

Preface

This standard is an automotive standard that has been established by the Standardization Board, following deliberation of the Standardization Committee, in accordance with the Standardization Board system regulations based on the Japanese Automobile Standards Organization statutes.

If the second part of the regulations is followed, it is possible that the rights of the following patent will be exploited:

Name of Invention	Fuse Element and Fuse Mounting Device
Japanese Patent Application Publication No.	2001-250466
Application Publication Date	September 14, 2001

Note that, citation here of the above patent exerts no impact of any nature on the validity, scope or other facets of the patent rights thereof. The holder of the above patent has provided the Standardization Committee of the Japanese Automobile Standards Organization with assurance of its willingness to license, on impartial and reasonable terms, use of the above patent to any third parties. There is a possibility that sections of all parts of this standard may infringe or have a legal bearing on patent rights, laid-open patent applications, utility model rights, and laid-open utility model no. applications of a technology-related nature, in addition to possibly infringing the rights of the above publication. The Standardization Committee of the Japanese Automobile Standards Organizations accepts no responsibility of any nature with regard to confirmation of such patent rights, laid-open patent applications, utility model rights, and laid-open utility model no. applications of a technology related nature.

JASO D621-2 has the following Annex:

Annex (Provisions) Performance requirements for terminal contacts of 42V fuse-links with tabs (blade type), miniature type

JASO D621 includes the following parts:

Part 1: Definitions and general test requirements

Part 2: Fuse-links with tabs (blade type); Miniature type

Part 3: Fuse-links with female contacts (type A) and bolt-in contacts (type B)

Automotive parts - 42V Fuse-links -

Part 1: Definitions and general test requirements

Introduction

This standard has been established because the test conditions for the 42V fuse-link is different from those specified in **JASO D612** (for 12/24 V) issued in 2001.

1. Scope

This standard specifies definitions for the low-voltage fuse-link used in automobiles with a system voltage of 42V, a rated voltage of 58 V, and a breaking current of 1000 A (hereinafter referred to as simply "fuse-link"). In addition, the standard specifies general conditions relating to testing, basic test methods and performance requirements.

2. Normative references

The following standards, when referred to in this standard, constitute a part of the specifications of this standard. As required, the most recently updated version of the applicable standard (including addenda) shall be applied.

JASO D612-1: Automotive parts - Fuse-links - Part 1: Definitions and general test requirements

3. Definitions

Definitions of main terms used in this standard shall be as specified in **JASO D612-1, 3** (Definitions).

4. Identification and marking

4.1 Marking of rated current value

As a primary means of identifying the rated current value, permanently mark the value of the fuse-link on the top surface thereof. As a secondary means of identification, show the rated current by using color coding in line with the specifications in **Part 2** or **3** of this standard.

4.2 Marking of rated voltage value

As per **JASO D612-1, 4.2** (Marking of rated voltage value).

4.3 Marking of manufacturer's name

As per **JASO D612-1, 4.3** (Marking of manufacturer's name).

5. Test method

5.1 General conditions

For all fuse-links, perform the tests specified in **5.2** to **5.9** in accordance with the following conditions.

- In all tests other than the vibration durability test and the temperature and humidity cycling test, mount the terminal surface of the fuse-link horizontally.
- Perform all electrical tests with (i) a direct current that is maintained within the ± 1 % range unless tolerance is specified for current and voltage, and (ii) at (23 ± 5) °C.
- Mount the fuse-link in the standard test fixture as specified in **Part 2** or **3** of this standard, or any alternate fixture with equivalent electrical, mechanical and thermal properties.
- The size of the electric wire used in all burn-in tests shall be as specified in **Attached Table 1** in **Part 2** or **3** of this standard, and the length shall be 600 mm or more. If a test is conducted with two or more fuse-links mounted in series, any two fuse-links shall be 150 mm or more apart when mounted.
- Use copper-alloy dummy fuse-links or fuse-links when confirming the voltage.
- Do not apply current to the fuse-links during the vibration durability test and the resistance to environment test.

- To remove a fuse-link, apply a pulling force to the insulator two minutes after breaking the current.

5.2 Voltage drop

Measure the voltage drop (mV) at a point between the two points specified in **5.2** in **Part 2** or **3** of this standard after applying the rated current to the fuse-links for 15 mins.

5.3 Transient current cycling

For transient current cycling, use the resistance load to change the transient current in accordance with the percentage for the fuse-link rated current specified in **Part 2** or **3** of this standard. This shall be deemed as one cycle, and a minimum of 50,000 cycles shall be repeated continuously in accordance with the applicable provision in **Part 2** or **3**.

5.4 Vibration durability

As per **JASO D612-1, 5.4** (Vibration durability).

5.5 Resistance to environment

As per **JASO D612-1, 5.5** (Resistance to environment).

5.6 Operating time rating test

Before performing the operating time rating test, stabilize the test fixture and the fuse-links at (23 ± 5) °C. Adjust the power supply to the test current specified in **Part 2** or **3** of this standard, and then apply current to the fuse-links and measure the operating time. Repeat this procedure for each fuse-link. If a large number of fuse-links are to be tested, allow sufficient cooling time to prevent overheating of the test fixture.

For this test, use a power supply with a direct current of 58 V or less, and a time constant of 2 ms or less.

5.7 Current steps

As per **JASO D612-1, 5.7** (Current steps).

5.8 Breaking capacity

Perform the breaking capacity test using the circuit specified in **Attached Figure 1** of this **Part**. Use a power supply with a direct current of $(58 + 2.0 / - 0)$ V, and a time constant of (2.0 ± 0.5) ms. First, insert the dummy [K], then close the switch [Sch], and adjust the circuit current to (1000 ± 50) A with the adjustable resistor [R]. Next, open the switch to remove the dummy, and insert the fuse-link to be tested [Si] and close the switch. After the fuse-link blows, maintain the power supply voltage for 30 sec, and measure the leakage current. Then, open the switch, and remove the fuse-links. The conductor cross-sectional area shall be as specified in **Attached Table 1** in **Part 2** or **3** of this standard, and the length shall be 600 mm or more.

5.9 Strength of terminals

The strength of the terminals shall be as specified in **Part 2** or **3** of this standard.

6. Performance

6.1 General

After the test is conducted in accordance with the method specified in **5** following the test sequence specified in **Part 2** or **3** of this standard, the fuse-links must remain intact when removed from the test fixture, and shall meet the performance requirements specified in **6.2** to **6.9**. Further, the following phenomenon shall not be present:

- The markings being unintelligible
- The color coding being unintelligible

6.2 Voltage drop

The maximum voltage drop measured at a temperature of (23 ± 5) °C shall not exceed the value specified in **Part 2** or **3** of this standard.

6.3 Transient current cycling

After 50,000 transient current cycles are repeated, the fuse-link shall meet the operating time requirements specified in **Part 2** or **3** of this standard.

6.4 Vibration durability

After the vibration conditions are applied three-directionally for a total of six hours, the fuse-link shall meet the operating time requirements specified in **Part 2** or **3** of this standard.

6.5 Resistance to environment

6.5.1 Temperature and humidity durability test

After a minimum of ten cycles are repeated, the fuse-link shall meet the operating time requirements specified in **Part 2** or **3** of this standard, and shall be free of any defect that is detrimental to use.

6.5.2 Resistance to oil

6.5.2.1 Resistance to lubricating oil

After being immersed in lubricating oil, the fuse-link shall meet the operating time requirements specified in **Part 2** or **3** of this standard, and shall be free of any defect that is detrimental to use.

6.5.2.2 Resistance to fuel

After being immersed in fuel, the fuse-link shall meet the operating time requirements specified in **Part 2** or **3** of this standard, and shall be free of any defect that is detrimental to use.

6.6 Operating time rating test

The operating time of the fuse-link shall be within the range specified in **Part 2** or **3** of this standard. After the test, the current through the fuse-link shall be 0.5 mA or less at a direct current of 58 V.

6.7 Current steps

After the fuse-link blows, measure the current through the fuse-link between the terminals at a direct current of 58 V. The current shall be 0.5 mA or less. Further, it must be possible to remove the fuse-link from the test fixture two minutes after the test is completed.

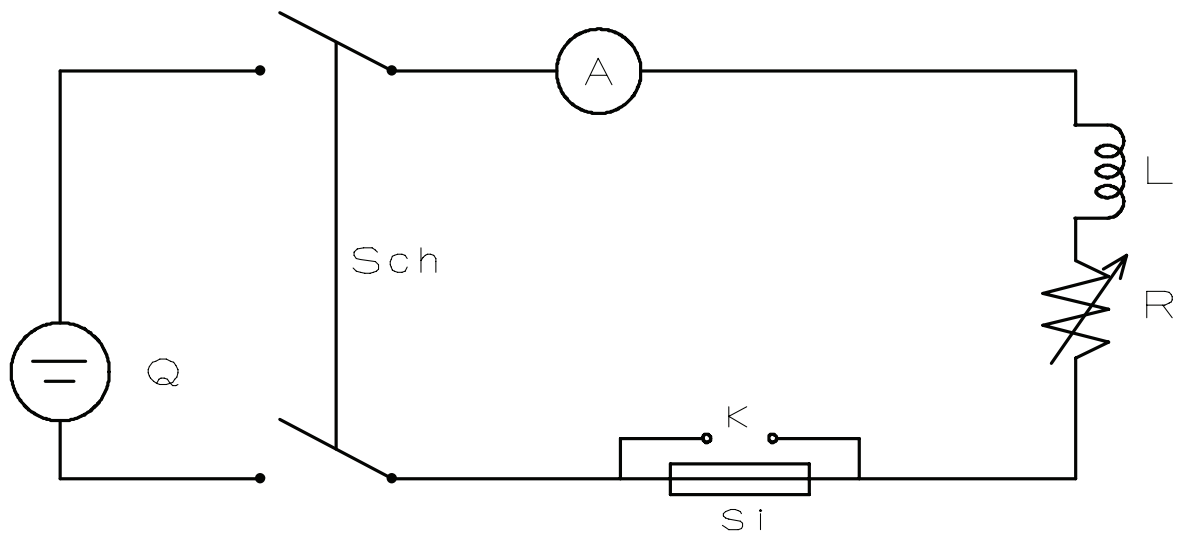
6.8 Breaking capacity

After the fuse-link blows, measure the current through the fuse-link between terminals at a direct current of 58 V. The current shall be 0.5 mA or less. Further, it must be possible to remove the fuse-link from the test fixture. Moreover, the following phenomenon or problems shall not be apparent:

- Continuous arcing
- Visible through-holes in the outer surface
- Melting of the terminal sections

6.9 Strength of terminals

After testing, the permanent displacement caused by the force applied in the direction specified in **Part 2** or **3** of this standard shall be 0.5 mm or less.



Remark: Symbols in the above figure are as follows:

- A: Ammeter
- K: Dummy fuse-link
- L: Inductor, air core
- Q: Power supply, DC 58 V
- R: Adjustable resistor
- Sch: Switch
- Si: Fuse-link mounted in test fixture

Attached Figure 1 Breaking capacity test circuit

Automotive parts - 42V Fuse-links -

Part 2: Fuse-links with tabs (blade type); Miniature type

1. Scope

This standard specifies the low-voltage fuse-link with tabs (blade-type; miniature type) with a rated current of 30 A or less for use in automobiles with a system voltage of 42V, a rated voltage of 58 V, and a breaking current of 1000 A (hereinafter referred to as "fuse-link"). This standard also specifies the shape of the fuse slot of the fuse holder that is adopted in order to prevent inadvertent use of the miniature type fuse-link specified in **JASO D612-3** in a 42V circuit.

2. Normative reference

The following standards, when referred to in this standard, constitute a part of the specifications of this standard. As required, the most recently updated version of the applicable standard (including addenda) shall be applied.

JASO D612-1: Automotive parts - Fuse-links - Part 1: Definitions and general test requirements

JASO D612-3: Automotive parts - Fuse-links - Part 3: Fuse-links with tabs (blade type)

JASO D621-1: Automotive parts - 42V Fuse-links - Part 1: Definitions and general test requirements

3. Definitions

Definitions of the main terms used in this standard shall be as specified in **JASO D612-1, 3** (Definitions).

4. Identification and marking

Marking of identification on fuse-links shall be as specified in **JASO D621-1, 4** (Identification and marking) and **Attached Table 3** of this **Part**.

5. Test method

5.1 Standard test fixture

The standard test fixture shall be set up in accordance with **Attached Figure 3** of this **Part**, and the voltage drop at the connections (V_{cd-Vab}) shall be 2 mV/A or less, and the total voltage drop at the connections (V_{ef}) shall be 4 mV/A or less.

Perform the measurement using the dummy fuse-link shown in **Attached Figure 2** of this **Part**, while applying a current of 10 A.

5.2 Voltage drop

Voltage drop (mV) shall be as specified in **JASO D621, 5.2** (Voltage drop). However, perform the measurement at a point between points a and b on the fuse-link terminals shown in **Attached Figure 3** of this **Part**.

5.3 Transient current cycling

As per **JASO D612-3, 5.3** (Transient current cycling).

5.4 Vibration durability

As per **JASO D612-1, 5.4** (Vibration durability).

5.5 Resistance to environment

As per **JASO D612-1, 5.5** (Resistance to environment).

5.6 Operating time rating test

As per **JASO D621-1, 5.6** (Operating time rating test).

5.7 Current steps

As per JASO D612-1, 5.7 (Current steps).

5.8 Breaking capacity

As per JASO D621-1, 5.8 (Breaking capacity). However, the conductor cross-sectional area shall be as specified in **Attached Table 1** of this Part.

5.9 Strength of terminals

For the testing of the strength of terminals, follow the methods shown in **Attached Figures 4A** and **4B**, and apply the force specified in **Table 1** to the fuse-link terminal.

5.10 Test sequence

Perform the tests following the sequence specified in **Attached Table 2** of this Part.

Table 1 Applied force to terminal

Force(F_1, F_2) N
50 ± 1

6. Performance

6.1 General

JASO D621-1, 6.1 (General) shall apply. Additionally, the following requirements shall be met. The electrical connection status of the fuse-link shall be recognizable when the tests up to test sequence 9 in **Attached Table 2** of this Part are performed.

6.2 Voltage drop

As per JASO D621-1, 6.2 (Voltage drop), and **Attached Table 3** of this Part.

6.3 Transient current cycling

As per JASO D621-1, 6.3 (Transient current cycling).

6.4 Vibration durability

As per JASO D621-1, 6.4 (Vibration durability).

6.5 Resistance to environment

As per JASO D621-1, 6.5 (Resistance to environment).

6.6 Operating time rating test

As per JASO D621-1, 6.6 (Operating time rating test), and **Attached Table 4** of this Part.

6.7 Current steps

As per JASO D621-1, 6.7 (Current steps).

6.8 Breaking capacity

As per JASO D621-1, 6.8 (Breaking capacity).

6.9 Strength of terminals

As per JASO D621-1, 6.9 (Strength of terminals).

7. Shape and Dimensions

7.1 Fuse-link

The shape and dimensions of the fuse-links shall be as shown in **Attached Figure 1** of this Part.

7.2 Fuse slot of fuse holder

The shape and dimensions of the fuse slot of the 42V fuse holder shall be as shown in **Attached Figure 5** of this Part.