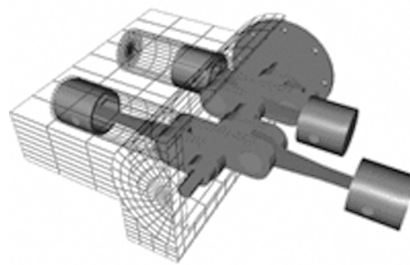


Fig. 1. 1. 1-3 Flat 4

In Volkswagen designs, new cylinder arrangements of engines are created (Fig. 1. 1. 1-4).

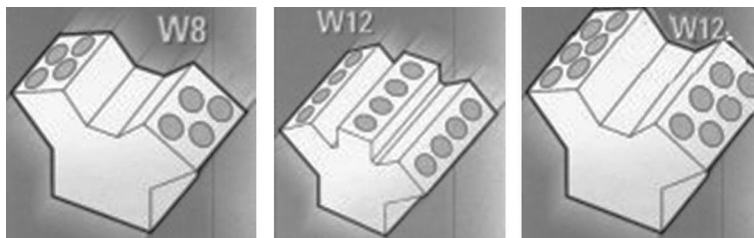


Fig. 1. 1. 1-4 New Designs in Volkswagen

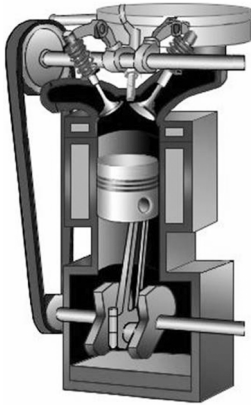
**Fuel Energy Used ( Fig. 1. 1. 1-5 and Fig. 1. 1. 1-6)**

Fig. 1. 1. 1-5 Gasoline Engine

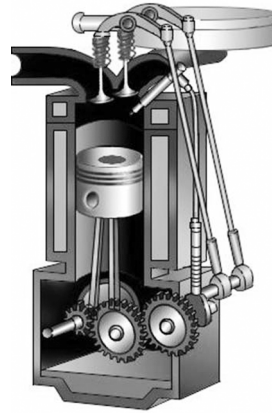


Fig. 1. 1. 1-6 Diesel Engine

**Operating Stroke ( Fig. 1. 1. 1-7 and Fig. 1. 1. 1-8)**

Fig. 1. 1. 1-7 Four Strokes

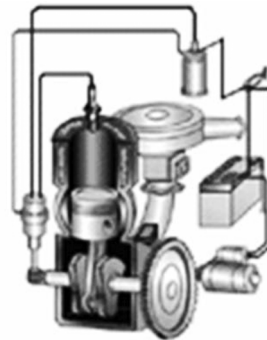


Fig. 1. 1. 1-8 Two Strokes

**Cooling Method ( Fig. 1. 1. 1-9 and Fig. 1. 1. 1-10)**

Fig. 1. 1. 1-9 Coolant Cooling

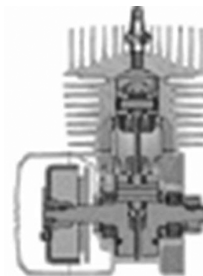


Fig. 1. 1. 1-10 Air Cooling

**1.1.2 Engine System Introduction**

When we are driving our own cars or taking a bus, even other vehicles, we are wondering that such marvelous transportations can send us anywhere we like to go. As we know, the engine

is the heart of a vehicle, and it can produce great power to propel the vehicle. Here is the configuration of an engine (Fig. 1. 1. 2-1).

Generally speaking, an engine contains one engine block, two assemblies and five systems.

One engine block means that this assembly has a cylinder block, one or two cylinder heads (if it is a V type engine) and a crankcase.

Two assemblies mean an engine crankshaft and connecting rod assembly and a valve train.

Five systems mean the fuel supply system, the lubrication system, the cooling system, the ignition system and the starting system.

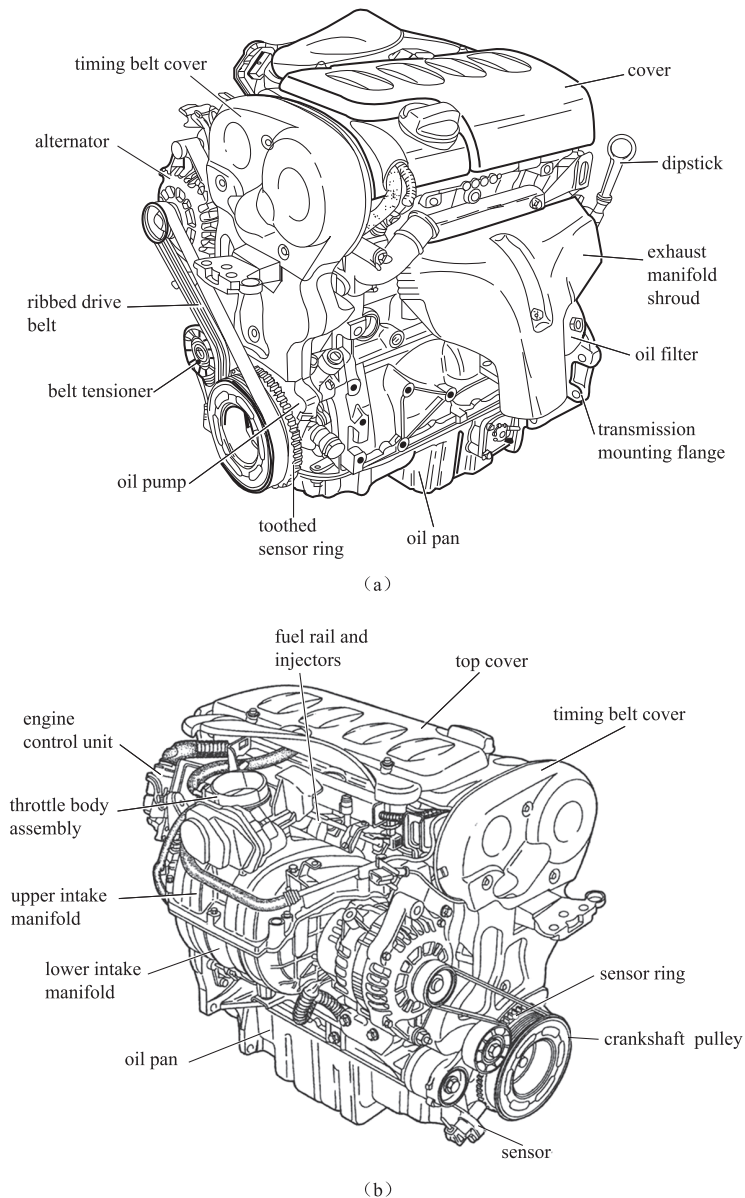


Fig. 1. 1. 2-1 Main Engine Components

(a) Left Side; (b) Right Side

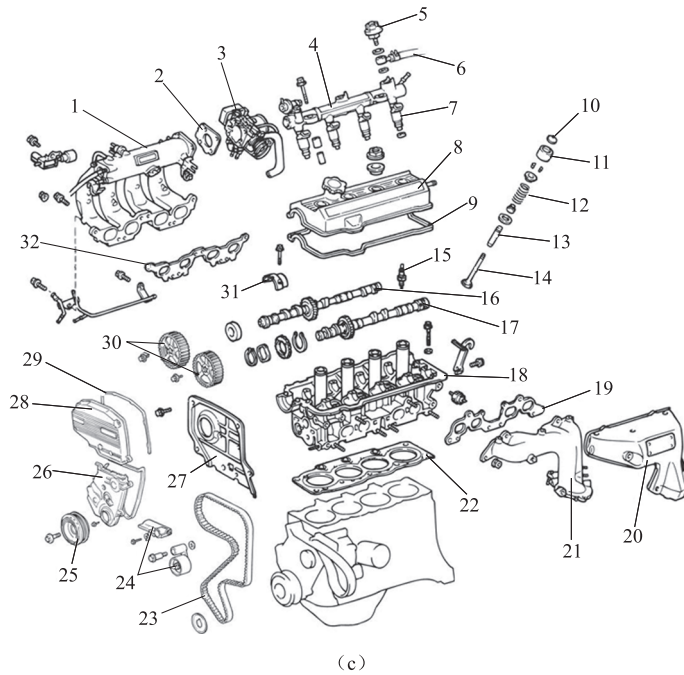


Fig. 1. 1. 2-1 Main Engine Components (Continued)

(c) Parts

1—intake manifold; 2—gasket; 3—throttle body; 4—fuel rail; 5—fuel damper; 6—fuel line; 7—injector; 8—valve cover; 9—gasket; 10—shim; 11—bucket tappet; 12—valve spring; 13—valve guide; 14—valve; 15—spark plug; 16—intake camshaft; 17—exhaust camshaft; 18—cylinder head; 19—gasket; 20—shield; 21—exhaust manifold; 22—cylinder-head gasket; 23—timing belt; 24—tensioner; 25—crankshaft pulley; 26-28—timing belt covers; 29—gasket; 30—camshaft pulleys; 31—bearing cap; 32—gasket

### 1.1.3 Four Strokes Operation

Have you ever opened the hood of your auto and wondered what was going on there? An automotive engine looks like a big confusing jumble of metal, tubes and wires to the uninitiated. You might want to know what's going on simply out of curiosity. Now we'll discuss the basic idea behind an engine operation (Fig. 1. 1. 3-1).

As we know, the internal combustion engine (ICE) seems to be the one most commonly used in the automotive field. According to the fuel energy used, internal combustion engines are further divided into gasoline engines, kerosene engines, diesel engines, etc.



Fig. 1. 1. 3-1 Engine Compartment

Most automotive engines operate on the four strokes to convert gasoline into motion. The power production cycle consists of four strokes of the piston reciprocating motion. The four strokes are illustrated in Fig. 1. 1. 3-2. They are: intake stroke, compression stroke, power stroke, and exhaust stroke.

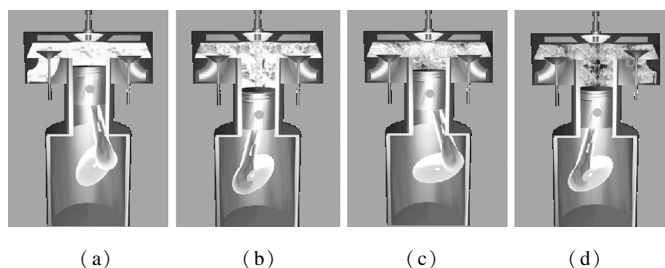


Fig. 1. 1. 3-2 Four Strokes of Engines

(a) Intake Stroke; (b) Compression Stroke; (c) Power Stroke; (d) Exhaust Stroke

### Intake Stroke

On the intake stroke, when the piston moves downward to the bottom dead center (BDC), a vacuum is created in the cylinder. Meanwhile, the intake valve opens, and the air-fuel mixture is drawn into the cylinder through the valve port. Sometimes, the intake stroke can also be called “induction stroke.”

### Compression Stroke

After the piston reaches the bottom dead center (BDC), it begins to move upward. As this happens, the intake valve closes. The exhaust valve is also closed, so that the cylinder is sealed. As the piston moves upward, it compresses the trapped air-fuel mixture. The amount that the mixture is compressed is determined by the compression ratio of the engine. The compression ratio on the average engine is in the range of 8 : 1 to 10 : 1. It means that when the piston reaches the top of the cylinder, the air-fuel mixture is squeezed to about one tenth of its original volume.

### Power Stroke

As the piston reaches the top dead center (TDC) on the compression stroke, an electric spark is produced at the spark plug. The ignition system delivers a high tension current to the spark plug to produce the spark, and ignites the air-fuel mixture. Each spark plug fires at a different time, which is determined by the engine firing order. The power process pushes the piston down the cylinder with great force turning the crankshaft to provide the power to propel the vehicle.

### Exhaust Stroke

As the piston reaches the bottom dead center (BDC) again, the exhaust valve opens to allow the exhaust gas or burned gas to be expelled through the exhaust-valve port. Since the cylinder contains so much pressure, when the valve opens, the gas is expelled with a violent force. That is why a vehicle without a muffler sounds so loud. The piston travels up to the top of the cylinder pushing all the exhaust out before closing the exhaust valve in preparation for starting the four-stroke process over again.

## Words

combustion [kəm'brʌstʃən] *n.* 燃烧  
 Volkswagen [vəʊks'wægən] *n.* 大众  
 cylinder ['silində] *n.* 气缸, 泵体  
 gasoline ['gæsəli:n] *n.* 汽油



- diesel [ 'di:zəl ] *n.* 柴油
- stroke [ strəuk ] *n.* 冲程,行程
- coolant [ 'ku:lənt ] *n.* 冷却剂,冷冻液
- marvelous [ 'mɑ:vələs ] *adj.* 令人惊叹的,非凡的
- configuration [ kən,figju'reiʃən ] *n.* 构造,轮廓
- assembly [ ə'sembli ] *n.* 装配,组合
- crankcase [ 'kræŋkkeis ] *n.* 曲轴箱
- crankshaft [ 'kræŋkʃɑ:ft ] *n.* 曲轴
- lubrication [ ,lu:bri'keiʃən ] *n.* 润滑,润滑油
- ignition [ ig'niʃən ] *n.* (汽车发动机的)发火装置,点火
- component [ kəm'pəunənt ] *n.* 零件,组件,成分,部件
- manifold [ 'mæni'fəuld ] *n.* 歧管(汽车发动机用于进气或排气)
- gasket [ 'gæskit ] *n.* 垫圈
- damper [ 'dæmpə ] *n.* 阻尼器,减振器,风门,挡板
- injector [ in'dʒektə ] *n.* 喷油器
- shim [ ʃim ] *n.* 垫片
- tappet [ 'tæpit ] *n.* 推杆,挺杆
- valve [ vælv ] *n.* 气门,阀
- tensioner [ 'tenʃənə ] *n.* 张紧器
- pulley [ 'puli ] *n.* 皮带轮
- camshaft [ 'kæmʃɑ:ft ] *n.* 凸轮轴
- hood [ hud ] *n.* 发动机罩
- automotive [ ɔ:tə'məutiv ] *adj.* 汽车的
- jumble [ 'dʒʌmbəl ] *vt. & vi.* 使混杂 *n.* 混乱,杂乱的一堆
- uninitiated [ ,ʌni'niʃieitid ] *adj.* 缺乏某种特定知识和经验的
- curiosity [ ,kjʊəri'ɔ:siti ] *n.* 好奇心,求知欲
- reciprocate [ ri'siprəkeit ] *vt. & vi.* (使)往复运动
- piston [ 'pistən ] *n.* 活塞
- port [ pɔ:t ] *n.* 通道
- induction [ in'dʌkʃən ] *n.* 吸入
- seal [ si:l ] *n. & v.* 密封
- compress [ kəm'pres ] *vt.* 压缩
- squeeze [ skwi:z ] *vt. & vi. & n.* 挤,压
- ignite [ ig'nait ] *vt. & vi.* 点火,使燃烧
- tension [ 'tenʃən ] *n.* 紧张,张紧力,拉力
- current [ 'kʌrənt ] *n.* 电流,气流,水流 *adj.* 当前的,流行的
- propel [ prə'pel ] *vt.* 推进,驱使
- expel [ iks'pel ] *vt.* 排出,喷出(空气等)
- muffler [ 'mʌflə ] *n.* 消音器
- preparation [ ,prepə'reiʃən ] *n.* 准备工作,准备措施

## Phrases and Expressions

electric motor 电动机	ignition system 点火系统
steam engine 蒸汽机	starting system 起动系统
in line 直列	intake manifold 进气歧管
gasoline engine 汽油机	throttle body 节气门体
diesel engine 柴油机	spark plug 火花塞
engine block 发动机机体	intake stroke 进气冲程
cylinder block 气缸体	compression stroke 压缩冲程
cylinder head 气缸盖	power stroke 做功冲程
connecting rod 连杆	exhaust stroke 排气冲程
crankshaft and connecting rod assembly 曲柄 连杆机构	air-fuel mixture 可燃混合气
valve train 配气机构	compression ratio 压缩比
fuel supply system 燃油供给系统	original volume 原容积
lubrication system 润滑系	firing order 点火顺序
	exhaust gas 废气

## Abbreviations

ICE (internal combustion engine) 内燃机	TDC (top dead center) 上止点
BDC (bottom dead center) 下止点	

## Practice

- What do almost all cars use to convert gasoline into motion?
  - One-stroke combustion cycle.
  - Two-stroke combustion cycle.
  - Three-stroke combustion cycle.
  - Four-stroke combustion cycle.
- Which of the following does not aid in the powering of most mainstream cars today?
  - Gas.
  - Battery.
  - Solar energy.
  - Alternator.
- A car engine's job is to \_\_\_\_\_.
  - convert fuel into heat
  - convert fuel into motion
  - convert fuel into exhaust
- A car uses a four-stroke engine. The four strokes are \_\_\_\_\_.
  - intake, compression, ignition and exhaust
  - injection, rotation, ignition and exhaust
  - injection, carburetion, rotation and exhaust
- A device that works on the same principle as a car engine is \_\_\_\_\_.
  - a nuclear submarine
  - a jackhammer
  - a spud gun
- In the intake stroke, the crankshaft has rotated about \_\_\_\_\_.

- A. 90 degrees      B. 180 degrees      C. 360 degrees      D. 720 degrees
7. Near the end of the downward movement of the piston on the power stroke, the camshaft opens the \_\_\_\_\_, but the \_\_\_\_\_ remains closed.
- A. exhaust valve; exhaust valve      B. exhaust valve; intake valve  
C. intake valve; exhaust valve      D. intake valve; intake valve
8. With the \_\_\_\_\_ at the bottom of the cylinder, the exhaust valve opens to allow the burned exhaust gas to be expelled to the exhaust system.
- A. piston      B. valve      C. camshaft      D. crankshaft
9. According to the method of ignition of the air-fuel mixture, engines are divided into \_\_\_\_\_.
- A. gas engine and steam engine  
B. gasoline engine and diesel engine  
C. external combustion engine and compression ignition engine  
D. internal combustion engine and diesel engine
10. According to the classification of valve arrangement, the engines have \_\_\_\_\_.
- A. four-cylinder engine, six-cylinder engine and eight-cylinder engine  
B. in-line engine, V-shape engine, opposed engine  
C. I-head engine, F-type engine, I-head engine  
D. air-cooled engine, water-cooled engine

## 1.2 Engine Block

In engine block, the cylinder block is the main supporting structure to which all other engine parts are attached. It contains two main sections: cylinder section and crankcase section (Fig. 1.2-1).

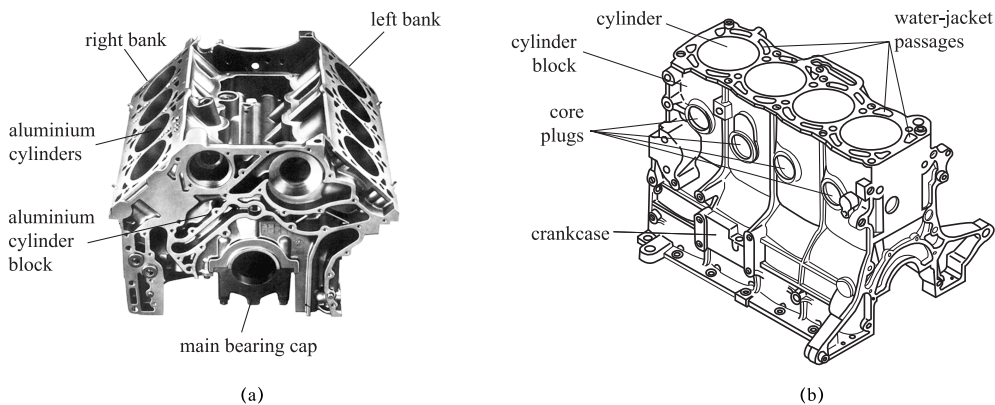


Fig. 1.2-1 Cylinder Block and Crankcase

The cylinder block is a single machined casting unit. It contains cylinders, cylinder heads, coolant passages or water sockets, and lubrication passages. And there is a drilled passageway within some blocks for the camshaft. In addition, the crankshaft is housed in the crankcase at the bottom of the cylinder block. Usually, it is cast into one piece, and made from cast iron.

However, in modern engine, it is also made from aluminium and magnesium, so that it can be much stronger enough to withstand any bending or distortion.

In addition, the crankcase (in Audi A8 6.0 W12 engine) is formed by the cylinder block and bearing support made of aluminium. The sump (also aluminium) is of two-piece design (Fig. 1.2-2).

### Cylinder Head and Gasket (Fig. 1.2-3 to Fig. 1.2-5)

A cylinder head is bolted to the top of each bank of cylinders to seal the individual cylinders and contain the combustion process that takes place inside the cylinder.

Most cylinder heads are made from cast aluminum or cast iron. The cylinder head contains at least one intake valve and one exhaust valve for each cylinder. This allows the air-fuel mixture to enter the cylinder and the burned exhaust gas to exit from the cylinder. Usually, in-line four-cylinder and six-cylinder engines have one head, while V6 and V8 engines have two.

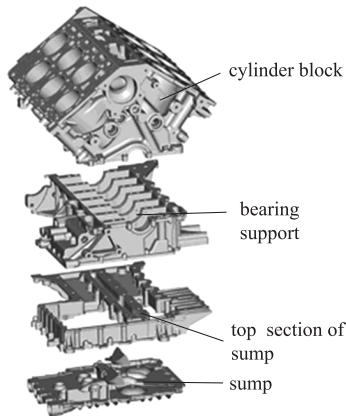


Fig. 1.2-2 Audi A8 6.0 W12 Engine  
Cylinder Block and Crankcase

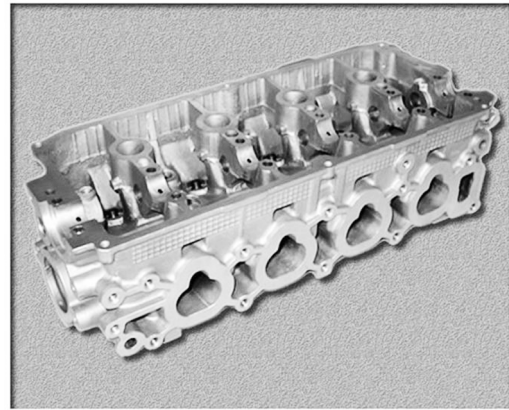


Fig. 1.2-3 Cylinder Head

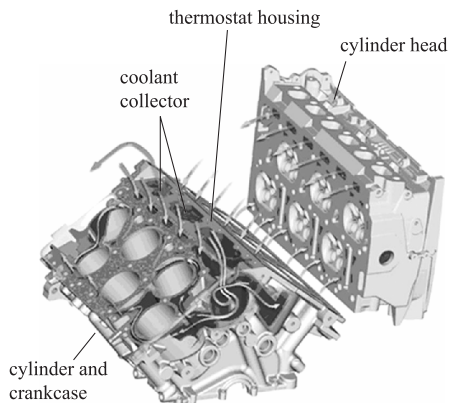


Fig. 1.2-4 Cylinder Block and One Cylinder Head

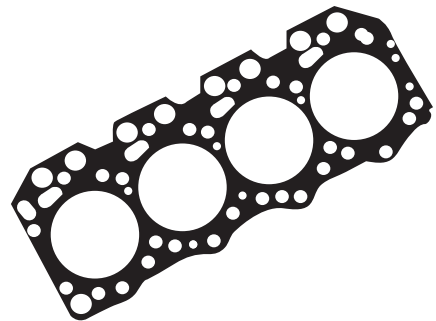


Fig. 1.2-5 Gasket

The joint between the cylinder block and the head must be tight and able to withstand the pressure and the heat developed in the combustion chamber, so the gasket is needed.

## Words



structure [ˈstrʌktʃə] *n.* 结构, 构造  
 machine [məˈʃiːn] *n.* 机器, 机械装置  
 cast [kɑːst] *vt.* 浇铸 *n.* 铸件  
 passage [ˈpæsiːdʒ] *n.* 通道, 过道  
 socket [ˈsɒkɪt] *n.* 孔, 穴, 插孔, 插座  
 drill [drɪl] *n.* 钻头, 钻床 *vt.* 钻孔  
 passageway [ˈpæsiːdʒweɪ] *n.* 过道, 出入口  
 house [haus] *vt.* 给(机器、齿轮)装外罩  
 iron [ˈaɪən] *n.* 铁  
 aluminium [ˌæljʊˈmɪnjəm] *n.* 铝  
 magnesium [mæɡˈniːzjəm] *n.* 镁  
 withstand [wɪðˈstænd] *vt.* 经受, 承受  
 sump [sʌmp] *n.* 油底壳, 油盘, 润滑油槽  
 bolt [bəʊlt] *n.* 螺栓 *vt.* 用螺栓紧固  
 bank [bæŋk] *n.* 列, 组  
 thermostat [ˈθɜːməˌstæt] *n.* 节温器

## Phrases and Expressions

water sockets 水道

cast into 浇铸成

cast iron 铸铁

bearing support 轴承座

thermostat housing 节温器盖, 恒温器壳体

coolant collector 冷却液收集器

combustion chamber 燃烧室

### Practice

- What is the core of a car's engine?
  - The cylinder.
  - The spark plug.
  - Windshield-washer fluid.
  - Exhaust.
- The engine crankcase and block are usually made from \_\_\_\_\_.
  - high-grade cast alloy iron
  - high alloy iron
  - high-grade cast alloy steel
  - high alloy steel
- Which statement about cylinder head is fault?
  - The cylinder head is bolted to a very flat surface above the cylinder portion of the block.
  - The cylinder head is cast into one piece from iron only.
  - The cylinder head forms the upper portion of the combustion chamber.
  - The cylinder head is used to hold the valves, and it has ports to allow air, fuel and exhaust to move through the engine.

4. What is the purpose of the cylinder liner?
  - A. It is used to avoid accumulating carbon deposits inside the cylinder.
  - B. It is used to avoid leaking air-fuel mixture out of the cylinder.
  - C. It is a good conductor that can carry the heat away from the cylinder.
  - D. It can be removed and replaced rather easily if the cylinder is damaged.
5. Which component does the engine block contain and support?
  - A. It contains the cylinders and supports the crankshaft and camshaft.
  - B. It contains the cylinders and supports the flywheel.
  - C. It contains the crankcase and supports the cylinders and a head.
  - D. It contains the camshaft and supports the crankshaft and camshaft.
6. Which component forms a guide for the piston and acts as a container for taking in, compressing, firing, and exhausting the air-fuel charge?
  - A. Valve guide.
  - B. Camshaft.
  - C. Cylinder.
  - D. Engine block.
7. The joint between the cylinder block and the head must be tight and able to withstand the pressure and the heat developed in the combustion chambers. What is the joint?
  - A. Water jacket.
  - B. Sleeve.
  - C. Gasket.
  - D. Plug.
8. Which material cannot be used to cast engine block?
  - A. Aluminum.
  - B. Chromium.
  - C. Gray iron.
  - D. Stannum.
9. The cylinder head contains \_\_\_\_\_ for cooling in the assembled engine.
  - A. oil passages
  - B. water jackets
  - C. a fan
  - D. an oil cooler
10. What determines the size and the placement of the engine block?
  - A. The number of spark plugs.
  - B. The number of pistons.
  - C. The number of cylinders.
  - D. The number of valves.

### 1.3 Engine Crankshaft and Connecting Rod Assembly

Engine crankshaft and connecting rod assembly is one of the assemblies in the engine. It converts thermal energy into mechanical energy used to drive the vehicle.

This assembly is composed of pistons, piston rings, connecting rods and crankshafts(Fig. 1. 3-1).

#### Piston

A piston is composed of a piston head, piston rings, piston grooves, piston lands, piston skirts, and a piston pin hole ( Fig. 1. 3-2).



Fig. 1. 3-1 Engine Crankshaft and Connecting Rod Assembly