
**Road vehicles — Connection interface
for pyrotechnic devices, two-way and
three-way connections —**

**Part 2:
Test methods and general
performance requirements**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

*Véhicules routiers — Interface de raccordement pour dispositifs
pyrotechniques, deux voies et trois voies —*

Partie 2: Méthodes d'essai et exigences des performances générales

[https://standards.iteh.ai/catalog/standards/sist/35e54d80-f90-4760-a443-
bc6a0ead1d1f/iso-19072-2-2019](https://standards.iteh.ai/catalog/standards/sist/35e54d80-f90-4760-a443-bc6a0ead1d1f/iso-19072-2-2019)



iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 19072-2:2019

<https://standards.iteh.ai/catalog/standards/sist/35e54d80-f90-4760-a443-bc6a0ead1d1f/iso-19072-2-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Functional characteristics of mated connectors	2
4.1 General.....	2
4.2 Visual examination.....	2
4.3 Mating and unmating.....	2
4.4 Resistance to tensile and compressive force between the connector and squib holder equipped with initiator and retainer.....	3
4.4.1 Test.....	3
4.4.2 Requirements.....	4
4.5 Mechanical strength of the retainer in the squib holder.....	5
4.5.1 Test.....	5
4.5.2 Requirements.....	5
4.6 Combination of temperature/humidity/vibration.....	6
4.6.1 Test.....	6
4.6.2 Requirements.....	8
4.7 Coding.....	9
4.7.1 Test.....	9
4.7.2 Requirements.....	9
4.8 Polarisation.....	9
4.8.1 Test.....	9
4.8.2 Requirements.....	9
4.9 Contact resistance (voltage drop), millivolt test.....	9
4.9.1 Test.....	9
4.9.2 Requirements.....	11
4.10 Insulation resistance.....	11
4.11 Withstand voltage.....	11
4.12 Thermal ageing.....	11
4.13 Opening and closing of the short-circuit.....	11
4.14 Short-circuit resistance.....	12
4.14.1 Test.....	12
4.14.2 Requirements.....	13
4.15 Rapid change of temperature (thermal shock).....	13
4.16 Chemical fluids.....	13
5 Test sequences	13
Annex A (normative) Sealed variant of the pyrotechnic device/initiator harness connector assembly	15
Annex B (normative) Two-way (without ground) variant of the pyrotechnic device/initiator harness connector assembly	17
Annex C (normative) Variant without retainer of the pyrotechnic device/initiator harness connector assembly	19
Bibliography	20

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 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This third edition cancels and replaces the second edition (ISO 19072-2:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

- [4.4.2.1 Table 1](#), force and torque requirements for straight connectors;
- [4.4.2.2 Table 2](#), force and torque requirements for right angle connectors;
- [4.9.1.2 Figure 8](#) including key, signal contact resistance;
- [4.9.2.1 Table 5](#), maximum signal contact resistance;
- [4.9.2.2 Table 6](#), maximum contact resistance between ground and squib holder.

A list of all parts in the ISO 19072 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

Road vehicles integrate an increasing number of pyrotechnic devices contributing to occupant safety in vehicles (for example, frontal and side air bags, safety belt pretensioner, etc.).

To build the complete system providing the function requires a supply of various components from several different equipment makers. Vehicle manufacturers need to define a common specification to ensure that connectors designed and produced by the various equipment makers meet the same performance criteria and requirements.

In the current design of this vehicle equipment, three areas of connection have been identified:

- between the pyrotechnic device (e.g. initiator) and the harness connector;
- between the tab holder and the clip holder of the harness connector;
- between the harness connector and the electronic control module.

The connection between the pyrotechnic device and the harness connector is the only connection that can be standardized and forms the subject of this document. Due to the location of the safety device in the vehicle, the connector design could be a right angle or straight.

A sealed variant of the pyrotechnic device/initiator harness connector assembly is defined in [Annex A](#).

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 19072-2:2019](#)

<https://standards.iteh.ai/catalog/standards/sist/35e54d80-f90-4760-a443-bc6a0ead1d1f/iso-19072-2-2019>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 19072-2:2019

<https://standards.iteh.ai/catalog/standards/sist/35e54d80-f990-4760-a443-bc6a0ead1d1f/iso-19072-2-2019>

Road vehicles — Connection interface for pyrotechnic devices, two-way and three-way connections —

Part 2: Test methods and general performance requirements

1 Scope

This document specifies the performance criteria and requirements of a three-way connection interface, including ground connection, linking the pyrotechnic device and harness connector built into a road vehicle.

Performance criteria and requirements are defined for a sealed variant of the pyrotechnic device/initiator harness connector assembly (see [Annex A](#)).

Performance criteria and requirements are defined for a two-way (without ground) variant of the pyrotechnic device/initiator harness connector assembly (see [Annex B](#)).

Performance criteria and requirements are defined for a variant without a retainer of the pyrotechnic device/initiator harness connector assembly (see [Annex C](#)).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8092-2, *Road vehicles — Connections for on-board electrical wiring harnesses — Part 2: Definitions, test methods and general performance requirements*

ISO 20653, *Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

connector

assembly used to connect several conductors together or a single conductor to an appliance

Note 1 to entry: A male (female) connector is a *housing* (3.2) containing male (female) contacts and accessory items. A male connector may be permanently fixed to a wiring harness or to an appliance [an electronic control unit (ECU) for example]. A female connector is generally permanently fixed to a wiring harness.

[SOURCE: ISO 19072-1:2019, 3.1]

3.2

housing

connector (3.1) without its contacts

[SOURCE: ISO 19072-1:2019, 3.2]

3.3

retainer

ring holding an optional shorting clip (shunt) and providing coding and electrical insulation, generally made of plastic

Note 1 to entry: The shorting clip (shunt) may be omitted by decision between manufacturer and supplier.

[SOURCE: ISO 19072-1:2019, 3.5]

3.4

short-circuited initiator

inert *initiator* (3.6) with two male contacts internally short-circuited with a shunt, used for testing

3.5

squib holder

part of the pyrotechnic device, holding the *initiator* (3.6) and the *retainer* (3.3)

3.6

initiator

part of the pyrotechnical device with two male contacts

ITeH STANDARD PREVIEW
(standards.iteh.ai)

4 Functional characteristics of mated connectors

4.1 General

ISO 19072-2:2019

<https://standards.iteh.ai/catalog/standards/sist/35e54d80-f90-4760-a443-1168e5d10422/iso-19072-2:2019>

Mated connectors shall meet the requirements specified in 4.2 to 4.16.

Unless other specifications are given, the temperature class to be taken into account for these tests (see ISO 8092-2) is class 2.

4.2 Visual examination

The test and corresponding requirements shall comply with ISO 8092-2.

4.3 Mating and unmating

The test shall be carried out in compliance with ISO 8092-2 by measuring the force applied on the connector.

The connector shall not be locked during the mating and unmating process unless otherwise specified.

The mating/unmating sequence shall comply with the one described in Table 7.

The maximum connecting and disconnecting force measured on the connector shall be less than 40 N.

NOTE The movements of the mating sequence (Table 7) can be carried out simultaneously with the same force.

4.4 Resistance to tensile and compressive force between the connector and squib holder equipped with initiator and retainer

4.4.1 Test

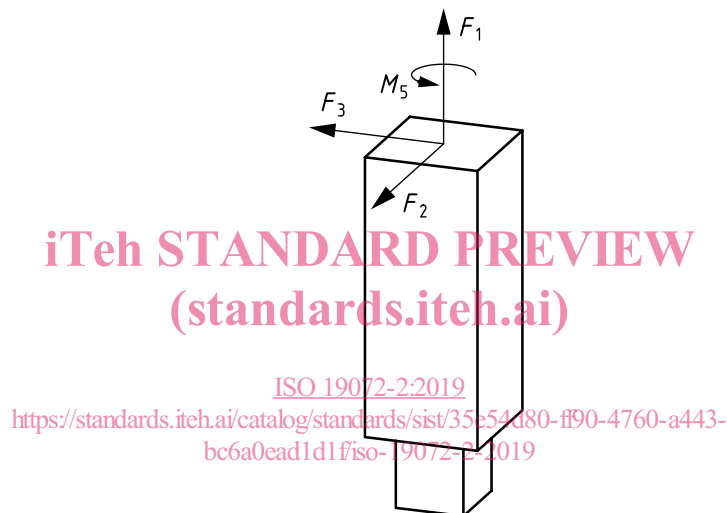
4.4.1.1 General

The connector shall be locked for testing.

This test is a destructive test carried out on an assembly comprising a squib holder, an initiator with male contacts, and a retainer.

4.4.1.2 Straight connectors

The test is carried out on a new sample, applying the forces in the directions shown in [Figure 1](#) on the straight connector without its cable.



Key

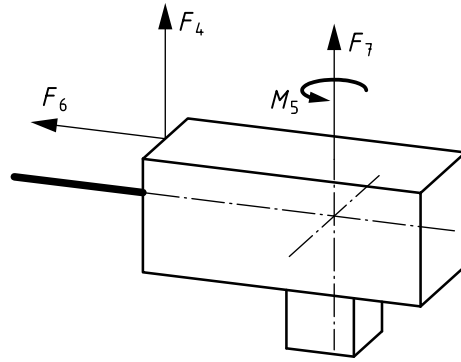
- F_1 tensile force
- F_2 tensile and compressive forces
- F_3 tensile and compressive forces
- M_5 torque

Figure 1 — Direction of forces applied on straight connectors

4.4.1.3 Right-angle connectors

The test is carried out on a new sample, applying the forces F_4 and F_6 on the connector body where the cable exits the connector in the directions shown in [Figure 2](#).

Apply the force F_7 in the central axis of the connector as shown in [Figure 2](#).



Key

- F_4 tensile and compressive forces
- F_5 tensile and compressive forces
- F_7 tensile force
- M_5 torque

Figure 2 — Direction of forces applied on right-angle connectors

4.4.2 Requirements

4.4.2.1 Straight connectors

Mated straight connectors shall be able to withstand minimum forces and torque indicated in [Table 1](#).

Table 1 — Minimum tensile and compressive force values for straight connectors

Forces/torque applied to straight connectors	Minimum values of tensile/compressive forces or torque for straight connectors	ISO	Variant
F_1	120 N ^a		
F_2	80 N		
F_3	80 N		
M_5	1,0 Nm	ISO 19072-4	Two-way connections
	0,6 Nm		Three-way (with ground) connections (Annex A)
	1,5 Nm	ISO/TS 19072-5	Two-way connections

^a For the test carried out with force F_1 , after 10 cycles, the value of the minimum force is 100 N.

4.4.2.2 Right-angle connectors

Mated right-angle connectors shall be able to withstand minimum forces and torque indicated in [Table 2](#).

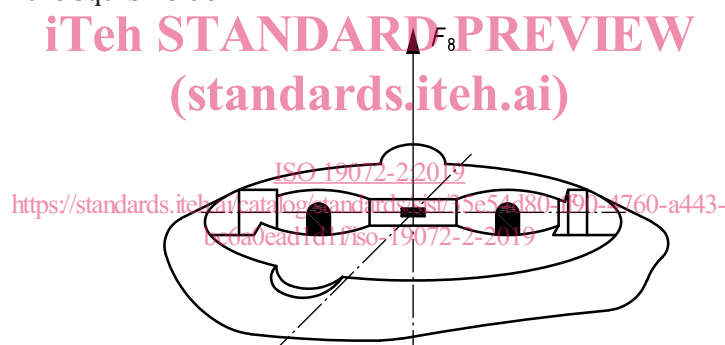
Table 2 — Minimum values of tensile/compressive forces or torque for right-angle connectors

Forces/torque applied to right-angle connectors	Minimum values of tensile/compressive forces or torque for right-angle connectors	ISO	Variant
F_4	70 N		
M_5	1,0 Nm	ISO 19072-4	Two-way connections
	0,6 Nm		Three-way (with ground) connections (Annex A)
	1,5 Nm	ISO/TS 19072-5	Two-way connections
F_6	80 N		
F_7	100 N		

4.5 Mechanical strength of the retainer in the squib holder

4.5.1 Test

The test is carried out on a new sample by applying the force in the direction shown in [Figure 3](#) on the retainer installed in the squib holder.



Key

F_8 force applied to retainer installed in squib holder

Figure 3 — Direction of force applied to the retainer installed in the squib holder

4.5.2 Requirements

The retainer installed in the squib holder without mated connector shall withstand minimum force F_8 indicated in [Table 3](#).

Table 3 — Minimum force applied to the retainer installed in the squib holder

Force applied to the retainer installed in the squib holder	Minimum value of force applied to the retainer installed in the squib holder
F_8	10 N