INTERNATIONAL STANDARD

ISO 4141-3

First edition
1998-02-01

Road vehicles — Multicore 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 4141-3:1998(E)

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.

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.

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

Together with ISO 4141-1 and ISO 4141-2, this first edition of ISO 4141-3 cancels and replaces ISO 4141:1988, which has been technically revised.

ISO 4141 consists of the following parts, under the general title *Road vehicles – Multicore 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: Test methods and requirements for coiled cable assemblies*

Annex A of this part of ISO 4141 is for information only.

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Printed in Switzerland

Road vehicles — Multicore 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 multicore cables for the connection of towing and towed vehicles, suitable for a temperature range of − 40 °C to + 85 °C.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4141. At the time of publication, the editions indicated were valid. All Standards are subject to revision, and parties to agreements based on this part of ISO 4141 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1185:1997, *Road vehicles — Electrical connections between towing and towed vehicles with 24V system — 7 pole connector type 24N (normal).*

ISO 1724:1997, *Road vehicles — Electrical connections between towing and towed vehicles with 12V system — 7 pole connector type 12N (normal).*

ISO 3731:1997, *Road vehicles — Electrical connections between towing and towed vehicles with 24V system — 7 pole connector type 24S (supplementary).*

ISO 3732:1997, *Road vehicles — Electrical connections between towing and towed vehicles with 12V system — 7 pole connector type 12S (supplementary).*

ISO 4141-1:1998, *Road vehicles — Multicore connecting cables — Part 1: Test methods and requirements for basic performance sheathed cables.*

ISO 4141-2:1997, *Road vehicles — Multicore connecting cables — Part 2: Test methods and requirements for high performance sheathed cables.*

ISO 7638-1:1997, *Road vehicles — Electrical connectors for braking systems — Part 1: Connectors for 24 V nominal supply voltage.*

ISO 7638-2:1997, *Road vehicles — Electrical connectors for braking systems — Part 2: Connectors for 12 V nominal supply voltage.*

ISO 11446:1995, *Passenger cars and light commercial vehicles with 12 V systems — 13-pole connectors between towing vehicles and trailers — Dimensions and contact allocation.*

ISO 12098:1994, *Commercial vehicles with 24 V systems — 15-pole connectors between towing vehicles and trailers — Dimensions and contact allocation.*

3 General requirements

Multicore sheathed connecting cables for basic performance shall comply with the requirements of ISO 4141-1.

Multicore sheathed connecting cables for high performance shall comply with the requirements of ISO 4141-2.

4 Construction and dimensions

4.1 Single cores

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 multicore cables specified in the International Standards cited above.

4.1.1 Data core lay length

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

4.1.2 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 4141-1:1998, subclause 4.6, shall be 1 mm for uncoiled cables, and 1,2 mm for coiled cables.

4.2.2 Outside diameter

The outside diameter of the multicore cable, measured in accordance with ISO 4141-1:1998, subclause 4.5, shall be as specified in table 1.

The cable ovality, measured in accordance with ISO 4141-1:1998, subclause 4.5, shall not exceed 10 %.

Table 1 — Outside diameter of multicore cables

Dimensions in millimetres

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

4.3 Coil dimensions

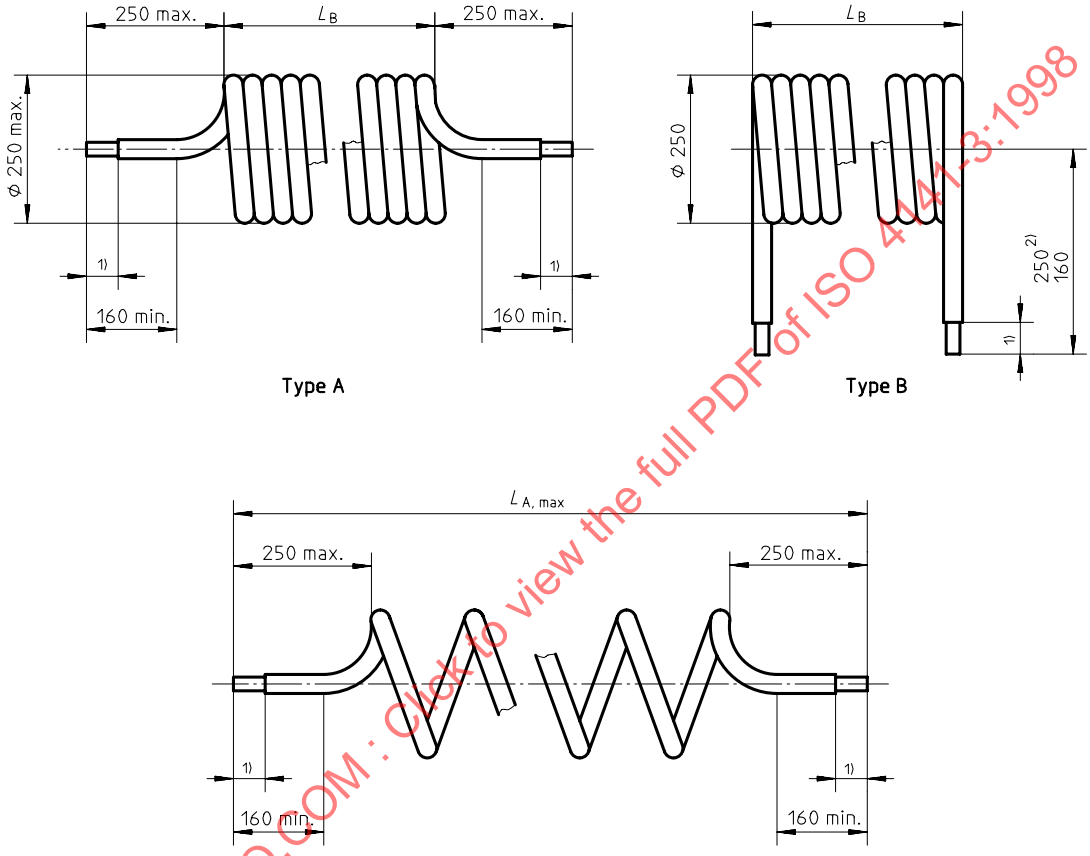
Dimensions of the coiled connecting cables shall be as specified in table 2 and figure 1.

Table 2 — Overall dimensions of coiled multicore cables

Dimensions in millimetres

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

Dimensions in millimetres



1) As agreed between maufacturer and user.
2) 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 4;

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

Alternative methods of marking 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 ISO 7638-2	ISO 11446	ISO 12098
Yellow	1	1	3	1	3	1	1
Blue	2	2	7	1)	—	2	3
White	3	3	1	3	5	3	4
Green	4	4	5	4	—	4	2
Brown	5	5	6	5	4	5	6
Red	6	6	4	6	1	6	7
Black	7	7	2	7	2	7	5
Pink	—	—	—	—	—	8	8
Orange	—	—	—	—	—	9	9
Grey	—	—	—	—	—	10	10
White/Green	—	—	—	—	6	—	14
White/Brown	—	—	—	—	7	—	15
White/Black	—	—	—	—	—	11	11
White/Blue	—	—	—	—	—	1)	12
White/Red	—	—	—	—	—	13	13

NOTE — For functional allocation see the connector standards indicated.

1) No core required.

5.2 Sheath

Multicore cable sheaths shall be marked, as indicated in figure 3, with the manufacturer's identification and the following application characters:

— 7-core cable for 12N connectors: 12N;

— 7-core cable for 12S connectors: 12S;

— 7-core cable for 24N connectors: 24N;

— 7-core cable 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 tractor and semi-trailer), it is possible to omit this marking.

Dimensions in millimetres

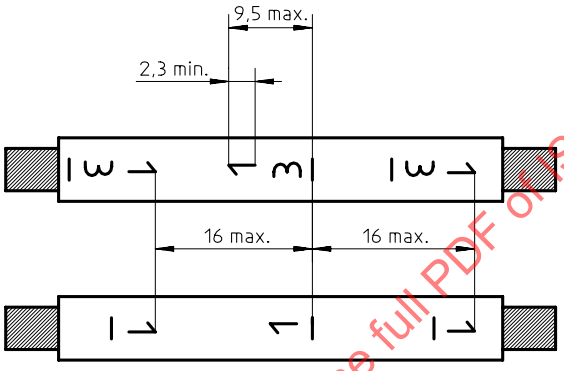


Figure 2 — Marking of cores

Dimensions in millimetres

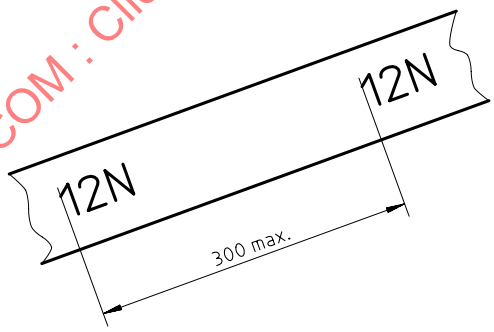


Figure 3 — Marking of sheath

Annex A
(informative)

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

Dimensions in square millimetres

<table>
<tr><th rowspan="2">Contact no.</th><th colspan="8">Cross-sectional areas of cores for cables used with connectors as in</th></tr>
<tr><th>ISO 1185</th><th>ISO 1724</th><th>ISO 3731</th><th>ISO 3732</th><th>ISO 7638-1</th><th>ISO 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>6 3)</td><td rowspan="2">1,5</td><td rowspan="3">1,5</td></tr>
<tr><td>2</td><td rowspan="7">1,5</td><td rowspan="3">1,5</td><td>2)</td><td rowspan="3">1,5</td><td rowspan="3">1,5</td></tr>
<tr><td>3</td><td>2,5</td><td rowspan="3">2,5</td><td>2,5</td></tr>
<tr><td>4</td><td rowspan="4">1,5</td><td>2,5</td><td>4</td><td>6 3)</td><td rowspan="6">1,5</td><td>2,5</td></tr>
<tr><td>5</td><td>1,5</td><td>1,5</td><td>1,5</td><td>1,5</td><td rowspan="4">1,5</td></tr>
<tr><td>6</td><td>2,5</td><td rowspan="2">2,5</td><td rowspan="2">1,5 4)</td><td rowspan="2">1,5 4)</td></tr>
<tr><td>7</td><td>1,5</td></tr>
<tr><td>8</td><td colspan="6" rowspan="7">1)</td><td rowspan="3">2,5</td><td>2,5</td></tr>
<tr><td>9</td><td rowspan="3">1,5</td></tr>
<tr><td>10</td></tr>
<tr><td>11</td><td>2)</td></tr>
<tr><td>12</td><td>2,5</td><td>2,5</td></tr>
<tr><td>13</td><td rowspan="2">1)</td><td rowspan="2">1,5 4)</td></tr>
<tr><td>14</td></tr>
<tr><td>15</td><td colspan="8"></td></tr>
</table>

1) No contact exists.

2) No single core required.

3) It is intended to delete this multicore cable at the next periodical review of this standard.

4) Cores for data transmission.