



BRITISH
TRANSPORT
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Rail cable and metal identification guide

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Contact details

British Transport Police: 0800 40 50 40

Crimestoppers: 0800 555 111



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Introduction

Criminal attacks that target Network Rail cable cause major disruption to the rail industry, impacting on vital transport services on key commuter and local routes affecting communities across England, Scotland & Wales.

Following a review in 2011, BTP launched Operation Leopard and set up a dedicated Metal Theft Unit committed to policing and using innovative tactics to combat this type of criminality.

To help the police and other agencies in the identification of cable belonging to Network Rail, we have updated and are reissuing the 'Guide for Rail Cable Identification'. This is a comprehensive catalogue to help identify stolen cables and associated material used on the national rail network. We have also provided a 'Cable Identification'

poster so that materials can be identified at a glance. Using this guide and the other materials available, you should take positive action against the criminals involved in cable theft sending a clear message that BTP will relentlessly investigate all those involved in these crimes.

BTP investigators have made additional information and guidance available on the Operation Leopard intranet pages, and you can seek expert clarification / identification through Area or Force Operation Leopard teams or the Force Headquarters based Metal Theft Unit.

Thank you for your support.

Alan Pacey
Assistant Chief Constable

Information for scrap metal dealers (SMDs)

As you are aware, the recent increase in the value of metals, particularly copper, has led to a significant increase in metal theft from vital parts of the national railway infrastructure. This criminal activity is not only extremely dangerous posing a serious risk to life, but one which also impacts heavily on the day to day running of the rail network.

BTP is actively seeking to work in partnership with the scrap metal industry in dealing with this problem. By acting responsibly and within the law, the scrap metal industry can play a vital and valuable role in helping us achieve this.

Although we recognise the importance of recycling redundant material and the valuable contribution the metal recycling industry makes to the UK economy, any SMD suspected of being, or found involved in dishonestly acquiring, using or disposing of stolen cable and other metals **will** be dealt with robustly and to the full extent of the law. Handling stolen goods and money laundering carry sentences of up to 14

years in prison and can also mean the confiscation and disposal of **all** assets under the Proceeds of Crime Act 2000.

This is **in addition** to any offences they may have committed under the Scrap Metal Dealers Act (In Scotland - Civic Government [Scotland] Act 1982).

The Scrap Metal Dealers Act allows local authorities to regulate the scrap metal trade within their area and places a legal obligation on the SMD to keep full and accurate records for:

- All scrap metal received at their premises
- All scrap metal either processed at, or despatched from, their premises

Scotland Only - this does not apply if an exemption is held under the Civic Government [Scotland] Act 1982. All books must be bound (i.e hardback) and kept exclusively for this purpose. They must be kept for a minimum of two years after the last entry is made.

The books must accurately show:

- Description and weight
- Date and time of receipt
- Full name and address of person received from
- Price and/or value if any
- Registration mark of vehicle delivering the scrap metal

Scrap metal processed/despached other than on sale or exchange: the estimated value immediately before processing or despatch.

All entries must be recorded immediately after the transaction.

Failure to comply with any of these requirements is a criminal offence.

Together with our partners Network Rail, train operating companies, SOCA, HMRC, BT, all the UK Power Networks, Environment Agency, Calor Gas, NHS, Virgin, VOSA, local authorities, Health & Safety Executive and our colleagues from other police forces, BTP will continue to make regular, unannounced visits

to SMDs to ensure there is full compliance with all regulations.

Important: revised legislation was implemented from 3 December 2012

The Legal Aid, Sentencing and Punishment of Offenders Act 2012 received Royal Assent on 1 May 2012. The legislation sets out changes to the Scrap Metal Dealers Act 1964 which creates a new criminal offence prohibiting scrap metal dealers from paying for scrap metal in cash. The Act also significantly increases the fines under the existing Scrap Metal Dealers Act 1964 so that the most serious breaches can result in a level 5 fine.

This legislation will apply to **all SMDs** as defined by the Scrap Metal Dealers Act 1964, regardless of whether they are registered with their local authority. Trading without a registration under the above act is a criminal offence.

The Scrap Metal Dealers Act 2013 received Royal Assent on 28th February which means it is now on the Statute book. The Act includes a rigorous licensing scheme that ensures every sale of scrap metal is accounted for, and that all people trading in scrap are doing so legitimately. Its key features are:

- Any individual or business that carries on business as a scrap metal dealer must complete an enhanced application process to get a licence – local authorities can refuse unsuitable applicants and have the power to revoke licences
- All sellers of metal must provide verifiable ID at point of sale which is recorded and retained by the dealer
- The cashless offence will apply to all scrap metal dealers without exception including 'mobile/itinerant collectors' who conduct house to house collections
- Police and officers of a local authority will have the right to enter and inspect the premises of licensed and unlicensed scrap metal dealers
- Police and officer of a local authority may issue a 'closure notice' to unlicensed sites and apply for a closure notice to the court
- The worst breaches of the act including trading in cash, failing to keep an accurate record of deals and trading without a licence, would face unlimited fines
- Creation of a single national publicly available register of all scrap metal dealers
- Definition of scrap metal dealer to include motor salvage operators, thereby bringing that licensing scheme within one new scrap metal licensing regime
- Compulsory vehicle and site badging

The offence of buying scrap metal for cash

Section 146 of the LASPO Act 2012 provides that:

(1) A scrap metal dealer must not pay for scrap metal except—

(a) by a cheque which under section 81A of the Bills of Exchange Act 1882 is not transferable, or

(b) by an electronic transfer of funds (authorised by credit or debit card or otherwise).

(2) The Secretary of State may by order amend subsection (1) to permit other methods of payment.

(3) In this section paying includes paying in kind (with goods or services).

(4) If a scrap metal dealer pays for scrap metal in breach of subsection (1), each of the following is guilty of an offence—

(a) the scrap metal dealer;

(b) a person who makes the payment acting for the dealer;

(c) a manager who fails to take reasonable steps to prevent the payment being made in breach of subsection (1).

Therefore from the commencement of this provision cash cannot be used to purchase scrap metal, only payment by cheque or an electronic transfer of funds will be acceptable.

Methods of payment

- Only electronic payment
- Payment by 'crossed cheque' made out to a named individual or firm and **not** made out to cash

Any other payment instruments which do not come within the methods above, and which provide anonymous or near cash alternatives are **not** acceptable within this legislation. This includes:

- Postal orders, foreign currency, electronic vouchers, virtual currencies, mobile phone airtime credits, retailer/supermarket gift cards and vouchers, single, non-reloadable pre-paid debit cards and re-loadable debit cards which are anonymous are **all not acceptable**.

Record keeping

The LASPO Act, section 146(6). It now also includes a requirement for SMDs to provide details of the transaction as part of each record. This record must either be a copy of a named cheque or a print out receipt of the electronic payment made. A record must also be made giving the details of the person who made the payment and the person who took receipt. Records which fail to show the transaction and how the payment was made will be considered incomplete and deemed an offence under s2 of the Scrap Metal Dealers Act.

Key words

Key words within the Act are **knows** and **suspects**.

Knows

Includes actual knowledge, wilfully shutting one's eyes to the obvious, wilfully and recklessly failing to make such enquiries an honest and reasonable person would make, knowledge of circumstances which would indicate the fact to an honest and reasonable person, knowledge of circumstances which would put an honest and reasonable person on enquiry.

Suspects

Includes a momentary suspicion: 'I suspect – but cannot prove'.

Police powers have legal authority at all reasonable times:

- To enter and inspect any place registered with the local authority as a scrap metal store or as a place occupied by a scrap metal dealer wholly or partly for the purposes of his business
- To require production of, to inspect the books or records and any scrap metal at that place and to take copies of, or extracts from, any such books or records (unless exempt under the Civic Government [Scotland] Act 1982)

Our officers will be making regular unannounced visits to SMDs to check that the regulations are complied with. We will also be working with other agencies such as Health & Safety Executive, the Environment Agency, the local authorities and police to ensure full compliance of all regulations.

Cable reference guide



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2 core 10mm² B2
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4 core 2.5mm² C2
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7 core 0.75mm² B2
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19 core 0.75mm² B2
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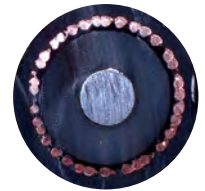
27 core 0.75mm² B2
Page 19



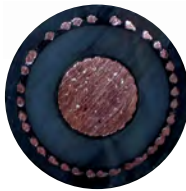
37 core 0.75mm² B2
Page 20



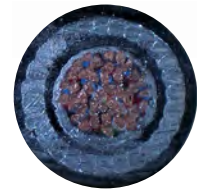
48 core 0.75mm² B2
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1 core 185mm²
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3 core (armoured) 95mm²
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Images not to scale

Signalling cables

This is a popular target for thieves due to its high copper content. Signalling cabling has rubberised insulation and rubber outer sheathing.

Cable identification

Cable can bear markings on the sheath, the following examples are markings used by Network Rail:

RT/E/PS/00005

NR/E/PS/00005

NR/PS/SIG/00005

- **2 core 95mm² B2**

Each core is made up of approximately 19 wires at Ø 3 mm

Ø 40 mm (shown at actual size)



- **2 core 70mm² B2**

The two insulated cores can also be red and black. Each core is made up of approximately 7 wires at \varnothing 4.7 mm

\varnothing 36 mm (shown at actual size)



- **2 core 70mm² B2**

∅ 26 mm (shown at actual size)



- **2 core 35mm² B2**

∅ 20 mm (shown at actual size)



- **2 core 10mm² B2**

The 2 cores have coloured sheathing – red and black

Ø 17 mm (shown at actual size)

A long, thin, black cable with white text printed on it. The text is oriented horizontally and reads: "08/06 RT/E/PS/00005006/120093 2c 10 mm2 type B2".

08/06 RT/E/PS/00005006/120093 2c 10 mm2 type B2

- **4 core 2.5mm² C2**

∅ 18 mm (shown at actual size)



- **7 core 0.75mm² B2**

∅ 15 mm (shown at actual size)



- **19 core 0.75mm² B2**

∅ 20 mm (shown at actual size)



- **27 core 0.75mm² B2**

∅ 23 mm (shown at actual size)



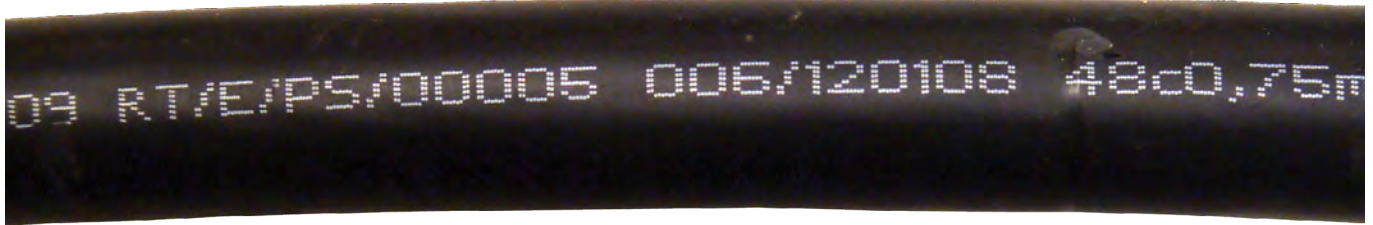
- **37 core 0.75mm² B2**

∅ 25 mm (shown at actual size)



- **48 core 0.75mm² B2**

∅ 28 mm (shown at actual size)



High voltage cables

High voltage cable can have either cross linked polyethylene (XLPE) or oil insulation around the copper or aluminium core. The outer sheathing is black plastic PVC or hession covered.

High voltage cable is electrified and has up to **33,000 volts** running through it. It presents a significant danger and risk of death to thieves.

Cable identification

New cable will be embossed with 'PROPERTY OF NETWORK RAIL' otherwise it will not have any relevant identification on the sheathing.

- 1 core 185mm²

High voltage cables bear 'PROPERTY OF NETWORK RAIL' embossed along the sheathing. A solid aluminium core rod approximately \varnothing 14 mm surrounded by a ring of XLPE and a copper wire screen.

\varnothing 45 mm (shown at actual size)

This cable is also available as a 1 core 95mm²

Example markings:

NR/PS/ELP/00008

RT/E/PS/00008

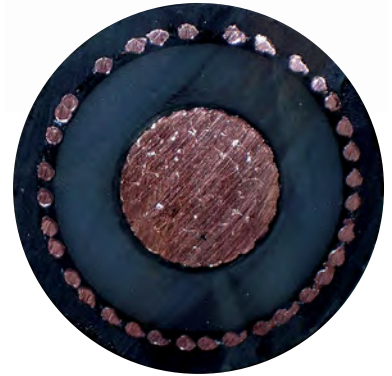


- **1 core 300mm²**

High voltage cables bear 'PROPERTY OF NETWORK RAIL' embossed along the sheathing. A copper core of individual wires approximately $\varnothing 21$ mm surrounded by a ring of XLPE and a copper wire screen.

$\varnothing 50$ mm (shown at actual size)

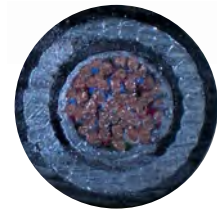
This cable is also available as a 1 core 400mm²



- **20 pair 0.9mm²**

High voltage cables bear 'PROPERTY OF NETWORK RAIL' stamped along the sheathing. This cable is also available with 30 pairs.

∅ 27.5 mm (shown at actual size)



• Oil filled cable

This cable is available with both aluminium and copper cores. Each core is approximately \varnothing 16mm and surrounded by copper or aluminium tape, with an outer ring of aluminium or lead. Oil filled cable is pressurised.

\varnothing 70 - 80 mm (shown at actual size)



Telecoms

Telecommunication cabling on the railway is usually armoured, with or without grease within the sheathing. Rather than 'cores', the inner strands of thin cabling are referred to as 'pairs' (30 pair is equivalent to 60 individual cores) and each core is sheathed in multi-colour polyethylene.

Cable with the following markings are manufactured for Network Rail:

BR 886
BR 899
BR 873
BR 874
BR 875
BR 876
BR 884
BR 885
BR 887
BR 894
BR 895
GK/RT 0315
RT/E/PS/00015
NR/PS/TEL/00015

- **Telecom 10 pair 0.9mm**

Armoured

Ø 22 mm (shown at actual size)



- **Telecom 30 pair 0.9mm**

Armoured

∅ 30 mm (shown at actual size)



- **Telecom 50 pair 0.9mm**

Non-armoured

Ø 35 mm (shown at actual size)



Overhead

This group looks at cables and bare copper used on the overhead elements. 'Strands' is the term used to describe the inner threads for this type of cabling, instead of 'core' or 'pairs' used in signalling and telecoms. It is generally not a target, as up to 25,000 volts pass through or near it.

Overhead cable is electrified and has 25,000 volts AC running through it. It presents a significant danger and risk of death to thieves.

• Solid copper overhead contact wire

Ø 12 mm (shown at actual size)

Suspended using these copper clips:



- **Copper rope**

This pure copper is rope-like in its appearance and attaches to two brackets that create an 'n' shape within the overhead cabling.



Traction (third rail) cables

Traction cables carry a large DC voltage.

When made in aluminium the cable has a PVC outer sheathing and may also have aluminium lugs attached to the ends. These cables are available in:

800 - Ø 48.5 mm

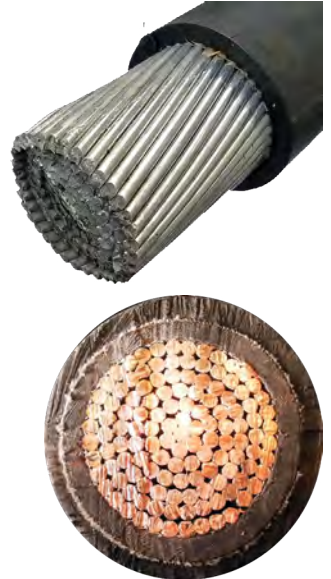
500 - Ø 40 mm

240 - Ø 28 mm

When made in copper the cable has a rubber outer sheathing and may also have brass lugs attached to the ends. These cables are available in:

630 - Ø 44 mm

161 - Ø 25 mm



Points heater cables

Black PVC covered cable - markings read
600/1000V CU/XLPE/SWA/PVC BS 5467 Electric Cable 4 X 185m

There is a outer layer of (SWA) Steel Wire Armour followed by a layer of insulation and then the four quadrant copper cores have coloured PVC around them in blue, black, brown and grey. These copper cores are made up of approximately 40 individual 2.8mm wires.

This cable is available in various sizes.



• 3 core (armoured) 95mm²

This is a double insulated standard power cable. It is made up of individual wires with insulation of brown, grey and black or red, blue and yellow. There is an SWA outer ring & PVC insulation.

May not have a unique manufacturing marking.

∅ 40 mm (shown at actual size)



Other materials

Fish plate



Facetta clamp



Pandrol clip



Portable inductor magnet



Bullhead check chair



Slide chair



S & C flat bottom baseplate



Adjustment switch baseplate



Step plate



Insulated block joint



Abbreviations

AWA	Aluminium Wire Armour
BR	British Rail
BS	British Standard
BT	British Telecom
BTP	British Transport Police
CWS	Copper Wire screen
E	Electric
EA	Environment Agency
EPR	Ethylene Propylene Rubber
FHQ	Force Headquarters
FIU	Force Intelligent Unit
KV	kilovoltage
HDPCP	Heavy Duty Polychloroprene
HMRC	HM Revenue & Customs
HOFR	Heat Oil Resistant and Flame Retardant
LASP	Legal Aid Sentencing & Punishment
LSZH	Low Smoke Zero Halogen
M	Metre
MDP	Medium Density Polyethylene
MM	Millimetre
MM ²	Square Millimetre

NHS	National Health Service
NR	Network Rail
PCP	Polychloroprene
PCW	Plain Copper Wire
PE	Polyethylene
PETP	Polyethylene Terephthalate
PICAS	Paper Insulated Corrugated Aluminium Sheath
PILC	Paper Insulated Lead Covered
PILOT	Signal Cable
PS	Product Specification
PVC	Poly Vinyl Chloride
RT	Rail Track
SIG	Signal
SMD	Scrap Metal Dealer
SOCA	Serious Organised Crime Agency
SSE	Scottish & Southern Energy
SWA	Steel Wire Armour
TEL	Telecoms
V	Voltage
VOSA	Vehicle and Operator Service Agency
XLPE	Cross Linked Polyethylene

Periodic elements

Ag	Silver
Al	Aluminium
Au	Gold
Cu	Copper
Fe	Iron
Mn	Manganese
Ni	Nickel
Pb	Lead
Pt	Platinum
Rh	Rhodium
Xe	Xeon
Zn	Zinc



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Accurate at time of production - May 2013

For more information about cable theft
please visit the following websites
www.btp.police.uk
www.networkrail.co.uk/cabletheft