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**National Standard of the People's Republic of China**

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Replacing GB 12732-1996

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**Automotive V-belts**

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Issued by

**General Administration of Quality Supervision, Inspection and  
Quarantine of the People's Republic of China**

## Foreword

**Subsection 5.3.4 of this Standard is mandatory; all other clauses are recommended.**

This standard and the Standard JASO E107-88 “Automotive V-belts” of the Japanese Automotive Standards Organisation are non-equivalent.

This Standard replaces GB 12732-1996, “Automotive V-belts.”

In comparison with JASO E107-88, the main changes to this standard are as follows:

- the fatigue test method for V-belts has been deleted and replaced with ISO 5287, “Belt drives - Narrow V-belts for the automotive industry - Fatigue test.” The insufficient part shall be supplemented by JASO E107, as cited in GB/T 11545;
- the dimensions of V-belts and the dimension test for long pulleys have been deleted and replaced with ISO 2790 “Belt drives - Narrow V-belts for the automotive industry and corresponding pulleys - Dimensions.” The insufficient part shall be supplemented by JASO E107, as cited in GB/T 13352;
- the AV15 model of automotive V-belts has been increased.

Compared with GB 12732-1996, the main changes to this Standard are as follows:

- the original fatigue life requirements of tested V-belts (Subsection 4.6.1 of 1996 version) have been deleted and replaced with the original requirements of first-class products and cancelled first-class products;
- in the fatigue life test on V-belts made of glass fibre rope, tension has been deleted (Subsection 6.5.2 of 1996 version);
- the requirements for the appearance and mass of edge-cut V-belts (Subsection 5.1 of this version) have been modified;

This Standard was proposed by China Petroleum and Chemical Industry Association.

This Standard is kept by the residing unit of chemical industrial rubber belt standardisation technology.

The main drafting units of this Standard were: Zhejiang Zijingang Rubber Belt Co. Ltd., Zhejiang Sanlux Rubber Corporation, Guizhou Dazong Rubber Co., Ltd., Zhejiang Sanwei Rubber Item Co., Ltd., Northwestern Polytechnical University, Henan Province Weishi County Zhongyuan Rubber Co., Ltd., and Qingdao Rubber Industry Research Institute.

The main drafters of this Standard were: Changzhi Pang, Youcan Zheng, Shuixiang Shi, Xuewei Xiang, Wenkang Ma, Shujun Li, Qingjun Zhang, and Deshen Han.

This standard supersedes the following previously issued versions:

- GB 12732-1991, GB 12732-1996.

# Automotive V-belts

## 1 Scope

This Standard sets the classifications, materials, requirements, sampling, test methods and signs, labelling, packaging, storage and transportation requirements for automotive V-belts (hereinafter referred to as V-belts).

This Standard applies to V-belts that drive the auxiliary equipment of internal combustion engines for automobiles (such as fans, power generators, water pumps, power-steering pumps, compressors, etc.).

## 2 Normative references

The provisions of the following documents become provisions of this Standard after being referenced. For dated reference documents, all later amendments (excluding corrigenda) and versions do not apply to this Standard; however, any parties that come to an agreement under this standard are encouraged to consider adopting the latest versions of these document. For undated reference documents, the latest versions apply to this Standard.

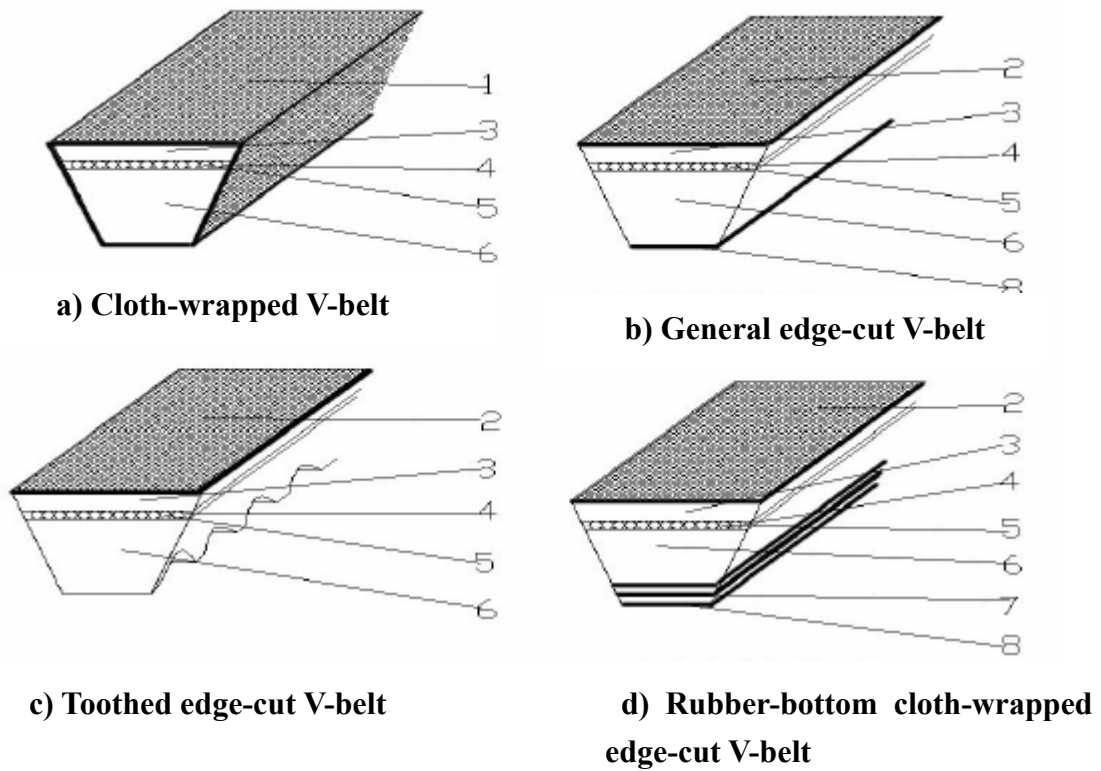
GB/T 3686	V-belts - Tensile strength and elongation test method
GB/T 11545	V-belt drives for the automotive industry - Fatigue test (GB/T 11545-1996, eqv. ISO 5287: 1985)
GBT 13352	Automotive V-belts - Dimensions

## 3 Classification

### 3.1 Type

V-belts are classified according to their structure as either edge-wrapped or edge-cut. Edge-cut V-belts are sub-divided into 3 types: general edge-cut V-belts, tooth edge-cut V-belts and rubber-bottom cloth-wrapped edge-cut V-belts (see figure 1).

**Figure 1 Structure of V-belts**



**a) Cloth-wrapped V-belt**

**b) General edge-cut V-belt**

**c) Toothed edge-cut V-belt**

**d) Rubber-bottom cloth-wrapped edge-cut V-belt**

- 1 – Wrapping cloth
- 2 – Top cloth
- 3 – Top rubber
- 4 – Buffer rubber
- 5 – Core rope
- 6 – Bottom rubber
- 7 – Bottom rubber with cloth
- 8 – Bottom cloth

### **3.2 Model number**

V-belts should have a symmetrical trapezium cross-section. There are 5 different model numbers, which are classified according to the top width of the V-belt: AV10, AV13, AV15, AV17 and AV22.

## **4 Materials**

### **4.1 Rubber**

The composition of the top rubber, buffer rubber and bottom rubber should be even. The respective performance of each should meet the requirements attributed to its respective intended performance.

## 4.2 Fabric

The material used for the wrapping cloth, top cloth, bottom cloth, and bottom rubber with cloth should be cotton or synthetic fibres. The density of longitudinal threads and latitudinal threads should be even. Yarns and fabrics should have no defects, imperfections or distortions, etc. that may affect the quality of the V-belt.

## 4.3 Core rope

The core rope should be made of a high-performance fibre such as polyester, and its twist should be even.

## 5 Requirements

### 5.1 Quality of appearance

V-belts should have no obvious visible defects that may affect their use, such as distortion, cracking, air holes, air bubbles or inlaid objects. The width of the cut-edge by the single side of the top surface of edge-wrapped V-belts should not exceed 0.5mm, and the trimming should not damage the inner wrapping cloth. No layered edge of cutting should be found on the lateral surface and top surface of edge-cut V-belts. There should be no defects such as separated layers, lap seams detached from the top cloth or obvious bending of wire ropes, etc.

### 5.2 Dimensions

The dimensions of V-belts and their movement should meet the requirements of GB/T 13352.

### 5.3 Physical performance

#### 5.3.1 Tensile performance

The tensile strength of V-belts and the elongation of reference forces are indicated in Table 1.

**Table 1 Tensile strength of V-belts and elongation of reference force**

Model No	AV 10	AV 13	Av 15	AV 17	AV 22
Tensile strength / N $\geq$	2260	3140	3700	4420	7060
Elongation of reference force / % $\leq$	4	4	4	6	6
Reference force / N	790	1480	1800	2360	3930

#### 5.3.2 Performance: resistance to high temperatures

V-belts should be tested for resistance to high temperatures as according to the methods stipulated in Subsection 7.3. After the test, no fractures should be found on the V-belt.

### **5.3.3 Performance: resistance to low temperatures**

V-belts should be tested for resistance to low temperatures as according to the methods stipulated in Subsection 7.4. After the test, no fractures should be found on the V-belt.

### **5.3.4 Fatigue life**

The fatigue life of edge-wrapped V-belts should not be less than 55 hours; the fatigue life of edge-cut V-belts should not be less than 80 hours.

## **6 Sampling**

**6.1** Quality inspections should be carried out on the appearance of V-belts.

**6.2** One batch of V-belts of the same model number or kind of material, manufactured at the same time, should not contain more than 50,000 belts. No less than 0.5% of a batch should be used as samples when inspecting dimensions. V-belts with requirements for assembly should undergo individual inspections at length, and assembling signs should be attached to each product.

**6.3** Each model number of V-belt should undergo a tensile strength test at least twice every month.

**6.4** V-belts should undergo high temperature and low temperature resistance tests at least once every 3 months, and the number of samples should not be less than two belts.

**6.5** For fatigue tests carried out on V-belts of the same model number and material, if the monthly output is greater than 120,000 belts, fatigue tests should be carried out once every 3 months; if the monthly output is less than 120,000 belts, fatigue tests should be carried out every six months. At least 2 belts should be tested at every sampling. If a belt (or two belts) fails the test, the number of failed V-belt samples multiplied by two should be taken out as samples for re-testing. If one sample belt fails when re-tested, the batch of products shall be considered as failed products, and tests should then be carried out on other batches.

**6.6** If any items fail the tests as described in Subsections 6.3 ~ 6.4, twice the number of failed samples should be taken out from the same batch and re-tested. If the test results indicate that one item has failed once again, the batch of products shall be considered as failed products.

## **7 Test methods**

### **7.1 Dimensions**

The length, exposed length, and the change in distance between centres are tested according to the requirements stipulated in GB/T 13352.

### **7.2 Tensile test**

The tensile strength of V-belts and the elongation of reference forces are tested according to the requirements stipulated in GB/T 3686.

### 7.3 High temperature test

Cut a length of around 250mm from the test sample and place it under a temperature of  $100^{\circ}\text{C} \pm 1^{\circ}\text{C}$  continuously for  $70^{+5}_0$  hours. Next, allow the sample to cool down at room temperature for at least 2 hours. After cooling, bend the sample in a normal bending direction on a tube or rod with a diameter as specified in Table 2. Observe whether any fractures appear on the sample.

**Table 2 Diameter of tube or rod**

Unit: mm

Model No	AV 10	AV 13	Av 15	AV 17	AV 22
Diameter of tube or rod	45	50	50	55	60

### 7.4 Low temperature test

Having carried out the high temperature test as described in Subsection 7.3, place the sample under a temperature of  $-30^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for  $70^{+2}_0$  hours. Immediately afterwards bend the product in a normal bending direction on a tube or rod, of which the diameter is specified in Table 2. Observe whether any fractures appear on the sample.

### 7.5 Fatigue life test

The fatigue life of a V-belt is tested as according to the requirements of GB/T 11545.

## 8 Sign, label, package, storage and transportation

### 8.1 Sign

**8.1.1** A noticeable sign that cannot be washed away by water should be visible on each belt. The sign should include the following contents:

- a) name and trademark of manufacturer;
- b) specifications (mark);
- c) year and month of manufacturing, or batch number.

**8.1.2** Belts to be assembled should be indicated by an assembling sign on its packaging or in another appropriate position.

### 8.2 Labelling

V-belts are labelled based on the same model number and the same effective length. The marks and assembling numbers of V-belts should be the same in each packet. An appropriate packaging bag or box should be used when packing the products. A label containing the following contents should be provided on each bag or box:

- a) name and trademark of manufacturer;
- b) mark;
- c) number of V-belts in each bag or box;



- d) year and month of manufacturing;
- e) seal of certification affixed by quality inspection department;
- f) use and maintenance conditions of V-belt.

### **8.3 Storage and transportation**

#### **8.3.1**

Direct sunshine and rainwater should be avoided during the transportation and storage of V-belts. V-belts should be kept clean and prevented from contacting substances that may affect their quality, such as acid, alkaline, oil and organic solvents. Prevent the machine from being damaged, and keep it at a distance higher than 1m from the heating device.

**8.3.2** The temperature of warehouses in which V-belts are stored should be kept at between  $-18^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$ , and the relative humidity should not exceed 80%.

**8.3.3** During the storage period, V-belts should not bear excessive weight, which may cause deformation to the product. V-belts should be suspended on a stand in the shape of a crescent moon, or laid flat on a shelf.

**8.4** Under the condition that the V-belts comply with Subsection 8.3, the manufacturer guarantees that the physical mechanical performance of V-belts may still meet the requirements of this Standard within a storage period of no more than 2 years as of the manufacturing date of the product.

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