



**Caledonian**

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# Comparison of BS 5308, PAS 5308 and BS EN 50288

## Scope

- **BS 5308 Part 1: 1986- Instrumentation Cables Part 1. Specification for Polyethylene Insulated Cables**  
*(withdraw, superseded by BS EN 50288-7)*
- **BS 5308 Part 2: 1986- Instrumentation Cables Part 2. Specification for PVC Insulated Cables** *(withdraw , superseded by BS EN 50288-7)*
- **PAS 5308-1:2009- Control and Instrumentation Cables Part 1: Specification for Polyethylene Insulated Cables** *(current, based on BS 5308-1:1986, has been developed to incorporate additional aspects not covered in the European standard for control and instrumentation cables, BS EN 50288-7)*
- **PAS 5308-2:2009- Control and Instrumentation Cables Part 2: Specification for PVC Insulated Cables** *(current, based on BS 5308-2:1986, has been developed to incorporate additional aspects not covered in the European standard for control and instrumentation cables, BS EN 50288-7)*
- **BS EN 50288-7:2005- Multi-element Metallic Cables Used in Analogue and Digital Communication and Control- Part 7: Sectional Specification for Instrumentation and Control Cables** **(Current)**



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Conductor</b>					
<b>Kind of conductor</b>	<ul style="list-style-type: none"> <li>• solid (BS 6360 class 1)</li> <li>• stranded (BS 6360 class 2 or class 5)</li> </ul>	<ul style="list-style-type: none"> <li>• stranded (BS 6360 class 2 or class 5)</li> </ul>	<ul style="list-style-type: none"> <li>• solid (BS EN 60228 class 1)</li> <li>• stranded (BS EN 60228 class 2 or class 5)</li> </ul>	<ul style="list-style-type: none"> <li>• stranded (BS EN 60228 class 2 or class 5)</li> </ul>	<ul style="list-style-type: none"> <li>• solid (HD383 class 1)</li> <li>• stranded (HD383 class 2)</li> <li>• flexible (HD383 class 5)</li> </ul> <p>(except for thermocouple extension and compensating cables, with conductors as described in Annex D)</p>
<b>Copper</b>	<ul style="list-style-type: none"> <li>• plain annealed copper</li> </ul>	<ul style="list-style-type: none"> <li>• plain annealed copper</li> </ul>	<ul style="list-style-type: none"> <li>• plain annealed copper</li> </ul>	<ul style="list-style-type: none"> <li>• plain annealed copper</li> </ul>	<ul style="list-style-type: none"> <li>• plain annealed copper</li> <li>• metal coated copper</li> </ul>
<b>Size</b>	<ul style="list-style-type: none"> <li>• 0.5mm<sup>2</sup></li> <li>• 1.0mm<sup>2</sup></li> <li>• 1.5mm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>• 0.5mm<sup>2</sup></li> <li>• 0.75mm<sup>2</sup></li> <li>• 1.5 mm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>• 0.5mm<sup>2</sup></li> <li>• 1.0mm<sup>2</sup></li> <li>• 1.5mm<sup>2</sup></li> <li>• 2.5 mm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>• 0.5mm<sup>2</sup></li> <li>• 0.75mm<sup>2</sup></li> <li>• 1.5mm<sup>2</sup></li> <li>• 2.5 mm<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>• 0.5mm<sup>2</sup></li> <li>• 0.75mm<sup>2</sup></li> <li>• 1.0mm<sup>2</sup></li> <li>• 1.5mm<sup>2</sup></li> <li>• 2.5 mm<sup>2</sup></li> </ul>



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Insulation</b>					
<b>Materials</b>	<ul style="list-style-type: none"> <li>PE type 03 acc. to BS 6234</li> </ul>	<ul style="list-style-type: none"> <li>PVC type T11 acc. to BS 6746</li> </ul>	<ul style="list-style-type: none"> <li>thermoplastic PE to BS EN 50290-2-23:2002</li> <li>grade L/MD XLPE to BS EN 50290-2-29.</li> </ul>	<ul style="list-style-type: none"> <li>PVC to BS EN 50290-2-21:2002, grade T151.</li> </ul>	<ul style="list-style-type: none"> <li>PVC acc. to EN 50290-2 21</li> <li>PE acc. to EN 50290-2 23</li> <li>PP acc. to EN 50290-2 25</li> <li>Halogen free flame retardant compound acc. to EN 50290-2 26</li> <li>XLPE acc. to EN 50290-2 29 temp. range from 70°C up to 105°C</li> </ul>
<b>Range</b>	<ul style="list-style-type: none"> <li>300/500 V</li> </ul>	<ul style="list-style-type: none"> <li>300/500 V</li> </ul>	<ul style="list-style-type: none"> <li>300/500 V</li> </ul>	<ul style="list-style-type: none"> <li>300/500 V</li> </ul>	<ul style="list-style-type: none"> <li>90V</li> <li>300V</li> <li>500V</li> </ul>
<b>Thickness</b>	<a href="#">Caledonian BS 5308 cable</a>	<a href="#">Caledonian BS 5308 cable</a>	<a href="#">Caledonian PAS 5308 cable</a>	<a href="#">Caledonian PAS 5308 cable</a>	<a href="#">Caledonian EN 50288-7 cable (LSZH Sheath)</a> <a href="#">Caledonian EN 50288-7 cable (PVC Sheath)</a>



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Cable elements</b>					
<b>Kind of elements</b>	<ul style="list-style-type: none"> <li>• pair (twisted)</li> <li>• quad (around a single dummy; only for 2 pair cables without individual pair screens)</li> </ul>	<ul style="list-style-type: none"> <li>• pair (twisted)</li> <li>• quad (around a central dummy; only for 2 pair cables without individual pair screens)</li> </ul>	<ul style="list-style-type: none"> <li>• pair (twisted)</li> <li>• quad (around a single dummy; only for 2 pair cables without individual pair screens)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>core</b></li> <li>• pair (twisted)</li> <li>• quad (around a single dummy; only for 2 pair cables without individual pair screens)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>core</b></li> <li>• pair (twisted)</li> <li>• <b>triple (twisted)</b></li> <li>• quad (twisted)</li> </ul>
<b>Twisting of elements</b>	reverse layer or reciprocating lay technique $\leq 100\text{mm}$	reverse layer or reciprocating lay technique $\leq 100\text{mm}$	reverse layer or reciprocating lay technique $\leq 100\text{mm}$	reverse layer or reciprocating lay technique $\leq 100\text{mm}$	lay length $\leq 100\text{mm}(\leq 1.5\text{mm}^2)$ and $\leq 150\text{mm}(2.5\text{mm}^2)$



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Individual pair screens</b>	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ (metallic side down, in contact with drain wire + wrapping consisting of one layer tape (50% overlap) or two layers of tape ( $\geq 23\mu\text{m}$ ) (each 25% overlap).)	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ (metallic side down, in contact with drain wire + wrapping consisting of one layer tape (50% overlap) or two layers of tape ( $\geq 23\mu\text{m}$ ) (each 25% overlap).)	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ (metallic side down, in contact with drain wire + wrapping consisting of one layer tape (50% overlap) or two layers of tape ( $\geq 23\mu\text{m}$ ) (each 25% overlap).)	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ (metallic side down, in contact with drain wire + wrapping consisting of one layer tape (50% overlap) or two layers of tape ( $\geq 23\mu\text{m}$ ) (each 25% overlap).)	a) a plain or coated metal braid with a minimum filling factor of 0.6 when calculated in accordance with Annex B b) a combination of a foil, and a plain or coated metal braid with a minimum filling factor of 0.3 when calculated in accordance with Annex B, optional drain wire c) a foil applied with a minimum overlap of 20% and drain wire
<b>Drain wire</b>	solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$	solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$	solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$	solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$	not defined



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Colour code</b>					
<b>Pairs</b>	<u>Colour code</u>	<u>Colour code</u>	<u>Colour code</u>	<u>Colour code</u>	Unless otherwise specified e.g. by means of numbered cores or tapes, the coding for identification shall be as given in IEC 60189-2 or EN 60708, as appropriate. The colours shall meet the requirements of 4.4 of EN 50288-1
<b>Triples</b>	Not defined	Not defined	Not defined	Not defined	
<b>Quads</b>	Not defined (exception: 2 pair is a 1 quad construction)	Not defined (exception: 2 pair is a 1 quad construction)	Not defined (exception: 2 pair is a 1 quad construction)	Not defined (exception: 2 pair is a 1 quad construction)	
<b>Remark</b>	differentiation of the pairs is defined through different colour codes for each pair; alternatively numbered PET foil around pairs	differentiation of the pairs is defined through different colour codes for each pair; alternatively numbered PET foil around pairs	differentiation of the pairs is defined through different colour codes for each pair; alternatively numbered PET foil around pairs	differentiation of the pairs is defined through different colour codes for each pair; alternatively numbered PET foil around pairs	



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Overall screen</b>					
<b>Collective screen</b>	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ + drain wire consisting of solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$ Wrapping layer of tape under collective screen	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ + drain wire consisting of solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$ Wrapping layer of tape under collective screen	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ + drain wire consisting of solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$ Wrapping layer of tape under collective screen	laminated tape aluminium/PET aluminium thickness $\geq 8 \mu\text{m}$ PET thickness $\geq 10 \mu\text{m}$ + drain wire (optional) consisting of solid or stranded, tinned annealed copper cross section $\geq 0.5\text{mm}^2$ Wrapping layer of tape under collective screen	a) a plain or coated metal braid with a minimum filling factor of 0.6 when calculated in accordance with Annex B b) a combination of a foil, and a plain or coated metal braid with a minimum filling factor of 0.3 when calculated in accordance with Annex B, optional drain wire c) a foil applied with a minimum overlap of 20% and drain wire  <i>screening over the cable core may also be in the form of a laminated sheath</i>
<b>Metal braid</b>	not defined	not defined	not defined	not defined	





	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Inner sheath</b>					
	-	-	-	-	a)PVC to EN 50290-2-22 b)Polyethylene to EN 50290-2-24 c)Halogen free flame retardant compound to EN 50290-2-27
<b>Bedding layer</b>					
	<ul style="list-style-type: none"> <li>extruded bedding of type 2C or type 03 black PE compound in accordance with BS 6234 (TYPE 2)</li> <li>extruded bedding of type TM1 or type 6 black PVC compound in accordance with BS 6746(TYPE 3)</li> </ul>	<ul style="list-style-type: none"> <li>extruded bedding of type TM1 black PVC compound in accordance with BS 6746 (TYPE 2)</li> </ul>	<ul style="list-style-type: none"> <li>extruded bedding of a PE compound conforming to BS EN 50290-2-24:2002, grade LD(TYPE 2)</li> <li>extruded bedding of a PVC compound conforming to BS EN 50290-2-22:2002, grade TM51(TYPE 3)</li> </ul>	<ul style="list-style-type: none"> <li>extruded bedding of a PVC compound conforming to BS EN 50290-2-22:2002, grade TM51 (TYPE 2)</li> </ul>	<ul style="list-style-type: none"> <li>between a lead sheath and a metallic protection. This layer may be extruded or comprise helically applied tapes or tapes</li> </ul>



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Metallic protection/armouring</b>					
<b>Round steel wire SWA</b>	galvanized steel wire armour 0.9, 1.25, 1.6, 2.0' 2.5mm	galvanized steel wire armour 0.9, 1.25, 1.6, 2.0, 2.5mm	galvanized steel wire armour 0.9, 1.25, 1.6, 2.0' 2.5mm	galvanized steel wire armour 0.9, 1.25, 1.6, 2.0, 2.5mm	SWA Min. thickness of wires 0.8 mm
<b>Flat steel wires with counter helix</b>	not defined	not defined	not defined	not defined	Only applied to cables where overall diameter under armour > 15 mm Min. thickness of wires 0.8 mm
<b>Steel or brass tape</b>	not defined	not defined	not defined	not defined	min. thickness of tape; brass: 0.075 mm steel: 0.20 mm single or double layer
<b>Metal braid</b>	not defined	not defined	not defined	not defined	galvanised steel wires ( Q ) wire diameter ≥ 0.3 mm filling factor ≥ 0.57 mm



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Outer sheath</b>					
<b>Material</b>	<ul style="list-style-type: none"> <li>extruded bedding of type TM1 or type 6 black PVC compound in accordance with BS 6746(TYPE 1)</li> <li>extruded oversheath of type TM1 PVC compound in accordance with BS 6746(TYPE 2/TYPE 3)</li> </ul>	<ul style="list-style-type: none"> <li>extruded bedding of type TM1 or type 6 black PVC compound in accordance with BS 6746(TYPE 1)</li> <li>extruded oversheath of type TM1 PVC compound in accordance with BS 6746(TYPE 2)</li> </ul>	<ul style="list-style-type: none"> <li>extruded sheath of a PVC compound conforming to BS EN 50290-2-22:2002, grade TM51</li> </ul>	<ul style="list-style-type: none"> <li>extruded sheath of a PVC compound conforming to BS EN 50290-2-22:2002, grade TM51</li> </ul>	<ul style="list-style-type: none"> <li>PVC (EN 50290-2-22)</li> <li>Polyethylene (EN 50290-2-24)</li> <li>Halogen free flame retardant compound LSZH (EN 50290-2-27)</li> </ul>
<b>Thickness</b>	refer standard	refer standard	refer standard	refer standard	Calculated acc. to formular: without metallic protection $SRT = 0.04 \times D + 0.7$ (min. 0.8 mm) with metallic protection $SRT = 0.028 \times D + 1.1$ (min 1.3 mm) D = Diameter under outer sheath



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Environmental and other protection</b>					
<b>Moisture barriers</b>	not defined	not defined	not defined	not defined	a)water swellable tapes b)water swellable non-toxic powder c)filling compound d)laminated sheath, consisting of a longitudinal overlapped metallic foil,bonded within the overlapping and to the inner surface of an extruded sheath. The foil shall be one or both sides plastic coated, but in the case of only one side being coated a tinned copper drain wire shall be applied in direct contact with the metallic surface of the foil. The thickness of the metallic part of the foil shall be atleast 0.15mm e)combinations of these four methods



	BS5308-1: 1986	BS5308-2: 1986	PAS5308-1: 2009	PAS5308-2: 2009	BS EN 50288-7: 2005
<b>Chemical and / or environmental protection (one of the follow methods)</b>					
<b>Multilayer sheath</b>					
	not defined	not defined	not defined	not defined	Multilayer sheath Laminated aluminium (Al) foil with an extruded layer of HDPE + layer of Polyamide (PA) Thickness of Al ≥ 15 µm Thickness of PA ≥ 0.3 mm (thickness at any point)
<b>Lead sheath</b>					
	Part 1 type 3 cables extruded sheath of lead alloy conforming to BS 801	none	Part 1 type 3 cables extruded sheath of lead alloy conforming to BS EN 50307	none	M (Lead sheath) complying with EN 50307 can be applied The thickness is calculated in acc. to the diameter (D) underneath; Formular: $LRT = 0.03 \times D + 0.7\text{mm}$ with a thickness at any point min. ≥ 0.66 mm