BRITISH STANDARD

BS ISO
4141-3:2006

Road vehicles — Multi-core connecting cables —

Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables

ICS 43.040.10

BSI
British Standards

National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii and iii, a blank page, pages 1 to 6, an inside back cover and a back cover.

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Amendments issued since publication

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INTERNATIONAL STANDARD

ISO 4141-3

Second edition
2006-07-01

Road vehicles — Multi-core connecting cables —

Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables

Véhicules routiers — Câbles de raccordement multiconducteurs —

Partie 3: Construction, dimensions et marquage des câbles basse tension gainés non blindés

Reference number
ISO 4141-3:2006(E)

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 4141-3 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This second edition cancels and replaces the first edition (ISO 4141-3:1998), which has been technically revised. It also incorporates the Technical Corrigendum ISO 4141-3:1998/Cor.1:1999.

ISO 4141 consists of the following parts, under the general title *Road vehicles — Multi-core connecting cables*:

— *Part 1: Test methods and requirements for basic performance sheathed cables*

— *Part 2: Test methods and requirements for high performance sheathed cables*

— *Part 3: Construction, dimensions and marking of unscreened sheathed low-voltage cables*

— *Part 4: Articulation test method and requirements for coiled cable assemblies*

The following part is under preparation:

— *Part 4: Test methods and requirements for coiled cable assemblies* [Revision of ISO 4141-4:2001]

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Road vehicles — Multi-core connecting cables —

Part 3:
Construction, dimensions and marking of unscreened sheathed low-voltage cables

1 Scope

This part of ISO 4141 specifies the construction, dimensions and marking of unscreened sheathed low-voltage multi-core cables for the connection of towing and towed vehicles, suitable for the temperature range − 40 °C to + 85 °C.

2 Normative references

The following referenced documents are indispensable for the application 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 1185, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage*

ISO 1724, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 12 N (normal) for vehicles with 12 V nominal supply voltage*

ISO 3731, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 24 S (supplementary) for vehicles with 24 V nominal supply voltage*

ISO 3732, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 7-pole connector type 12 S (supplementary) for vehicles with 12 V nominal supply voltage*

ISO 4141-1, *Road vehicles — Multi-core connecting cables — Part 1: Test methods and requirements for basic performance sheathed cables*

ISO 4141-2, *Road vehicles — Multi-core connecting cables — Part 2: Test methods and requirements for high performance sheathed cables*

ISO 7638-1, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Part 1: Connectors for braking systems and running gear of vehicles with 24 V nominal supply voltage*

ISO 7638-2, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — Part 2: Connectors for braking systems and running gear of vehicles with 12 V nominal supply voltage*

ISO 11446, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 13-pole connectors for vehicles with 12 V nominal supply voltage*

ISO 12098, *Road vehicles — Connectors for the electrical connection of towing and towed vehicles — 15-pole connector for vehicles with 24 V nominal supply voltage*

3 General Requirements

Multi-core sheathed connecting cables for basic performance according to this International Standard shall comply with the requirements of ISO 4141, Part 1.

Multi-core sheathed connecting cables for high performance according to this International Standard shall comply with the requirements of ISO 4141, Part 2.

4 Construction and dimensions

4.1 Single cores

4.1.1 General

During construction of the cable, the positions of the single cores within the cable construction shall be laid up, as far as possible, in accordance with the contact positions of the connector as specified in ISO 1185, ISO 1724, ISO 3731, ISO 3732, ISO 7638-1, ISO 7638-2, ISO 11446, or ISO 12098 as applicable.

NOTE Annex A gives a synopsis of the nominal cross-sections of single cores in multi-core cables specified in the International Standards cited above.

4.1.2 Data cores lay length

The lay length of the data cores shall be max. 50 mm.

4.1.3 Additional elements

Fillers may be used to complete the cable construction. Non-metallic tapes or wrappings under the sheath or an inner sheath may be applied.

4.2 Outer sheath dimensions

4.2.1 Thickness

The minimum thickness of the sheath, measured in accordance with ISO 4141-1, shall be 1 mm for uncoiled cables, and 1,2 mm for coiled cables.

4.2.2 Outside diameter

The outside diameter of the multi-core cable, measured in accordance with ISO 4141-1, shall be as specified in Table 1.

The cable ovality, measured in accordance with ISO 4141-1, shall not exceed 10 %.

Table 1 — Outside diameter of multi-core cables

Dimensions in millimetres

Outside diameter	Multi-core cable for use with connectors as in							
	ISO 1185	ISO 1724	ISO 3731	ISO 3732	ISO 7638		ISO 11446	ISO 12098
					5 poles	7 poles		
max.	13,5	13,5	13,5	13,5	13,5	15,5	15,0	17,0
min.	8,0	8,0	8,0	8,0	8,0	11,0	10,0	14,0

4.3 Coil dimensions

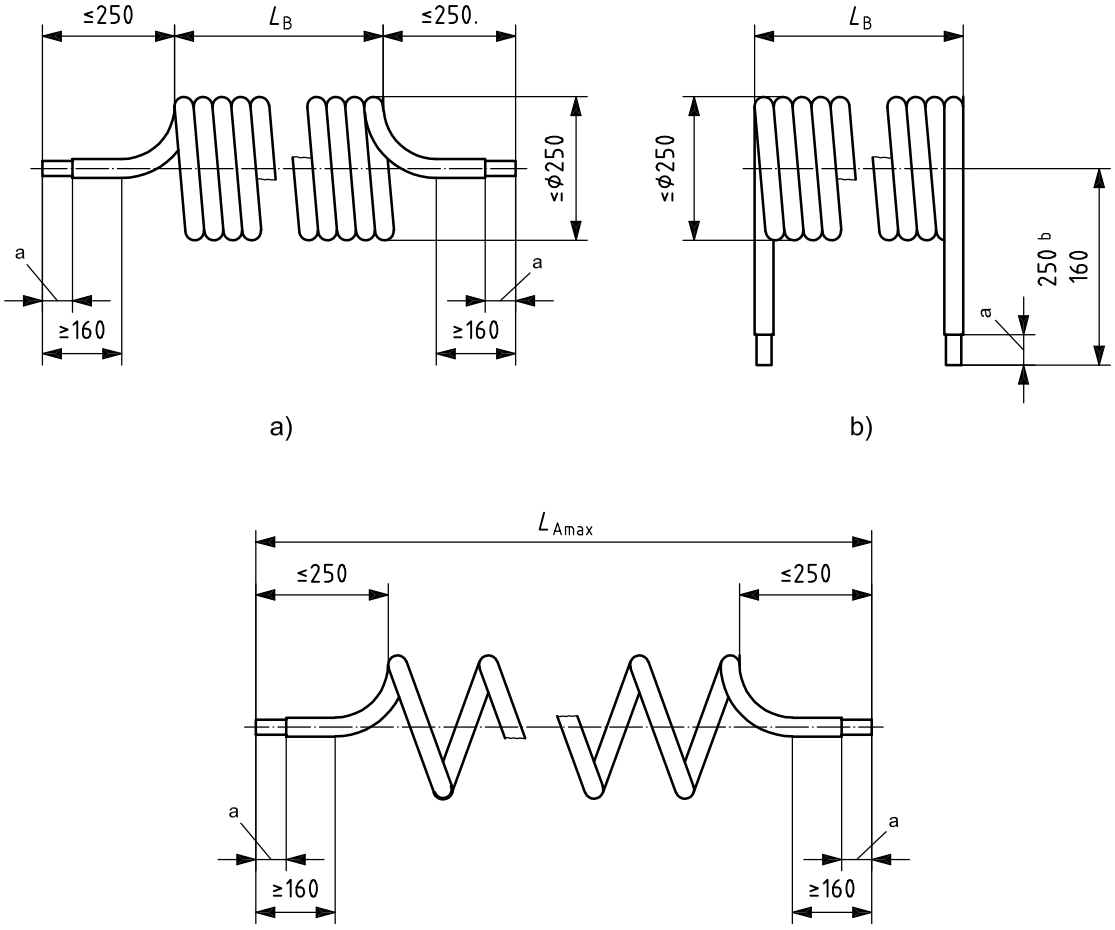
Dimensions of the coiled connecting cables shall be as detailed in Table 2 and Figure 1.

Table 2 — Overall dimensions of coiled multi-core cables

Dimensions in millimetres

Type of coiled connecting cable	Block length L_B max.	Working length L_A max.	Max. admitted extension length $L_{Amax.}$
1	500	1 750	3 000
2	550	2 250	4 000
3	575	2 500	4 500

Dimensions in millimetres



Key

a As agreed between manufacturer and user.

b Minimum straight tail length required.

Figure 1 — Overall dimensions of coiled connecting cables

5 Marking

5.1 Cores

Cores shall be identified by either of the following:

a) by the insulation colour as specified in Table 3; or

b) by numerals as specified in Figure 2 and Table 3, printed in a colour contrasting with that of the core insulation.

Alternative methods may be used by agreement between manufacturer and user.

Table 3 — Colour and marking of cores

Single core insulation colour	Single cores allocated to and marked with contact number according to the connector International Standard						
	ISO 1185	ISO 1724	ISO 3731	ISO 3732	ISO 7638-1 and 7638-2	ISO 11446	ISO 12098
Yellow	3	1	3	1	3	1	1
Blue	7	2	7	2	—	2	3
White	1	3	1	3	5	3	4
Green	5	4	5	4	—	4	2
Brown	6	5	6	5	4	5	6
Red	4	6	4	6	1	6	7
Black	2	7	2	7	2	7	5
Pink	—	—	—	—	—	8	8
Orange	—	—	—	—	—	9	9
Gray	—	—	—	—	—	10	10
White/Green	—	—	—	—	6	—	14
White/Brown	—	—	—	—	7	—	15
White/Black	—	—	—	—	—	11	11
White/Blue	—	—	—	—	—	12	12
White/Red	—	—	—	—	—	13	13

NOTE For functional allocation see the connector standards indicated.

5.2 Sheath

Multi-core cable sheaths shall be marked, as indicated in Figure 3, with the manufacturer's identification and the following application characters:

— 7 core cables for 12N connectors: 12N;

— 7 core cables for 12S connectors: 12S;

— 7 core cables for 24N connectors: 24N;

— 7 core cables for 24S connectors: 24S;

— 5 core cables for antilock braking systems: ABS;

— 7 core cables for electronically controlled braking systems: EBS;

— 8 to 12 core cable for 13 pole connectors: 12-8…12-12;

— 8 to 15 core cable for 15 pole connectors: 24-8…24-15.

The marking of the sheath shown in Figure 3 shall point to that end of the cable where the cores should be arranged to match with the contacts on the plug as specified in 4.1.

For cables having a plug at each end (for example between the tractor and semi-trailer), it is possible to omit this marking.

Dimensions in millimetres

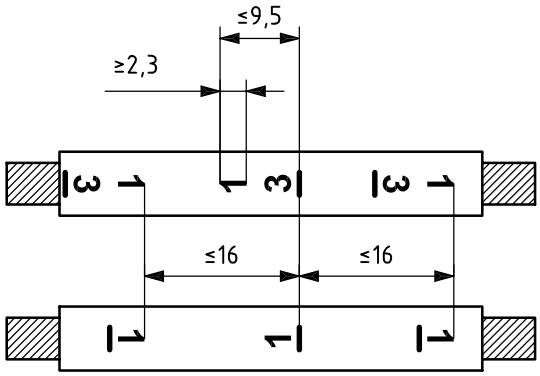


Figure 2 — Marking of cores

Dimensions in millimetres

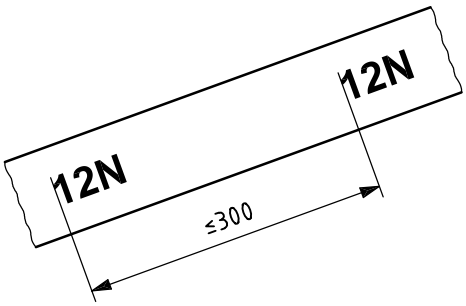


Figure 3 — Marking of sheath

Annex A
(informative)

Nominal cross-sections of individual cores in multi-core cables as specified in International Standards cited in 4.1

Table A.1 — Nominal cross-sections of individual cores

Dimensions in square millimetres

<table>
<tr><th rowspan="2">Contact No.</th><th colspan="7">Cross-sectional areas of cores used with connectors as in</th><th rowspan="2">Contact No.</th></tr>
<tr><th>ISO 1185</th><th>ISO 1724</th><th>ISO 3731</th><th>ISO 3732</th><th>ISO 7638-1 and 7638-2</th><th>ISO 11446</th><th>ISO 12098</th></tr>
<tr><td>1</td><td>2,5</td><td rowspan="2">1,5</td><td>2,5</td><td>1,5</td><td>4</td><td rowspan="2">1,5</td><td rowspan="3">1,5</td><td>1</td></tr>
<tr><td>2</td><td rowspan="6">1,5</td><td rowspan="2">1,5</td><td>[b]</td><td rowspan="2">1,5</td><td>2</td></tr>
<tr><td>3</td><td>2,5</td><td rowspan="2">2,5</td><td>2,5</td><td>3</td></tr>
<tr><td>4</td><td rowspan="4">1,5</td><td>2,5</td><td>4</td><td rowspan="5">1,5</td><td>2,5</td><td>4</td></tr>
<tr><td>5</td><td>1,5</td><td>1,5</td><td>1,5</td><td rowspan="4">1,5</td><td>5</td></tr>
<tr><td>6</td><td>2,5</td><td rowspan="2">2,5</td><td rowspan="2">1,5 [c]</td><td>6</td></tr>
<tr><td>7</td><td>1,5</td><td>7</td></tr>
<tr><td>8</td><td colspan="5" rowspan="7">[a]</td><td>8</td></tr>
<tr><td>9</td><td rowspan="3">2,5</td><td>2,5</td><td>9</td></tr>
<tr><td>10</td><td rowspan="3">1,5</td><td>10</td></tr>
<tr><td>11</td><td>11</td></tr>
<tr><td>12</td><td>[b]</td><td>12</td></tr>
<tr><td>13</td><td>2,5</td><td>2,5</td><td>13</td></tr>
<tr><td>14</td><td rowspan="2">[a]</td><td rowspan="2">1,5[c]</td><td>14</td></tr>
<tr><td>15</td><td>15</td></tr>
</table>

[a] No contact exists.

[b] Reserved for future allocation.

[c] Cores for data transmission.

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