



Ministero dell'Interno  
DIPARTIMENTO DELLA PUBBLICA SICUREZZA  
DIREZIONE CENTRALE PER LA POLIZIA STRADALE, FERROVIARIA,  
DELLE COMUNICAZIONI E PER I REPARTI SPECIALI DELLA POLIZIA DI STATO  
SERVIZIO POLIZIA FERROVIARIA  
II<sup>a</sup> DIVISIONE



# COPPER E-BOOK

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Typology of copper used by European Railway Companies  
in collaboration with



## RAILPOL

*(European network of Railway Police Forces)*



Internal /Office use only



## Introduction by Italian Railway Police

*Copper Thefts from Railway lines has now become an European problem.*

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The 2011 statistics show dramatically how, all over Europe, the run to “Red Gold” is directly proportional to increase of market price of valuable metal, this causes serious lacks for the Railway Companies and thousands of minutes of delay on the railway lines.

The Italian Railway Police, together with RAILPOL, is on duty since several years for counteracting this criminal activity, that more and more often is managed by criminal organizations. This issue requests to all Police Forces a synergic effort.

The Copper E-book was indeed created from this point of view: a tool in step with actual period, that, using the web, provides a fast and easy reading to Police Officers such as experts in the metal fields. The aim is to allow a identification of copper cables used by European Railway Companies, for allowing Police Forces, during their actions, to recognize the origin of found copper, and for warning the buyers that the goods they are buying could be suspect.

*This is only the first step, but very important, of the hard willingness of cooperation between the Police Forces of whom RAILPOL, in the European Railway environment, represents the highest expression.*



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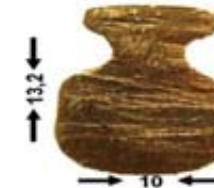
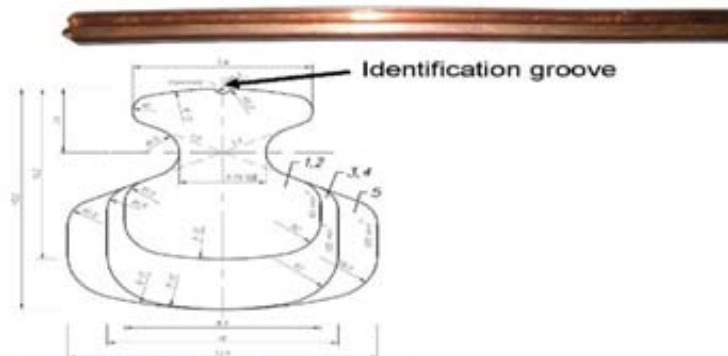
## Assistance for a clear Assignment of Copper Components used within the Austrian Railway Infrastructure

Provided by:  **ÖBB**  
Infrastruktur Betrieb

As of 11.11.2011 / Wochemayr

### Copper components used within the Austrian railway infrastru

Discription: **Contact wire with 1 identification groove**  
Material: Alloy of copper-aluminium or copper-cadmium  
Cross Section/Weight: 65 mmq ... 0,585 kg/m  
100 mmq ... 0,891 kg/m  
120 mmq ... 1,068 kg/m



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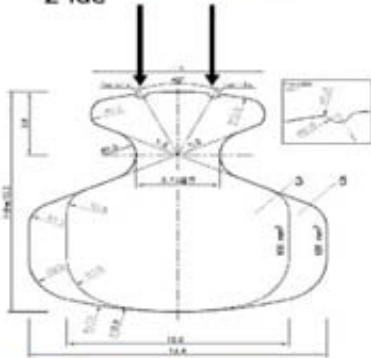
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## Copper components used within the Austrian railway infrastructure



Discrip  
Materie

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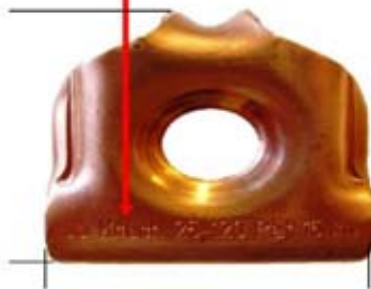
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## Copper components :

Discription: **Flexible catenary hanger**  
(for a suspension of catenary wires)



Kruch – Manufacturing company



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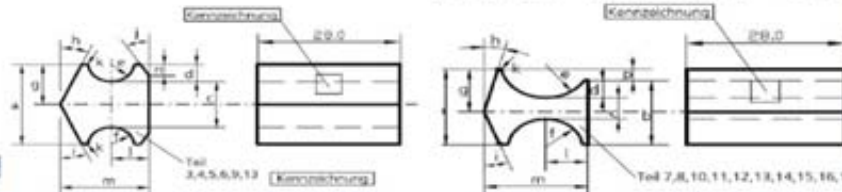
## Copper components used within the Austrian railway infrastructure

Discription: **Spacer for rope clip**



Unit of Measurement for Spacers

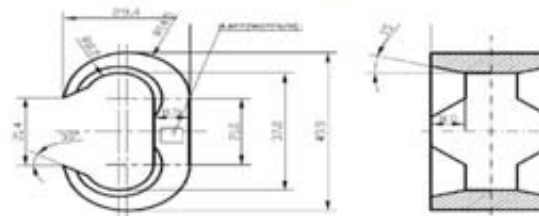
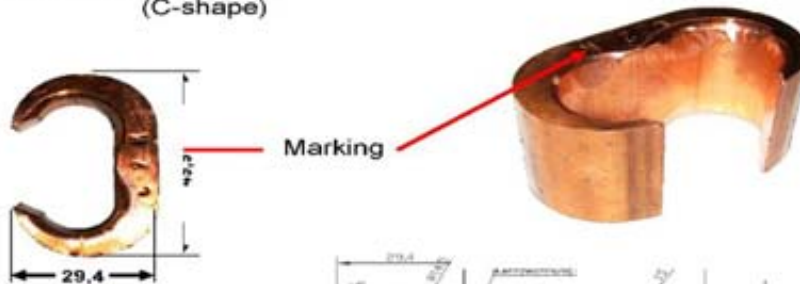
Cross Section	Teil	Unit of Measurement for Spacers														
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	p
35/40-50	1	24,80	14,70	5,30	84,25	84,25	12,40	15°	15°	30°	R1,60	7,50	18,30	2,50		
40-50/40-50	4	24,80	14,70	5,30	84,25	84,25	12,40	15°	15°	30°	R1,60	7,50	18,30	2,50		
40-50/70	5	24,50	15,50	4,50	84,50	85,25	12,25	11°	11°	30°	R1,25	7,50	17,40	2,50		
40-50/95	6	21,00	12,50	4,00	84,50	86,25	10,50	22°	14°	30°	R0,50	7,50	17,50	3,00		
40-50/95flex	7	19,20	11,00	4,00	84,50	87,75	10,50	22°	14°	30°	R0,82	7,50	17,50	3,00		
40-50/150	8	16,75	8,50	3,75	84,50	87,80	8,50	20°	15°	30°	R0,75		18,70	5,60		
70/70	9	22,00	14,50	4,75	85,25	85,25	11,50	11°	11°		R1,50	7,50	17,40			
70/95	10	19,00	10,00	5,00	86,50	85,50	10,00	14°	21°		R1,20	7,50	17,50			
70/95flex	11	16,75	8,75	3,50	87,75	85,50	9,00	14°	21°		R1,32		17,50			
95/95	12	18,00	9,00	4,50	86,75	86,75	7,25	15°	12°		R1,00	7,50	17,50			
95flex/95flex	13	16,38	8,19	6,75	87,75	87,75	8,19	12°	12°		R0,80	7,50	17,50			
95/150	14	17,70	11,10	5,00	86,25	87,50	7,70	20°	14°		R1,20	7,50	18,50			
95flex/150	15	16,30	11,10	4,50	87,75	87,50	6,30	20°	14°		R1,00	7,50	17,50			0,40
150/150	16	15,50	8,10	2,50	88,00	88,00	7,50	15°	12°		R0,70	6,00	17,00			4,50
							7,50	15°	12°		R0,70	6,00	17,00			4,50



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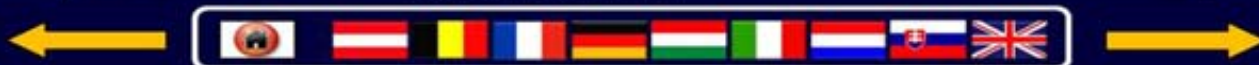
## Copper components used within the Austrian railway infrastructure

Discription: **Rope clip (C-shape)**



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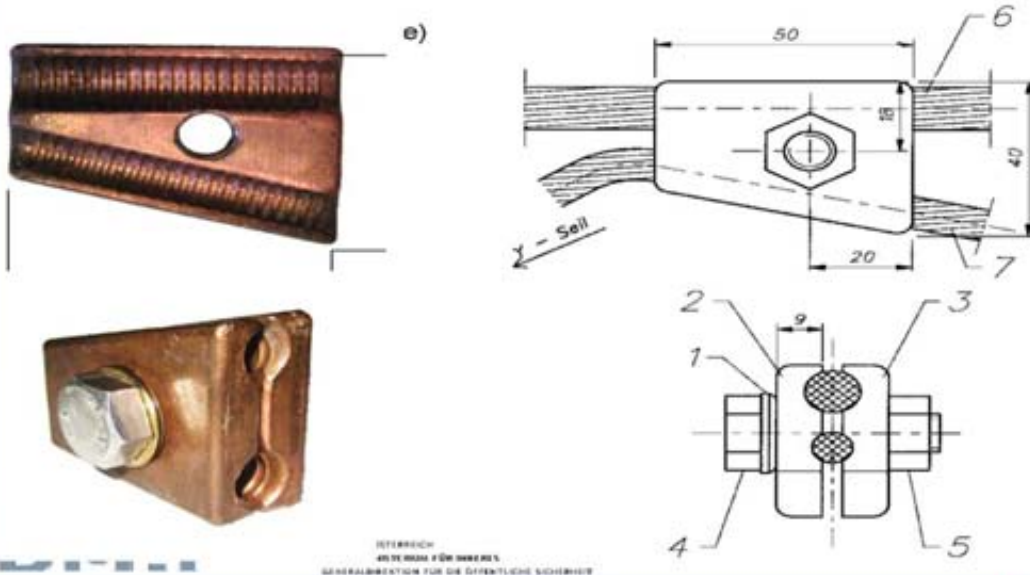
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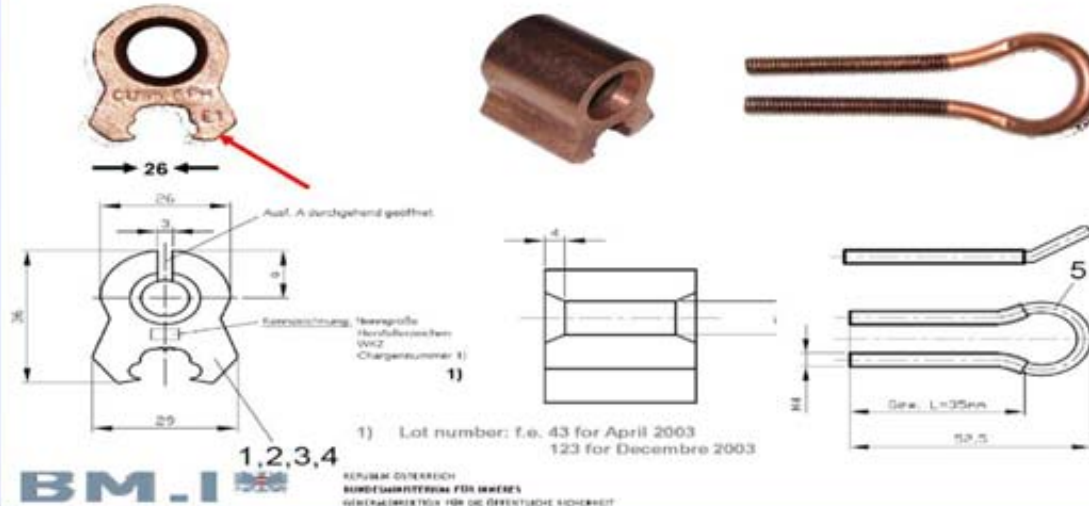
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## Copper components used within the Austrian railway infrastructure



## Copper components used within the Austrian railway infrastructure

Discription: Feed-in clip



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## Copper components used within the Austrian railway infrastructure



Discription: **Supporting cable CuAg 95 mmq**

Material: Alloy of copper-silver

Cross Section/required: 93,27 mmq

Diameter: 12,50 mm

Single Wires: 19

Single Wire-Diameter: 2,50 mm

Coloured Tracer Threads: 2



Coloured Tracer Threads



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## Copper components used within the Austrian railway infrastructure



Discription: **Supporting cable CuAg 150 mmq**

Material: Alloy of copper-silver

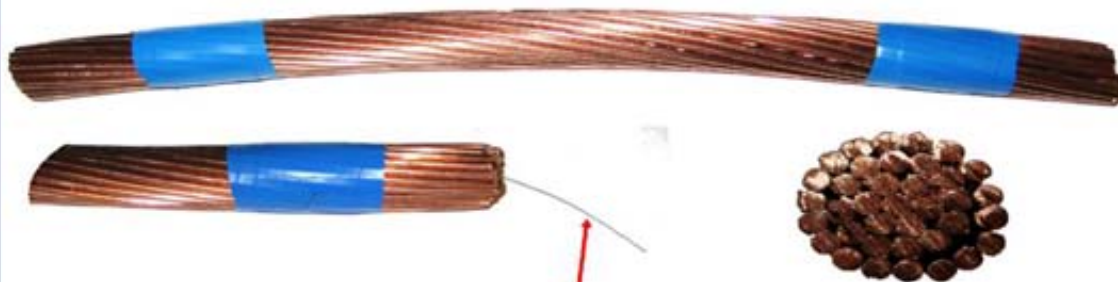
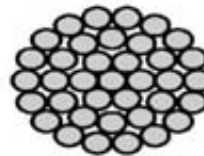
Cross Section/required: 147,11 mmq

Diameter: 15,75 mm

Single Wires: 37

Single Wire-Diameter: 2,25 mm

Coloured Tracer Threads: 1



Coloured Tracer Thread



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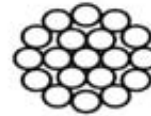
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## Copper components used within the Austrian railway infrastructure



Discription: **Drain cable 50 mmq**  
 Material: Copper  
 Cross Section/required: 48,40 mmq  
 Diameter: 9,00 mm  
 Single Wires: 19  
 Single Wire-Diameter: 1,8 mm  
 Coloured Tracer Threads: 0



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## Copper components used within the Austrian railway infrastructure



Discription: **Copper cable, ultraflexible 95 mmq**  
 Material: Copper  
 Cross Section/required: 98,05 mmq  
 Diameter: 14,15 mm  
 Single Wires: 480  
 Single Wire-Diameter: 0,51 mm  
 Coloured Tracer Threads: 0



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## Copper components used within the Austrian railway infrastructure

Discription: **Cable 10 mmq**  
Material: Bronze  
Cross Section/required: 10,01 mmq  
Diameter: 4,50 mm  
Single Wires: 7x7  
Single Wire-Diameter: 0,51 mm  
Coloured Tracer Threads: 0

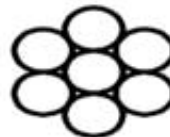


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## Copper components used within the Austrian railway infrastructure

Discription: **Cable 35 mmq**  
Material: Bronze  
Cross Section/required: 34,40 mmq  
Diameter: 7,50 mm  
Single Wires: 7  
Single Wire-Diameter: 2,5 mm  
Coloured Tracer Threads: 0



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## Copper components used within the Austrian railway infrastructure



Discription: **Copper wire 6 mmq**  
 Material: Copper  
 Cross Section/required: 28,27 mmq  
 Diameter: 6,00 mm  
 Single Wires: 1



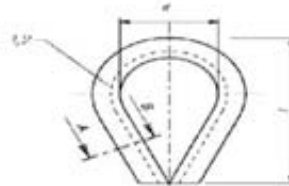
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## Copper components used within the Austrian railway infrastructure



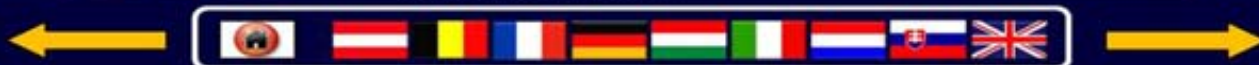
Discription: **Cable eye**



Ausf.	Seil- Nenn q <sup>2</sup>	a	d	b <sub>w</sub>	l	s	l
				mm			
A	11.5	14	3.5	22	52	4	9.5
B	7	8	2.3	13	47	2.5	6.5
C	5	5	12.5	9	35	3.5	3.1

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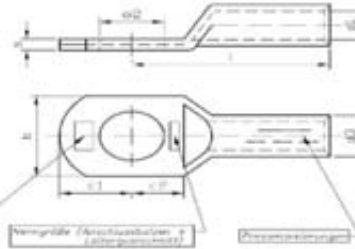
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## Copper components used within the Austrian railway infrastructure

Discription: **Cable shoe**



Nenngröße Nennweite mm	SK 2 Lug	Pressen- weite mm	SK 2 Anker	Pressen- weite mm	s	s <sub>1</sub>	s <sub>2</sub>	s <sub>3</sub>	s <sub>4</sub>	s <sub>5</sub>	s <sub>6</sub>	s <sub>7</sub>	s <sub>8</sub>	s <sub>9</sub>	s <sub>10</sub>	
10 - 25	10		10	2	5	17		15	12	7		10,5	10	38		3
12 - 25	10		10	2	5	18		16	13	7		13,0	10	38		3
10 - 35	12		12	2	5	19		15	12	8,2		10,5	12,5	42		2,5
12 - 35	12		12	2	5	21		16	13	8,2		12,5	12,5	42		2,5
16 - 35	12		12	2	5	26		13	16	8		17	12,3	46		2,5
10 - 50	14	1	14	3	5	22	s <sub>1</sub>	15	12	10		10,5	14,5	52		4
12 - 50	14	1	14	3	5	24		16	13	10		13	14,5	52		4
16 - 50	14	1	14	3	5	28		19	16	10	0,3	17	14,5	52		4
12 - 70	16	1	16	3	5	24		16	13	11,5		13	16,5	50		4,5
12 - 95	18	2	18	4	5	26		16	13	13,5		13	19	65		5
16 - 95	18	2	18	4	5	32		19	16	15,5		17	19	65		5
12 - 150	22	2	18	4	5	34		19	13	17		13	23,5	78		6
16 - 150	22	2	18	4	5	34	s <sub>2</sub>	19	16	17		17	23,5	78		6
12 - 185	25	2	18	5	5	37		19	13	19	0,4	13	25,5	82		6

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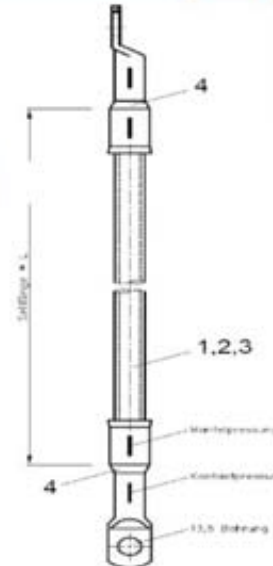
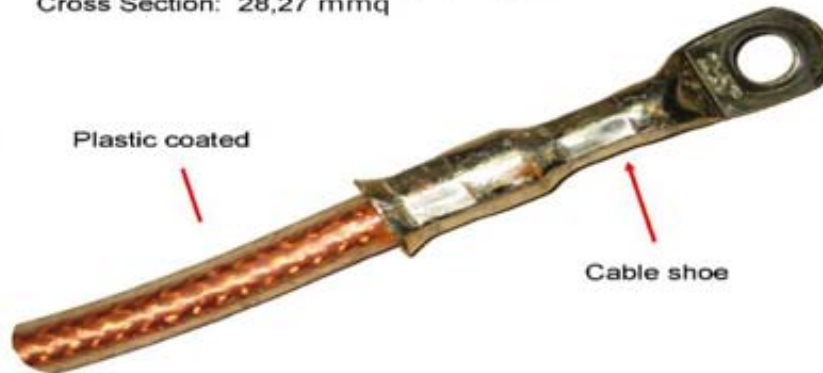
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## Copper components used within the Austrian railway infrastruc

Discription: **Earth cable for earthing devices**

Wire Length in m: 2; 4; 5; 6; 6,5; 8; 12

Cross Section: 28,27 mm<sup>2</sup>



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## Copper components used within the Austrian railway infrastructure

Discription: **XLPE-insulated Power cable (18/30 kV)**

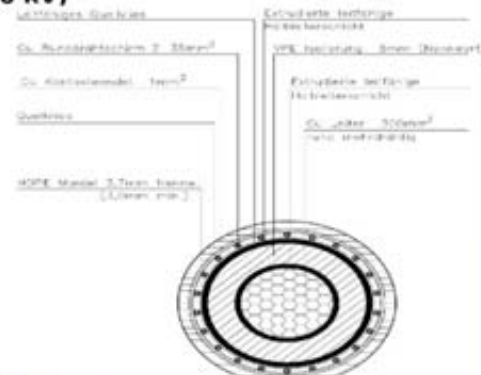
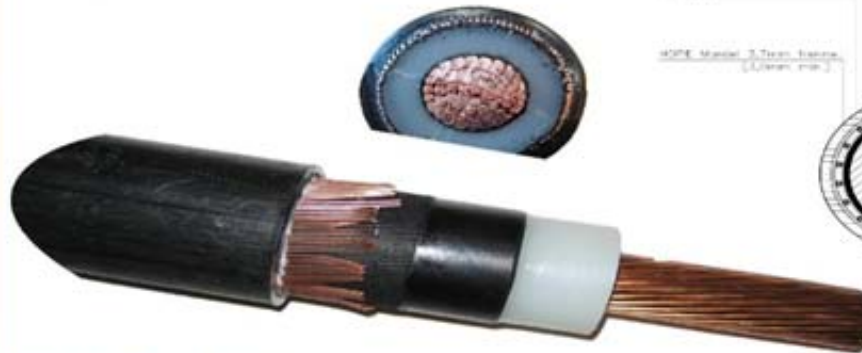
Marking: E-X2XHCJ2Y3V

Cross Section: 300 mmq

Diameter: 52 mm

Weight of Cable: 4500 kg/km

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## Copper components used within the Austrian railway infrastructure

Discription: **PVC-insulated Power cable (0,6/1 kV)**

Marking: E-YY-0

Cross Section: 5x10 mmq

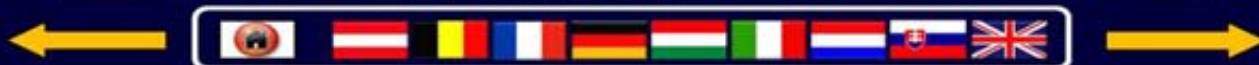
Diameter: 25 mm

Weight of Cable: 1200 kg/km



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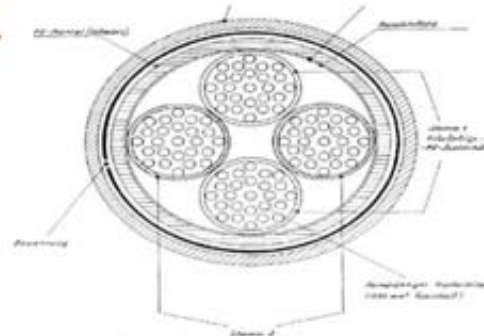
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Copper components used within the Austrian railway infrastructure

Discription: **Safeguard cable for the inductive train running control**



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Ministerium für Verkehr und Infrastruktur  
1000 Wien

Copper components used within the Austrian railway infrastructure

Discription: **Cable for direct current (DC)- isolation**

Marking: S-X11Y-1X50 (0,40)

Cross Section: 50 mmq fine-wired



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# BELGIUM

[www.police.be](http://www.police.be)



# BELGIUM



## *Copper – The new gold*

### Copper- and metaltheft in Belgium

CP Roland Vanherle  
CP Eric Van Echelpool



### Making an insight of cablesamples on an overviewboard



- to be technical supported
- better understanding and notion of section, diameter, jacket, etc..
- to help us to identify found copper and to match with coppertheft by the railroad company
- Study material for new members of the Railroad Police or partners
- to have a better insight on the problem



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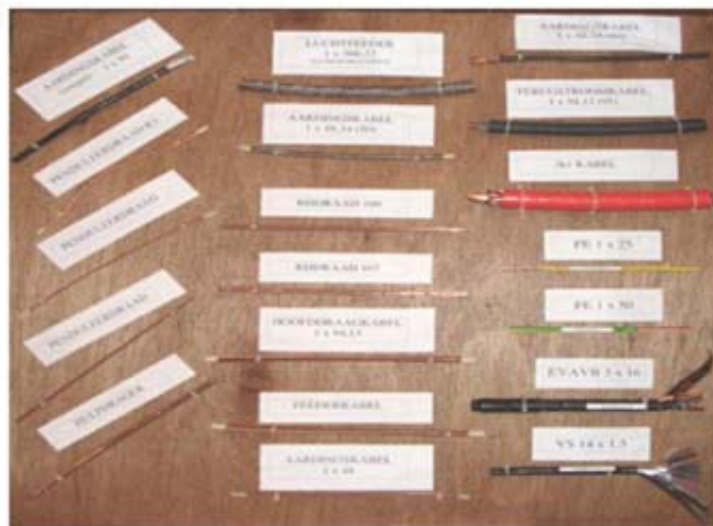
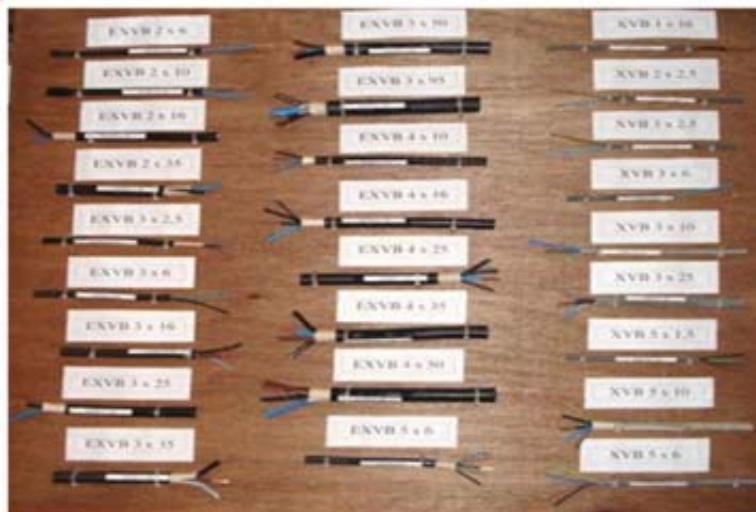
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# BELGIUM



Three different possible sections



R1 = round massive core

RM = round multiwire core



SM = sectoral multiwire core



R1 = round massive core



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RM = round multiwire core



SM = sectoral multiwire core



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## Stripping and cutting cables

Manual

- \* cutterknife
- \* stripknife



Mechanical assistance

- \* stripmachine (manual)



Full automatic

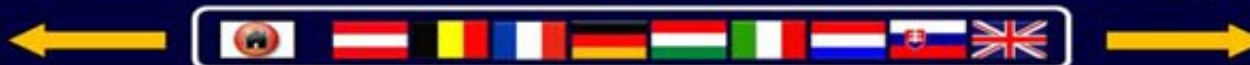
- \* strip – cuttingmachine



## Results and experience from actions "environment – metals"



- Parts will be offered in bundles (stripped)
- Different wholesalers will be visited
- Sometimes de ID ( identity card) , or the plate of the car and the trailer does not match
- Jackets and isolation will be offered in containerparks
- In Belgium there must be always an identification of someone who wants to offer copper to sell
- For the province East-Flanders in Belgium copper will be offered for 90% to the same wholesaler (Casier – Deerlijk)





# BELGIUM



type	Extern Ø in mm	Copperweight kg/km	Total weight kg/km	Type core
XVB 1 X 16	8.8	148	283	R1
XVB 2 X 2,5	9.7	46	157	R1
XVB 3 X 2,5	10.2	69	183	R1
XVB 3 X 6	12.2	166	313	R1
XVB 3 X 10	14.0	276	442	R1
XVB 3 X 25	21.4	690	1050	RM
XVB 5 X 1,5	10.9	69	197	R1
XVB 5 X 6	14.4	276	436	R1
XVB 5 X 10	16.8	460	632	R1
EVAVB 3 X 16	24.5	515	1300	R1
VS 14 X 1,5				
EXeCX 1 X 300 3KV				



Source : CEBCO via <http://www.elektrashop.be>



type	Extern section Ø in mm	Copperweight kg/km	Total weight kg/km	Type core
EXVB 2 X 6	14.2	111	340	R1
EXVB 2 X 10	15.8	184	455	R1
EXVB 2 X 16	18.2	295	650	R1
EXVB 2 X 35	24.0	645	1240	R1
EXVB 3 X 2,5	12.7	69	250	R1
EXVB 3 X 6	14.9	166	400	R1
EXVB 3 X 16	19.4	442	820	RM
EXVB 3 X 25	23.0	690	1200	RM
EXVB 3 X 35	25.6	986	1570	RM
EXVB 3 X 50	27.1	1380	1900	SM
EXVB 3 X 95	33.9	2622	3400	SM
EXVB 4 X 10	17.0	368	710	R1
EXVB 4 X 16	23.0	589	1050	RM
EXVB 4 X 25	26.0	920	1550	RM
EXVB 5 X 6	17.1	276	560	R1



Source : CEBCO via <http://www.elektrashop.be>



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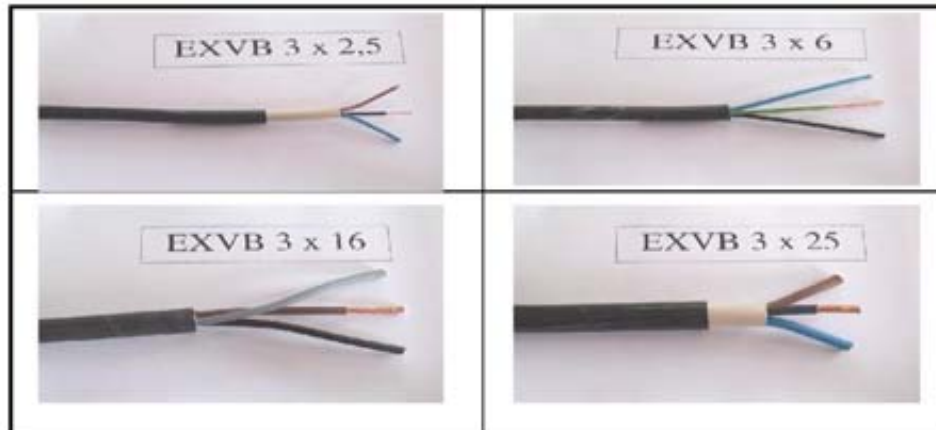
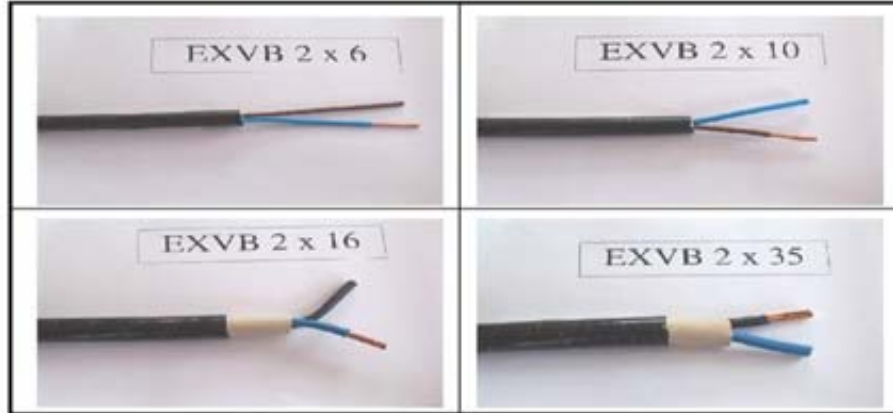
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EXVB 4 x 16



EXVB 4 x 25



EXVB 4 x 35



EXVB 4 x 50



EXVB 5 x 6



XVB 1 x 16



XVB 2 x 2,5



XVB 3 x 2,5



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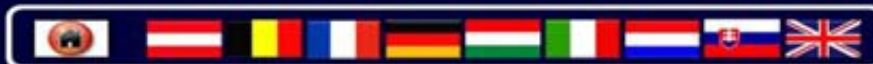
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EXVB 3 x 35



EXVB 3 x 50



EXVB 3 x 95



EXVB 4 x 10



XVB 3 x 6



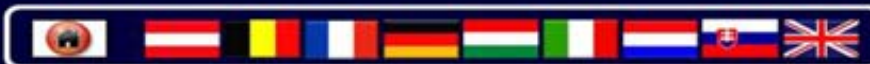
XVB 3 x 10



XVB 3 x 25



XVB 5 x 1,5



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XVB 5 x 6



XVB 5 x 10



PE 1 x 25



PE 1 x 50



VS 14 x 1,5



EXeCV 1 x 300



EVAVB 3 x 16



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PENDULEERDRAAD

AARDINGSKABEL  
(soepel) 1 x 50

AARDINGSKABEL  
1 x 48

HULPDRAGER

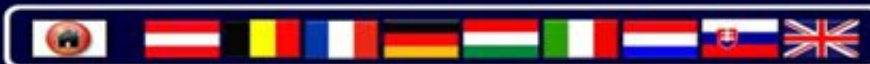


RIJDRAAD

RIJDRAAD 107

PENDULEERDRAAD R3

PENDULEERDRAAD





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## Remarques Chair your experience



- All copper cables are not known
- Some cables do not exist anymore but will still be stolen out of the cable sleeves along the railroad and replaced by more modern types (vb fiber for telephony)
- Specific cables
- If you know them please let us know. The more types we know the stronger we stand



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[www.interieur.gouv.fr](http://www.interieur.gouv.fr)





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## CABLE DE CUIVRE

Sections 104, 146, 164 et 185 mm<sup>2</sup>

Câble de cuivre nu de mise à la terre ou câble support de caténaire

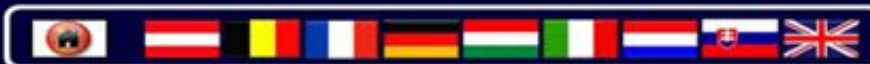


Câble de cuivre de retour de courant de traction ou d'alimentation



## Caténaire ou Fil de contact

Profilé rainuré à méplat de 107 et 150 mm<sup>2</sup>



# FRANCE

## CABLE 3 conducteurs de cuivre gainé type SCG 3 x 25 mm<sup>2</sup>



## TOURET FIL DE CONTACT Cuivre rainuré méplat 150



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## CABLE DE CUIVRE GAINÉ 3 x 185



## CABLE D'ALUMINIUM GAINÉ Section 185 et 240 mm<sup>2</sup>



# FRANCE

## CABLE DE SIGNALISATION



## CABLE MONOCONDUCTEUR DE CUIVRE GAINÉ 146 ou 240 mm<sup>2</sup>



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# FRANCE

## BARRE DE CUIVRE ronde



## BARRE DE CUIVRE plate



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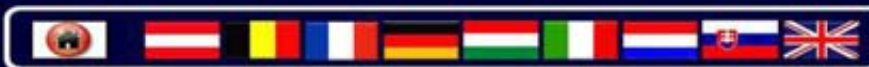
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[www.polizei.bund.de](http://www.polizei.bund.de)



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## Pictures of metal use by railway-company Deutsch Bahn AG

sleeve as connecting piece, copper



half-casing, copper

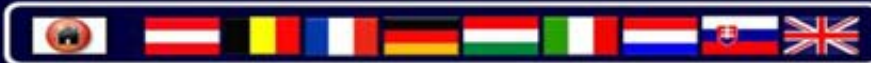


## Pictures of metal use by railway-company Deutsch Bahn AG

Bronze



Copper



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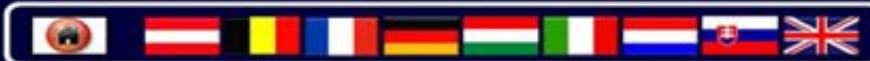
## Pictures of metal use by railway-company Deutsch Bahn AG

Bronze



## Pictures of metal use by railway-company Deutsch Bahn AG

Bronze





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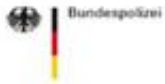
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## Pictures of metal use by railway-company Deutsch Bahn AG

hanging sling, copper



overhead lines on cable drum, aluminium

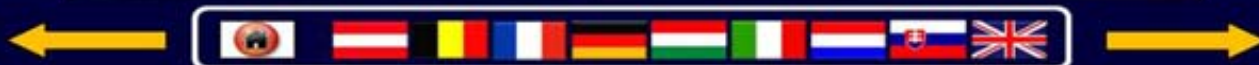


## Pictures of metal use by railway-company Deutsch Bahn AG

overhead traction wire, copper



catenary wire, copper



# GERMANY



## Pictures of metal use by railway-company Deutsch Bahn AG

catenary wire, copper



earthing cable with cable coating, copper



## Pictures of metal use by railway-company Deutsch Bahn AG

cable shoe, copper



connecting plate, copper (switchbox)



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## Pictures of metal use by railway-company Deutsch Bahn AG

connecting pieces and brackets for securing and joining overhead wire and earthing cable



various metal alloys



## Pictures of secured copper



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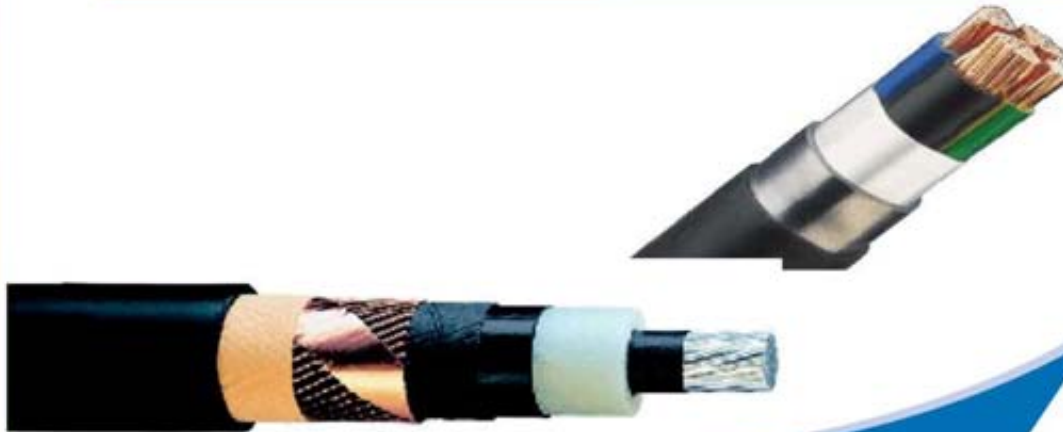
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other Pictures



Metalthefts in action





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[www.police.hu](http://www.police.hu)



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02.



Kettős műanyag-szigetelésű  
4 x 25  
ERŐSÁRAMÚ VEZETÉK  
4 db. műanyag szigetelésű  
ALUMINIUM belső szál  
25 mm<sup>2</sup> keresztmetszet/szál

03.



Távközlési leágazókábel (L.L.)  
5 x 4 / 0,8  
5 köteg x 4 szál/köteg  
0,8 mm átmérőjű,  
papírszigetelésű RÉZ vezeték,  
műanyag külső szigeteléssel



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31.



Biztosítóberendezési földkabel  
érszám: 14  
műanyag szigetelés, réz kábelér  
érátmérő 1 vagy 1,5 mm<sup>2</sup>

33.



# ITALY

[www.poliziadistato.it](http://www.poliziadistato.it)



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# ITALY



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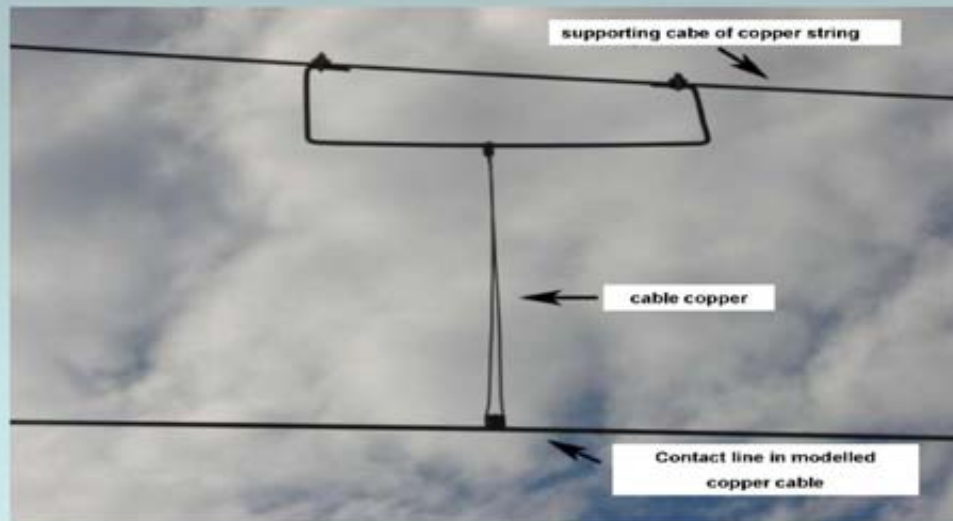
UNITED KINGDOM



**Material, mainly subject to the thefts, used from the railway infrastructure**



**Material, mainly subject to the thefts, used from the railway infrastructure**



# ITALY



## Material, mainly subject to the thefts, used from the railway infrastructure



Descrizione: Corda portante di rame crudo per linea di contatto e linea primaria  
 Formazione della corda: 19 fili della sezione 2,80 mm  
 Sezione nominale: 120 mm<sup>2</sup>  
 Carico di rottura della corda: Kg. min. 4679  
 Peso (Kg/m): 1,070



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## Material, mainly subject to the thefts, used from the railway infrastructure



Descrizione: Corda di rame ricotto per collegamenti vari della linea di contatto  
 Formazione della corda: 37 fili dalla sezione 1,70 mm.  
 Sezione nominale: 85 mm<sup>2</sup>  
 Carico di rottura della corda: Kg 1660 - 2115  
 Peso (Kg/m): 0,780



Formazione della corda: 37 fili dalla sezione 2 mm.  
 Sezione nominale: 115 mm<sup>2</sup>  
 Carico di rottura della corda: Kg 2300 - 2930  
 Peso (Kg/m): 1,070



# ITALY



**Material, mainly subject to the thefts, used from the railway infrastructure**

Descrizione: corda portante di rame crudo per linea di contatto  
Formazione della corda: 37 fili dalla sezione 2,30 mm  
Sezione nominale: 155 mm<sup>2</sup>  
Carico di rottura della corda: Kg min. 5948  
Peso Kg/m: 1,414



**Material, mainly subject to the thefts, used from the railway infrastructure**

Descrizione: Corda di rame crudo per linea di contatto  
Formazione della corda: 19 fili dalla sezione 2,1 mm  
Sezione nominale: 65 mm<sup>2</sup>  
Carico di rottura della corda: Kg min. 2631  
Peso (Kg/m): 0,603



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# ITALY



**Material, mainly subject to the thefts, used from the railway infrastructure**

Descrizione: Filo di rame elettrolitico crudo per linea di contatto  
Sezione nominale: 100 mmq  
Carico di rottura: Kg/mm<sup>2</sup>: 38  
Peso (Kg/m): 0.869



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**Material, mainly subject to the thefts, used from the railway infrastructure**



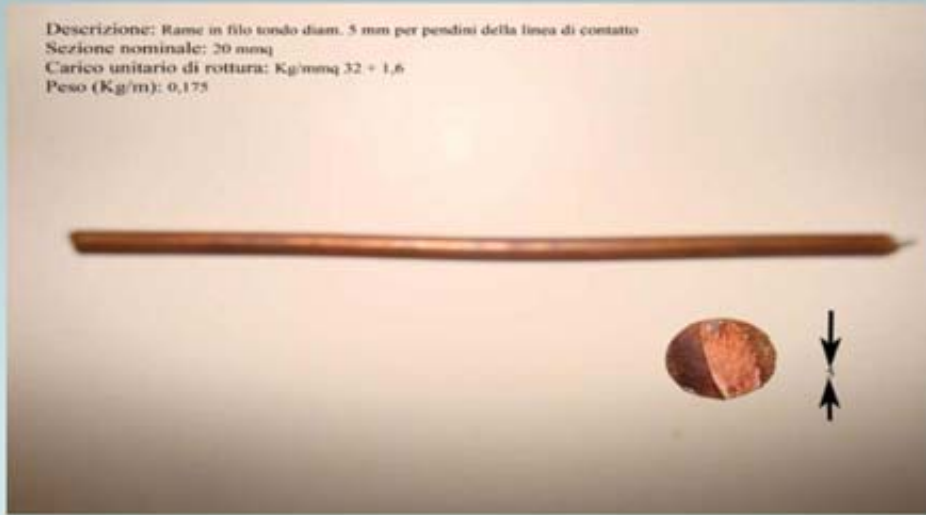


# ITALY



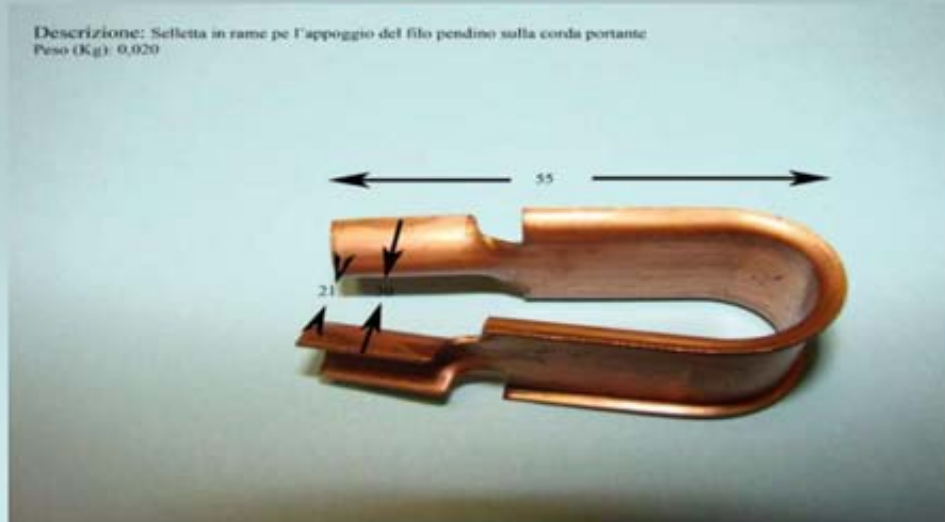
## Material, mainly subject to the thefts, used from the railway infrastructure

Descrizione: Rame in filo tondo diam. 5 mm per pendini della linea di contatto  
Sezione nominale: 20 mm<sup>2</sup>  
Carico unitario di rottura: Kg/mm<sup>2</sup> 32 + 1,6  
Peso (Kg/m): 0,175



## Material, mainly subject to the thefts, used from the railway infrastructure

Descrizione: Sella in rame pe l'appoggio del filo pendino sulla corda portante  
Peso (Kg): 0,020



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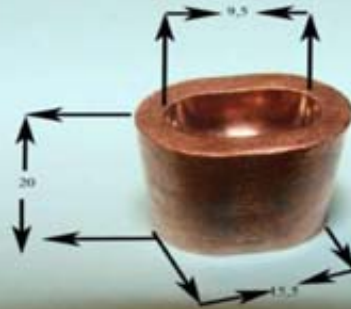


# ITALY



**Materiale, maggiormente soggetto ai furti, usato dall'infrastruttura ferroviaria**

Descrizione: fascetta per pendino  
Peso (Kg): 0.015



**Materiale, maggiormente soggetto ai furti, usato dall'infrastruttura ferroviaria**



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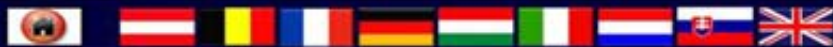
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# ITALY



**Material, mainly subject to the thefts, used from the railway infrastructure**



Descrizione: Cavo unipolare per collegamenti impianto sicurezza 120 mmq - colore nero



**Material, mainly subject to the thefts, used from the railway infrastructure**



Descrizione: cavo unipolare per collegamenti impianti sicurezza (vengono utilizzati cavi dal diametro 1\*240 mmq - 1\*160 mmq - 1\*120 mmq)



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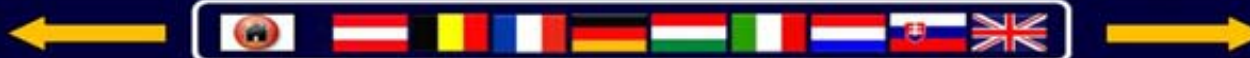
**Material, mainly subject to the thefts, used from the railway infrastructure**

Descrizione: tondino di rame di diametro 11 mm. non categorizzato ma ugualmente in uso in vari impianti per giunzioni e collegamenti



**Material, mainly subject to the thefts, used from the railway infrastructure**

Descrizione: Corda di rame crudo per la linea di blocco  
Formazione della corda: 7 fili dalla sezione 2,50 mm  
Sezione nominale: 35 mm<sup>2</sup>  
Carico di rottura della corda: Kg min. 1401  
Peso (Kg/m): 0,320





# ITALY



Material, mainly subject to the thefts, used from the railway infrastructure

Descrizione: Conda di rame elettrolitico crudo per linea di alimentazione  
Formazione della corda: 37 fili dalla sezione 2,80 mm  
Sezione nominale: 230 mm<sup>2</sup>  
Carico di rottura della corda: Kg min. 8816  
Peso (Kg/m): 2,096



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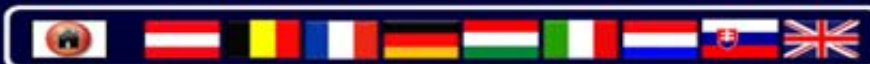
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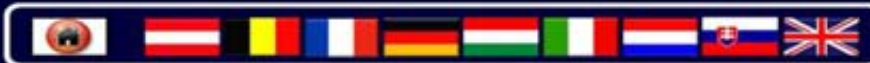
Material, mainly subject to the thefts, used from the railway infrastructure

Descrizione: cavo quadrifilare per collegamenti impianti di sicurezza cat. 803.942



## Electric Cables

Cable used for electrical power plants to 20,000 volts RFI. For the purposes of the Italian Law 626, after the red rubber sheath is covered with a sheet that, when cut, causing a flash fire, triggering the "ground", removing the tension.



# ITALY



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## Electric Cables



Cable used for electrical power plants to 10,000 volts.



## Accessories



brass terminals used on the railway line



# NETHERLAND

[www.politie.nl/klpd](http://www.politie.nl/klpd)



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### 3 Identification of the conductors and components

If there is a suspicion that there has been theft of railway-related materials, this chapter may provide conclusive. The following is a list of stolen sensitive material and their characteristics.

Note: over the years copper will get by corrosion a green-brown appearance.

Measurements / recognition	Photo/drawing	Name / length	Live ?
Copper Wire Diameter = ± 1 cm with two grooves		Contact wire Tens of meters	Yes, 1500 V or 25 kV
Copper Cable 50 mm <sup>2</sup> Diameter = 0.9 mm		Linear ground conductor Tens of meters	No
Copper Cable 70 mm <sup>2</sup> Diameter = 1.1 cm		Catenary wire Tens of meters	Yes, 1500 V or 25 kV
Copper Cable 120 mm <sup>2</sup> Diameter = 1.4 cm		Return cable Tens of meters	Yes, 1500 V
Copper Cable 150 mm <sup>2</sup> Diameter = 1.6 cm		Catenary wire Strengthening wire Tens of meters	Yes 1500 V



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<p>Copper Cable 10 mm<sup>2</sup> Diameter = 0.5 cm</p>		<p>Dropper Length between 0.5 on 3 m.</p>	<p>Yes 1500 V 25 kV</p>
<p>Copper</p>		<p>Several Clamps Catenary Size between 5 and 25 cm</p>	<p>Yes 1500 V 25 kV</p>
<p>Aluminium Diameter = 2 cm</p>		<p>Equipotential Strengthening cable Negative feeder Tens of meters</p>	<p>No Yes 1500 V Yes 25 kV</p>
<p>Copper with grey or black sheath Diameter = ± 1.5 cm  Markings on sheath: BMoK or BMqK and diameter</p>		<p>Post – rail connection  Connection between rails  Several meters</p>	<p>No  No</p>



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[www.minv.sk](http://www.minv.sk)





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Prepojovacie laná ku kofajovým obvodom

Kolky a pätky z napájajúcich lán

materiál: pocinovaná mosadz

prierez závitů  $\Phi = 20 \text{ mm}$



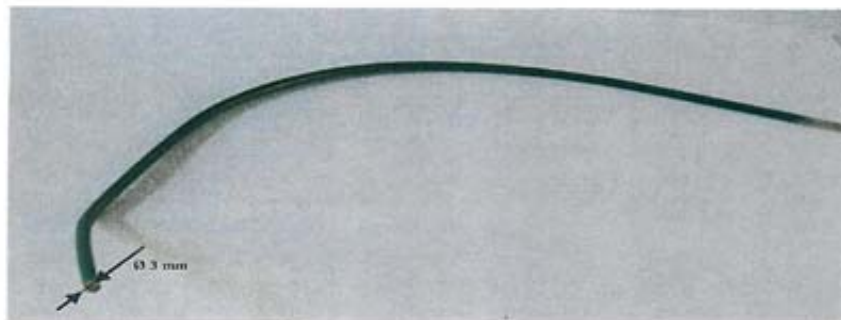
prierez závitů  $\Phi = 8 \text{ mm}$



Vodiče vzdĺušného vedenia (telefónne vedenie)

materiál: bronz

rozmery: drôt s priemerom  $\Phi 3 \text{ mm}$





# SLOVAK



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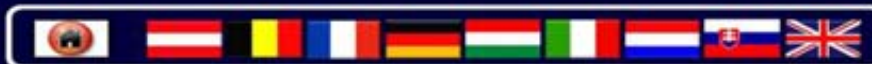
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Káble CYKY - AYKY



Nosné lano Bz 50, 70, 120 mm<sup>2</sup>



# SLOVAK



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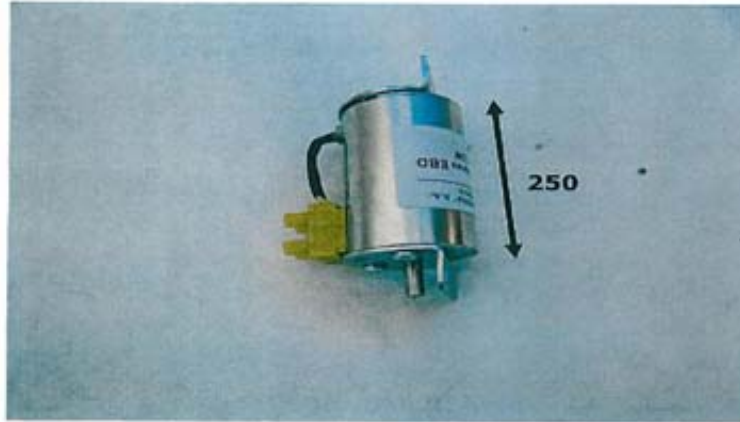
ITALY

NETHERLAND

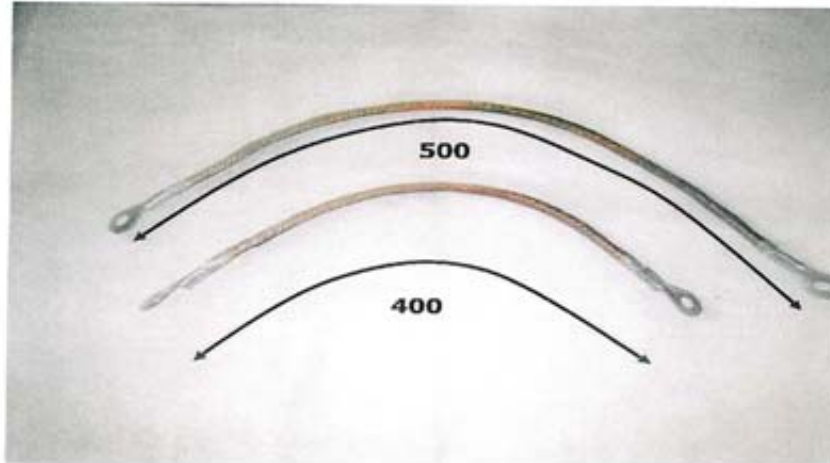
SLOVAKIA

UNITED KINGDOM

Elektromagnetická cievka materiál: meď



Uzemňovacie lanká na vozne materiál: meď





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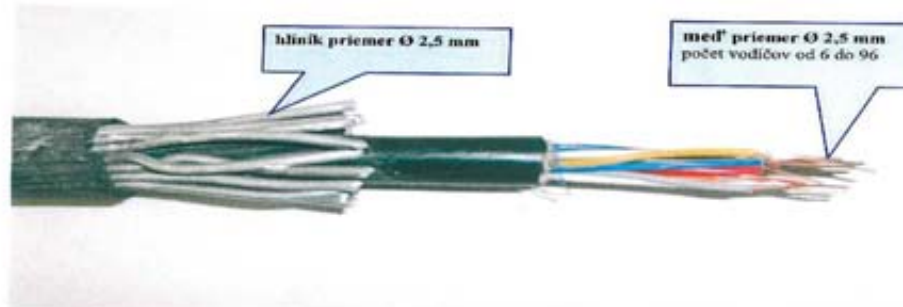
## Prepojovacie laná ku kofajovým obvodom

materiál: meď, oceľ  
 rozmery: dĺžka je od 0,5 m až do 30 m  
 prierez lana 9 mm<sup>2</sup>, 75 mm<sup>2</sup>, 150 mm<sup>2</sup>



## Kabel typ TCKEZE

materiál: vodiče medené, plášť ochranný hliník  
 rozmery: priemer medených vodičov 1 mm  
 priemer hliníkových vodičov 2,5 mm





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Vykurovacie káble

materiál: meď



Prepojovací kábel VSET

materiál: meď







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Svorcky Cu a FeZn



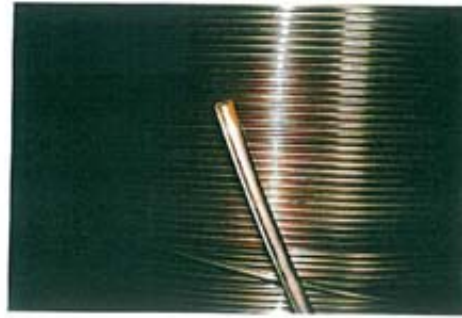
Spätne vedenie a jeho pripojenie na koľaj CuG 150 mm<sup>2</sup>



# SLOVAK



Trolejový drôt Cu 80, 100, 150 mm<sup>2</sup>



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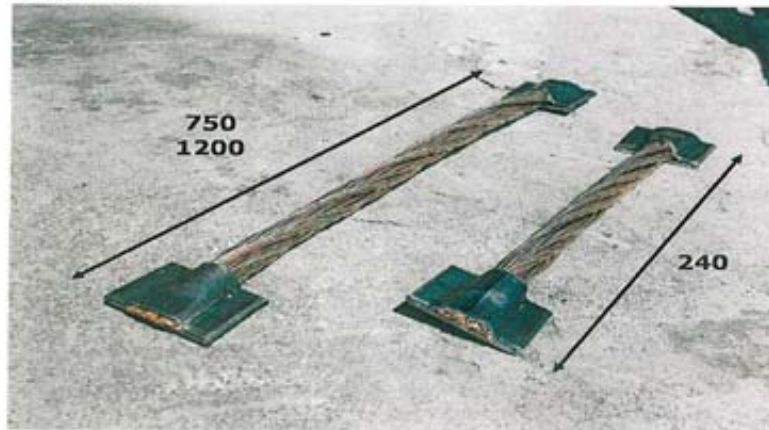
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Spojka z Cu



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[www.btp.police.uk](http://www.btp.police.uk)



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**BRITISH  
TRANSPORT  
POLICE**

## Information for scrap metal dealers



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British Transport Police recognises the valuable role that the metal recycling industry plays in the economy of the United Kingdom and the importance of recycling redundant material. The recent increase in the value of metals has led to a significant increase in the theft of metals from important parts of the national infrastructure which is a dangerous activity and one that could put others at risk as a result of this criminality.

The recycling community can play a major part in helping us combat this crime by ensuring that members of the industry act responsibly, within the law and deter thieves from attempting to profit from their actions.

If you have any information that may assist police in the identification and investigation of persons criminally involved in the handling and disposal of stolen metals please contact British Transport Police on 0800 40 50 40

Alternatively you can contact Crimestoppers on 0800 555 111

### Scrap metal received

In relation to scrap metal received the book must accurately record:

- description and weight;
- date and time of receipt;
- full name and address of person received from;
- price payable, if any, or estimated value;
- registration mark of any vehicle delivering the scrap metal.

### Common law reset

*(Scotland Only)*

With intent to deprive the owner, to receive and keep property knowing that it has been appropriated by theft, robbery, embezzlement or fraud. This can only be committed by a person who was not party to the original appropriation.

### Money laundering

There are a number of money laundering offences under the Proceeds of Crime Act 2002 may be committed when dishonestly handling stolen metals in particular an offence of possession of property which is derived from criminal conduct.

A person commits an offence if he:-

- acquires criminal property;
- uses criminal property;
- has possession of criminal property.

Criminal property includes stolen metals.

British Transport Police are seeking a partnership with the industry to tackle this problem however we will rigorously pursue any scrap metal dealer suspected of being involved in the dishonest receipt and disposal of stolen cable and other metals and as part of that process will undertake regular visits to scrap metal dealers to inspect the premises and records kept, in line with the requirements of the legislation.

The Scrap Metal Dealers Act 1964 (Civic Government (Scotland) Act 1982 for Scotland) allows local authorities to regulate the scrap metal trade within their area

### Scrap metal either processed at, or despatched from premises

In relation to scrap metal either processed at, or despatched from premises the book must accurately record:

- description and weight;
- date and description of processing, or date of despatch;
- in the case of scrap metal despatched on sale or exchange, full name and address of person to whom sold, or with whom exchanged, and the consideration (price, value, or other property) for which sold or exchanged;
- in the case of scrap metal processed or despatched other than on sale or exchange, the estimated value immediately before processing or despatch.

All entries must be recorded immediately after the transaction.

It is a criminal offence to fail to comply with these requirements.

### Key words

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

**Knows**- includes actual knowledge, wilfully shutting ones 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 inkling '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, and to inspect, the books or records, and any scrap metal, at that place, and to take

Scrap metal dealers registered with a local authority have a legal obligation to maintain books recording their dealings in relation to:

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

(unless holding an exemption under the Civic Government (Scotland) Act 1982 in Scotland)

All books must be bound and kept exclusively for this purpose. They must be retained for a period of two years after the final entry.

In addition to the provisions of the Scrap Metal Dealers Act 1964 dealers may commit other criminal offences if they dishonestly acquire, use or dispose of stolen metals in particular handling stolen goods (Common Law Reset in Scotland) or money laundering offences which can result in terms of imprisonment of up to 14 years.

### Handling stolen goods

A person handles stolen goods if knowing or believing them to be stolen goods he -

(i) dishonestly receives the goods,

OR

(ii) dishonestly undertakes their retention, removal, disposal, or realisation by or for the benefit of another person,

OR

(iii) dishonestly assists in their retention, removal, disposal, or realisation by or for the benefit of another person,

OR

(iv) arranges to do (i), (ii) or (iii) above.

copies of, or extracts from, any such books or records (unless exempt under the Civic Government (Scotland) Act 1982)

• British Transport Police will be making regular unannounced visits to scrap metal dealers to check that the regulations are complied with. We will also be working with other agencies such as Health & Safety Executive, environment agency and local authorities and police to ensure full compliance of these and other regulations.





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## Reference guide



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Signaling cable pg. 17	Signaling cable pg. 18	Signaling cable pg. 19	Signaling cable pg. 20	Signaling cable pg. 27	High Voltage pg. 26
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BRITISH TRANSPORT POLICE



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40mm



ACTUAL SIZE



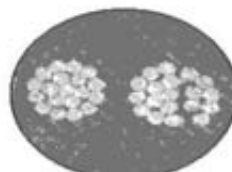
3 core (Armoured) 95mm<sup>2</sup>  
Does not have a unique manufacturing marking.

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MARKET FOR CABLE AND WIRELESS COMMUNICATIONS



40mm



ACTUAL SIZE



2 core 95mm<sup>2</sup> B2  
Cable that bears the marking on the sheath 'RT/EPS/0005' is uniquely Network Rail cable.

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36mm



ACTUAL SIZE



**2 core 70mm<sup>2</sup> B2**

*Cable that bears the marking on the sheath 'RTE/PS/00005' is uniquely Network Rail cable.*

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MARK FOR THE CASE AND OTHER INFORMATION ONLY



20mm



ACTUAL SIZE



**2 core 35mm<sup>2</sup> B2**

*Cable that bears the marking on the sheath 'RTE/PS/00005' is uniquely Network Rail cable.*

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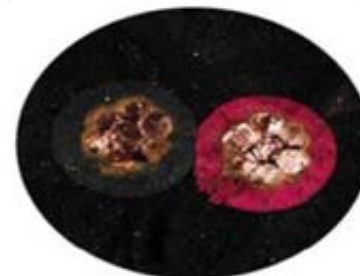
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17mm



ACTUAL SIZE



**2 core 10mm<sup>2</sup> B2**  
*(the 2 cores have coloured sheathing - red and black)*

*Cable that bears the marking on the sheath 'RT/E/PS/00005' is uniquely Network Rail cable.*

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MARKET FOR CABLE AND OTHER INFORMATION



26mm



ACTUAL SIZE



**2 core 10mm<sup>2</sup> B2**

*Cable that bears the marking on the sheath 'RT/E/PS/00005' is uniquely Network Rail cable.*

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MARKET FOR CABLE AND OTHER INFORMATION





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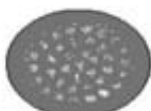
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## 37 core 0.75mm<sup>2</sup> B2

Cable that bears the marking on the sheath 'RT/E/PS/00005' is uniquely Network Rail cable.

25mm



ACTUAL SIZE

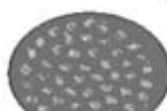


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## 48 core 0.75mm<sup>2</sup> B2

Cable that bears the marking on the sheath 'RT/E/PS/00005' is uniquely Network Rail cable.

28mm



ACTUAL SIZE



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20mm



ACTUAL SIZE



## 19 core 0.75mm<sup>2</sup> B2

Cable that bears the marking on the sheath 'RT/E/PS/00005' is uniquely Network Rail cable.

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23mm



ACTUAL SIZE



**27 core 0.75mm<sup>2</sup> B2**

*Cable that bears the marking on the sheath 'RT/EP/00005' is uniquely Network Rail cable.*

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MARKING FOR CABLE AND PHOTOGRAPH COURTESY NETWORK RAIL



15mm



ACTUAL SIZE



**7 core 2.5mm<sup>2</sup> B2**

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MARK FOR CABLE AND PHOTOGRAPH COURTESY NETWORK RAIL

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18mm



ACTUAL SIZE



**4 core 2.5mm<sup>2</sup> C2**

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IMAGE FOR THE LIVERPOOL POLICE APPROVED BY BPP



45mm



ACTUAL SIZE



**1 core 185mm<sup>2</sup>**

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IMAGE FOR THE LIVERPOOL POLICE APPROVED BY BPP



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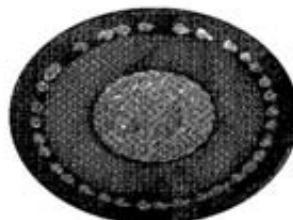
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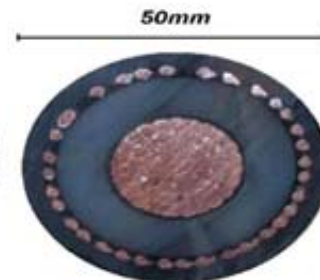


**1 core 300mm<sup>2</sup>**

High voltage cables bear 'PROPERTY OF NETWORK RAIL' on the sheathing which is not visible in these images.



ACTUAL SIZE



50mm

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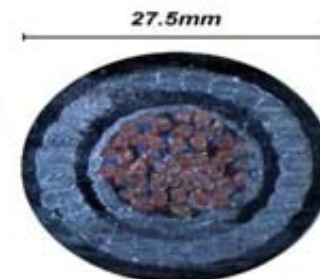


**20 pair 0.9mm<sup>2</sup>**

High voltage cables bear 'PROPERTY OF NETWORK RAIL' on the sheathing which is not visible in these images.



ACTUAL SIZE



27.5mm

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# Overhead



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## Overhead

This group looks at cables and bare copper used on the overhead elements. The word 'strands' is used 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, but it is vulnerable in depots.



OVERHEAD CABLE IS ELECTRIFIED AND HAS 25,000 VOLTS AC RUNNING THROUGH IT. IT PRESENTS A SIGNIFICANT DANGER AND RISK OF DEATH TO THIEVES.



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

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12mm

*Solid copper 'overhead contact wire' that is suspended using the copper clips shown below.*



ACTUAL SIZE

*The copper bracket fits onto the groove, pictured below*



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ACTUAL SIZE



20mm

*PVC sheathed 19 strand aluminium 'bond cable'. Commonly used to earth metal structures together and is usually in short lengths of 1-2m.*

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SEARCH FOR FILE CABLE AND WIRELESS UNDER RESEARCH

