

Ref:	NR/L2/SIG/30060
Issue:	3
Date:	03/03/2012
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Level 2

Product Specification for AzLM Axle Counter Cable

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User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – *No deviations, could stop the railway*

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box **with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – *Controlled deviations, approved risk analysis and mitigation*

- **Amber requirements shall** be complied with unless deviation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar **and with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Deviations **may** be permitted. Deviations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – *Guidance*

- Guidance is based on good practice. Guidance represents supporting information to help achieve **Red** and **Amber** requirements.
- Guidance shall be presented with a dotted green sidebar **and with the word “should” (usually in notes) or as a direct instruction**.
- Guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used. Alternative solutions do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

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Issue record

Issue	Date	Comments
1	March 2009	First issue
2	September 2011	Issue 2 is amended to include correct PADS Numbers in Table 2, Table 3 and Table 5.
3	March 2012	Issue 3 is an amendment to the maximum overall diameters for 2 pair cables (XPS and XPZ) and star-quad cables in tables 2,3,4 and 5. (CCMS2 document no. 62351892)

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 02/06/2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

BS5099	Electric cables. Voltage levels for spark testing
BS6234	Specification for polyethylene insulation and sheath of electric cables
BS6360	Specification for conductors in insulated cables and cords
BS6724	Electric cables. Thermosetting insulated, armoured cables for voltages of 600/1000 V and 1900/3300 V, having low emission of smoke and corrosive gases when affected by fire
BS6746C	Colour chart for insulation and sheath of electric cables
BS EN 60811-4-2	Insulating and sheathing materials of electric and optical cables. Common test methods. Methods specific to polyethylene and polypropylene compounds. Tensile strength and elongation at break after conditioning at elevated temperature. Wrapping test after conditioning at elevated temperature. Wrapping test after thermal ageing in air. Measurement of mass increase. Long-term stability test. Test method for copper-catalyzed oxidative degradation
BS EN 60228	Conductors of insulated cables
BS EN 60332-1	Tests on electrical and optical cables under fire conditions. Test for a vertical flame propagation for a

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single insulated wire or cable.

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1 Purpose

The aim of this standard is to clearly define to cable manufacturers the construction and performance requirements for AzLM Axle Counter cable. Manufacturers should therefore submit evidence intended to demonstrate compliance with this standard when seeking Network Rail Product Acceptance. It also provides background information to Signalling Designers, Signalling Installers and Signalling Maintainers.

2 Scope

The requirements defined in this standard apply to the AzLM Axle Counter system manufactured by Thales and specifically to the Axle Counter cables that carry the ISDN signal from:

- the EAK junction box or termination point to the EAK (star-quad);
- the EAK to the ACE equipment (multi-twisted-pair).

3 Symbols & Abbreviations

ACE	Axle Counter Evaluator
AzLM	Achszaehler Lorenz Mehrabschnitts achszaehler
dB	decibel
EaB	Elongation at Break
ISDN	Integrated Services Digital Network
kHz	kilohertz
m	metres
MDPE	Medium Density Polyethylene
mm	millimetres
PADS	Part and Drawings System
PE	Polyethylene
R	Routine
T	Type
ZHLS	Zero Halogen Low Smoke
Z_0	Characteristic Impedance
Ω/km	ohms per kilometre

4 General

The cables are a multicore, solid core, tinned, copper, conductor designs and can be arranged in multiple twisted pairs or star quad. The cables are a jelly filled design to counteract any moisture ingress travelling along the cores due to capillary action. A glass-fibre weave shall be provided around the cores to act as a rodent barrier. A longitudinal moisture barrier taking the form of a laminated aluminium tape is applied over the rodent barrier. A polymeric sheath shall then be provided over the