FLEI
special electrical cables

PRODUCT GUIDE

SPECIAL CABLES

instrumentation cables
fire resistant cables
thermocouple cables
low voltage cables

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner
CISQ/IMQ-CSQ
hereby certify that the organization
FLEI SRL
VIA A. DE GASPERI 82 - 20041 AGRATE BRIANZA (MI)
for the following field of activities

Power cables rated voltage 1Kv. Design and production special cables for signals, instruments and control, extension and compensating for thermocouple
Refer to quality manual for details of applications to ISO 9001:2008 requirements

has implemented and maintains a
Quality Management System
which fulfills the requirements of the following standard
ISO 9001:2008
Issued on: 2009 - 04 - 08

Registration Number: IT - 1095

IQNet
René Blaser
President of IQNET

CISQ
Giampiero Pratt
President of CISQ

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CERTIFICATO N.
CERTIFICATE N. 9125.FLEI

SI CERTIFICA CHE IL SISTEMA QUALITA' DI
WE HEREBY CERTIFY THAT THE QUALITY SYSTEM OPERATED BY

FLEI SRL

P.LE CADORNA 10 - 20124 MILANO (MI)
UNITA' OPERATIVE
OPERATIVE UNITS
VIA A. DE GASPERI 82 - 20041 AGRATE BRIANZA (MI)

E' CONFORME ALLA NORMA
IS IN COMPLIANCE WITH THE STANDARD

ISO 9001:2008

PER LE SEGUENTI ATTIVITA
FOR THE FOLLOWING ACTIVITIES

Produzione di cavi elettrici energia B.T. Progettazione e costruzione cavi speciali per trasmissione segnali, strumentazione e controllo, estensione e compensazione per termocoppie
Power cables rated voltage 1Kv. Design and production special cables for signals, instruments and control, extension and compensating for thermocouple
Riferirsi al manuale per avere per l'applicazione dei requisiti della norma ISO 9001:2008
Refer to quality manual for details of applications to ISO 9001:2008 requirements

IL PRESENTE CERTIFICATO E' SOGGETTO AL RISPETTO DEL REGOLAMENTO PER LA CERTIFICAZIONE DEL SISTEMA DI QUALITA' E DI GESTIONE DELLE AZIENDE
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR THE CERTIFICATION OF COMPANY QUALITY AND MANAGEMENT SYSTEMS

PRIMA EMISSIONE	EMISSIONE CORRENTE	DATA SCADENZA
FIRST ISSUE	CURRENT ISSUE	EXPIRY DATE
1998-03-09	2009-04-08	2012-04-08

SINCERT

CISQ

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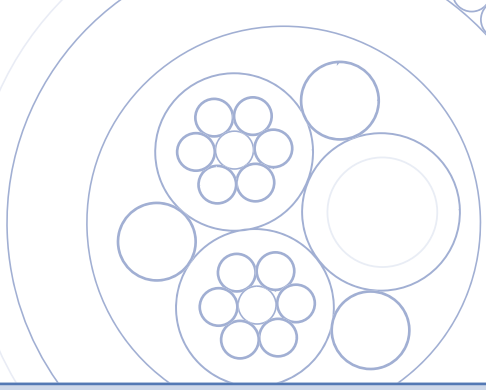

PRODUCT GUIDE

SPECIAL CABLES PRODUCTION

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INFORMATION

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TECHNICAL DATA

FLEI - SPECIAL CABLES

THE HISTORY OF FLEI

Since 1968 the industrial firm for special cables production has been operating in the national and international market. Flei s.r.l. has received this know-how as inheritance and, following a qualified industrial reorganization, implemented by ISO 9001:2008 certifications, it appeals to its clients with revitalized and ambitious goals about **product and service quality**. A professional team, with long technical experience in this field, guarantees the use of **materials with high technological contents** and their manufacturing to meet any request of special cables, according to the standards in use: CEI, BS, IEC, VDE, NFC. The capabilities of our technical office and of the Sales division are available to propose valid solutions in accordance with production specifications provided by clients. Our product range is not limited to what shown in this catalogue and we are available to offer our knowledge and production capability for any industrial need. Flei has the pleasure to offer to its Partners its **flexibility, dynamism and competence**.

special electrical cables

ABOUT FLEI CABLES

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CABLES REFERENCE STANDARDS

We have created three catalogue sections following the standards we currently use for our cables. These sections are: CEI STANDARDS, BS STANDARDS and VDE STANDARDS. CEI standards are commonly used in Italy. BS standards are used in the UK and worldwide. VDE standards are commonly used in Germany. Also there are IEC standards, used in Europe and worldwide. Following, you can find some tytles of the most used CEI, BS, IEC and VDE standards.

CEI STANDARDS

CEI 20-11	Technical characteristics and testing requirements for insulating and sheathing compounds of electric cables.
CEI 20-13	Rubber insulatated cables with rated voltage 1 to 30 kV.
CEI 20-14	PVC-insulated cables with rated voltages 1 to 3 kV.CEI 20-20 PVC insulated cables with nominal voltages up to 450/750 V.
CEI 20-22	Cables fire test. Test of fire propagation through cables or wires forming a bundle.
CEI 20-27	Power and signal cables. Designation systems. (See the last page of this catalogue)
CEI 20-29	Insulating cables conductors and their characteristics.(Tables 8 and 9 of this catalogue)
CEI 20-34	Test methods for insulating and sheathing materials (elastomers or thermoplastic polymers) of stiff or flexible electric cables.
CEI 20-35/1	Common test methods for cables under fire conditions. Flame propagation test for a single cable or conductor.
CEI 20-36	Fire resistance tests for electric cables. (Table 10 of this catalogue)
CEI 20-37/2-1	Cables emissions measurement of halogen acid gases. (Table 12 of this catalogue)
CEI 20-37/2-2	Gases acidity level measurement by PH determination and conductivity. (Table 12 of this catalogue)
CEI 20-37/5	Smoke density measurement for electric cables under fire defined condi-tions. (Table 11 of this catalogue)
CEI 20-37/7	Toxicity rating measurement of gases emitted by cables.
CEI 20-38	Insulating cables with not propagating fire sheaths and with low emissions of toxic fumes and corrosive gases. Part 1: nominal voltage Uo/U up to 0,6/1 kV.Part 2: nominal voltage Uo/U over 0,6/1 kV.
CEI 20-45	Fire resistant cables insulated with elastomeric compounds with nominal voltage Uo/U up to 0,6/1 kV.

NB: For core colour coding usually are used UNEL 00722 (Tab.1 of this catalogue) and DIN 47100 (Tab. 2 and 3 of this catalogue). Cable designation system used for cables following CEI standards is UNEL 35011.
(See the last page of this catalogue).

BS STANDARDS

BS 1843	Colour code for twin compensating cables for thermocouples.
BS 4066	Tests on electric cables under fire conditions. (Tab 9 of this catalogue)
BS 4937	Thermocouple reference tables. (Tab 6 of this catalogue)
BS 5308 Part 1	Instrumentation cables - Specifications for PE insulated cables. (Table 4 of this catalogue)
BS 5308 Part 2	Instrumentation cables - Specifications for PVC insulated cables. (Table 5 of this catalogue)
BS 5467	Cables with thermosetting insulation for electricity supply for rated voltage up to and including 600/1000V.
BS 6234	PE insulated cables for electricity supply.
BS 6346	PVC insulated cables for electricity supply.
BS 6360	Conductors for insulated cables.
BS 6387	Performance requirements for cables required to mantain circuit integrity under fire conditions. (Table 10 of this catalogue)
BS 6425 Part 1	Test of halogen acid gases emitted by cables under fire condition. (Table 12 of this catalogue)
BS 6724	Specifications for armoured cables for electricity supply having thermosetting insulation with low emission of smoke and corrosive gases when affected by fire. (Table 11 of this catalogue)
BS 6883	Flame retardant cables for off shore plant.
BS 7655	Insulation and sheath materials for electric cables.
BS 7917	Fire resistant cables.
BS EN10257-1	Steel wires armours for electric cables.

NB: For core colour coding usually are used BS 5308 part 1 (Table 4 of this catalogue) and BS 5308 part 2 (Table 5 of this catalogue).

IEC STANDARDS

IEC 60092-351	Insulation materials for electric cables.
IEC 60092-353	Electric installations in ships. Single and multicore cables with nominal voltage Uo/U up to 0,6/1 kV.
IEC 60092-359	Sheathing materials for electric cables.
IEC 60092-376	Cable for control and instrumentation circuits 150/250V (330V).
IEC 60228	Conductors of insulated cables. Guide to dimensional limits of circular conductor. (Table 8 of this catalogue)
IEC 60331	Test for electric cables under fire conditions. Circuit integrity. (Table 10 of this catalogue)
IEC 60332	Test of flame retardance for electric cables.
IEC 60754-1	Amount of halogen acid gases evolved during combustion of polymeric materials. (Table 12 of this catalogue)
IEC 60754-2	Acidity of gases (PH) and conductivity. (Table 12 of this catalogue)
IEC 60584	Thermocouples. (Table 6 of this catalogue)
IEC 60811	Common test methods for insulating and sheathing materials of electric cables.
IEC 61034	Smoke desity test for electric cables under fire condition. (Table 11 of this catalogue)

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VDE STANDARDS

VDE 0207 Part 2 to 24	Insulating and sheathing compounds for cables and flexible cords.
DIN VDE 0245 Part 1 to 202	Flexible PVC insulated cables.
DIN VDE 0250 Part 1 to 819	Cables, wires and flexible cords for power installation.
DIN VDE 0262	XLPE insulated and PVC sheathed cables with nominal voltage Uo/U 0,6/1 kV.
DIN VDE 0266 Part 1 to 4	Halogen free cables with improved characteristics in the case of fire, with reduced fire propagation and insulation integrity, applications in the containment of nuclear power plants.
DIN VDE 0267	Halogen free cables with improved characteristics in the case of fire, with nominal voltage 6 to 30 kV.
DIN VDE 0271	PVC insulated and sheathed cables with nominal voltage up to 6/10 kV.
DIN VDE 0272	XLPE insulated cables with nominal voltage Uo/U 6/10, 12/20 and 18/30 kV.
DIN VDE 0273	Power cables, 6 to 30 kV.
DIN VDE 0281 Part 1 to 404	PVC cables, wires and flexible cords for power installation with nominal voltage up to and including 450/750 V.
DIN VDE 0282	Rubber insulated cables of rated voltage up to and including 450/750 V.
DIN VDE 0292 Part 1 to 101	Code designation for harmonised cables and flexible cords for power installations. (Last page of this catalogue).
DIN VDE 0293	Identifications of cores in cables and flexible cords used in power installations with nominal voltage up to 1000V. (Table1 of this catalogue)
DIN VDE 0295	Conductors for cables and insulated wires for power systems. (Tab. 8 of this catalogue)
DIN VDE 0472 Part 1 to 818	Testing of cables, wires and flexible cords. (Fire resistance described in part 804 is in table 10 of this catalogue)
DIN VDE 0812	PVC insulated equipment wires and stranded equipment wires for telecommunications systems.
DIN VDE 0814	Cords for telecommunications systems.
DIN VDE 0815	Wiring cables for telecommunications systems and information processing systems.
DIN VDE 0816 Part 1 to 3	Outdoor cables for telecommunications systems; signal and measurement cables, mining cables, paper insulated cables.
DIN VDE 0817	Cables with stranded conductors for increased mechanical stress for telecommunications systems.

NB: For VDE designation system see the last page of this catalogue.

THERMOPLASTIC COMPOUNDS

For further informations about these materials see table 14 of this catalogue.

PVC (polyvinylchloride)
Generally self extinguishing, it's used for insulations and sheaths. It turns into soft over 90°C, on the contrary, at low temperatures (-40°C), it turns into brittle. It has good mechanical characteristics and water resistance. It is also a good flame retardant and oil resistant material.

PE (polyethylene)
It's used for insulations and sheaths. It provides a very good insulation resistance (≥ 5000MΩ x km). Its operating temperature is from -50°C to 70°C and it's selfestinguishing only if treated. It's suitable for applications where a good resistance to water aborption and to abrasion (HDPE) is required.

PP (polypropylene)
Used for small thickness insulation, it has good mechanical characteristics. Its operating temperature is from -10°C to 100°C.

PUR (polyurethane)
Excellent mechanical characteristics and good oil resistance. Also available in self estinguishing version. Its operating temperature is from -55°C to 80°C.

LOW SMOKE HALOGEN FREE MATERIALS (FLAME RETARDANT):

LSZH M1 (Unel designation)
Thermoplastic compound. Generally used for sheathing cables. Good oil resistance. Its operating temperature is from -40°C to 90°C.

ELASTOMERIC COMPOUND

For further informations about these materials see table 14 of this catalogue.

HEPR (hard ethylen propylene rubber)
Generally used for insulations of low voltage cables and instrument cables. GP4 (ethylen propylene rubber). Its operating temperature is from -40°C to 90°C.

XLPE (cross linked polyethylene)
Generally used for insulations of medium/high voltage cables. Its operating temperature is from -50°C to 90°C.

SIR (cross linked silicon rubber)
Generally flame retardant, it is low flammable. It's very good at low temperatures (-60°C) and it works up to 180°C.

GP4 (ethylen propylene rubber)
Its operating temperature is from -40°C to 90°C.

LOW SMOKE HALOGEN FREE MATERIALS (FLAME RETARDANT):

LSZH G9 (Unel designation)
Cross-linked elastomeric compound. Generally used for insulating single core cables. Its operating temperature is from -40°C to 90°C.

LSZH G10 (Unel designation)
Cross-linked elastomeric compound. Generally used for insulating cables with rated voltage up to 1kV. Its operating temperature is from -40°C to 90°C.

M2 (Unel designation)
Cross-linked elastomeric compound. Generally used for sheath cables with rated voltage up to 1kV. Its operating temperature is from -40°C to 90°C.

SHF2
Cross-linked elastomeric compound. Generally used for sheath cables with rated voltage up to 1kV. Its operating temperature is from -40°C to 90°C.

SW4
Cross-linked elastomeric compound. Generally used for sheath cables with rated voltage up to 1kV. Its operating temperature is from -40°C to 90°C.

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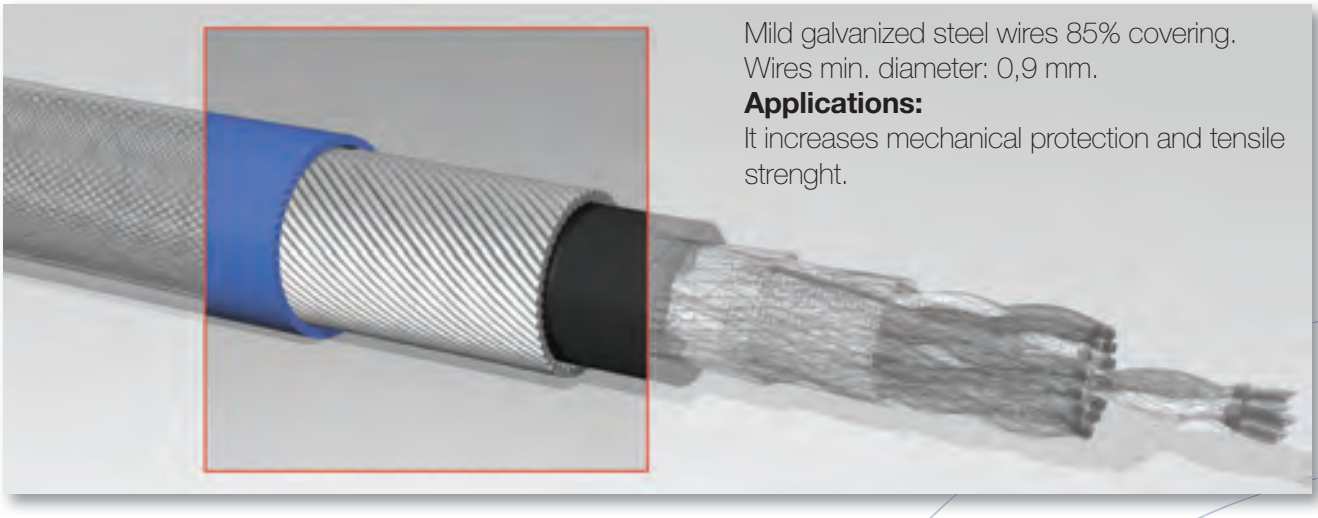
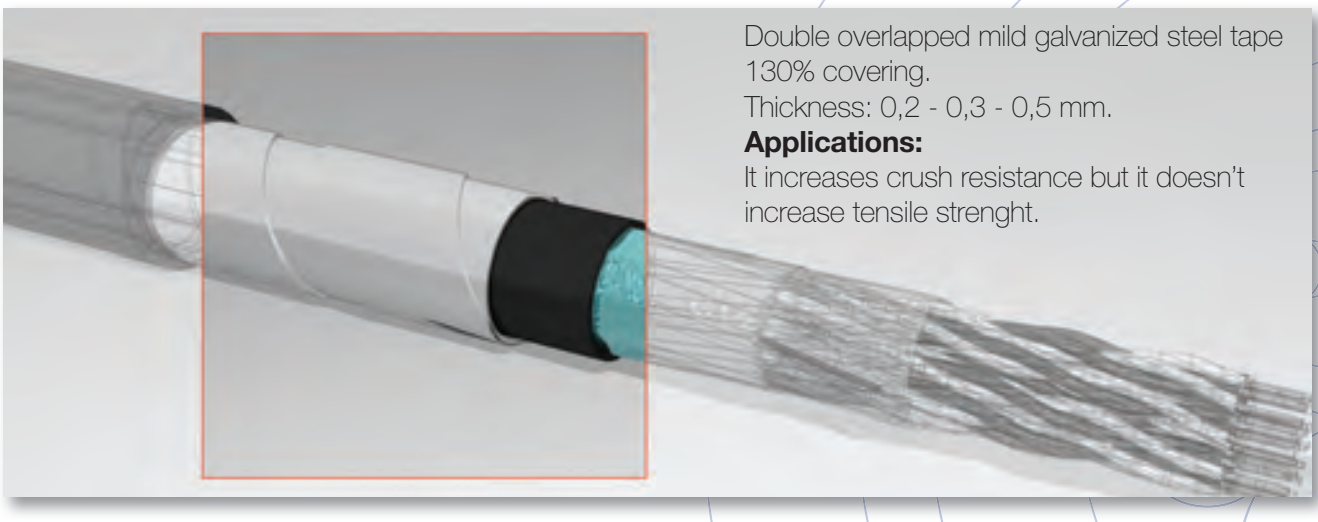
STEEL WIRES ARMOUR



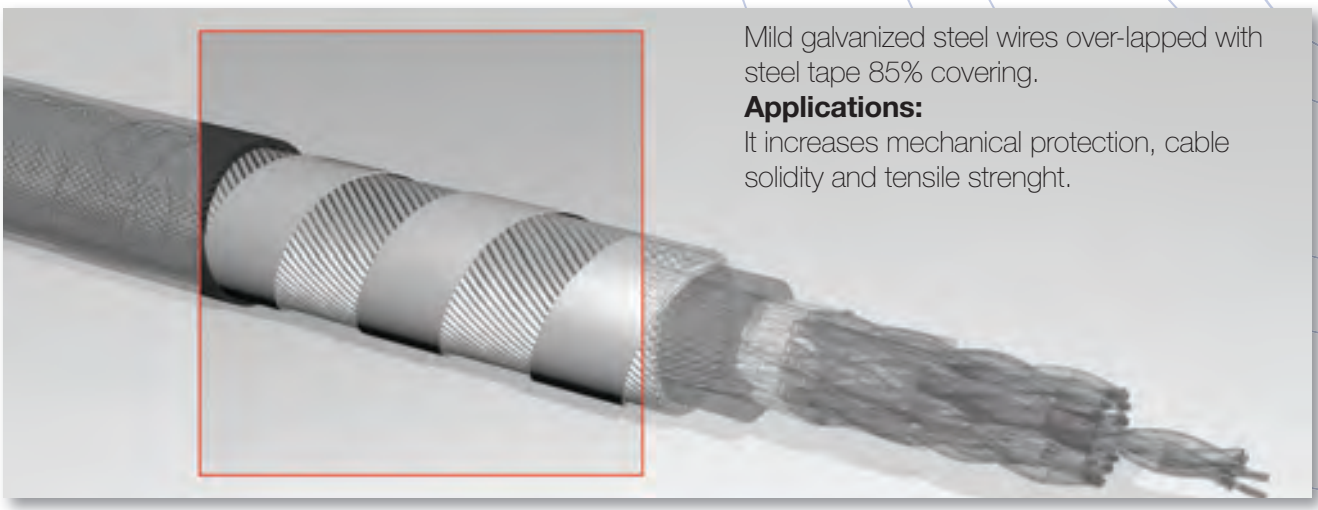
Mild galvanized steel wires 85% covering.
Wires min. diameter: 0,9 mm.
Applications:
It increases mechanical protection and tensile strenght.

STEEL TAPE ARMOUR



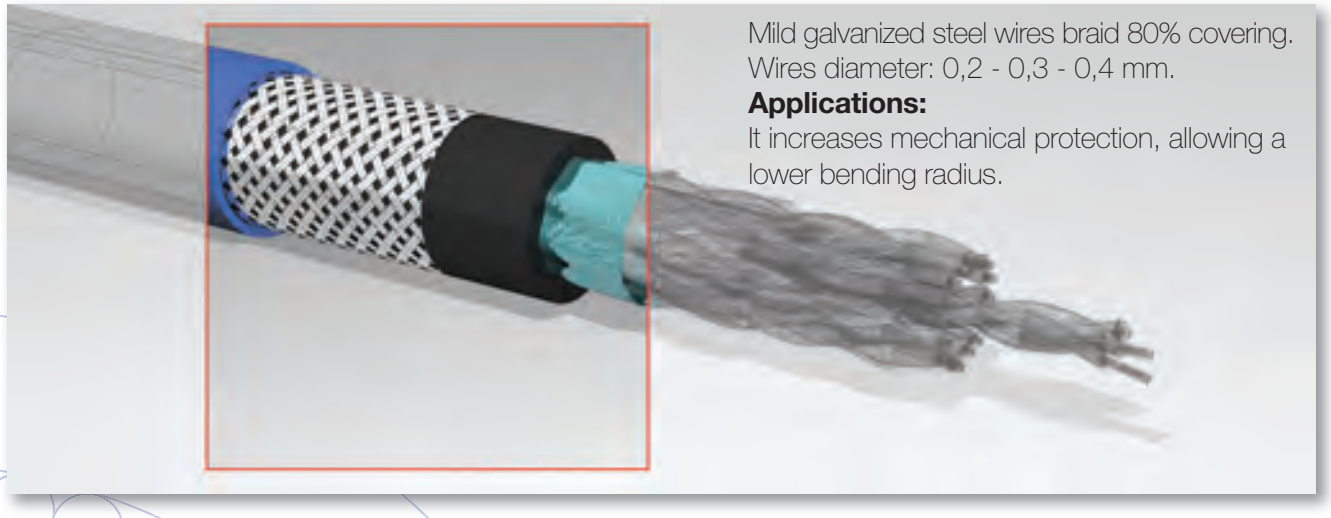
Double overlapped mild galvanized steel tape 130% covering.
Thickness: 0,2 - 0,3 - 0,5 mm.
Applications:
It increases crush resistance but it doesn't increase tensile strenght.

STEEL WIRES AND TAPE ARMOUR



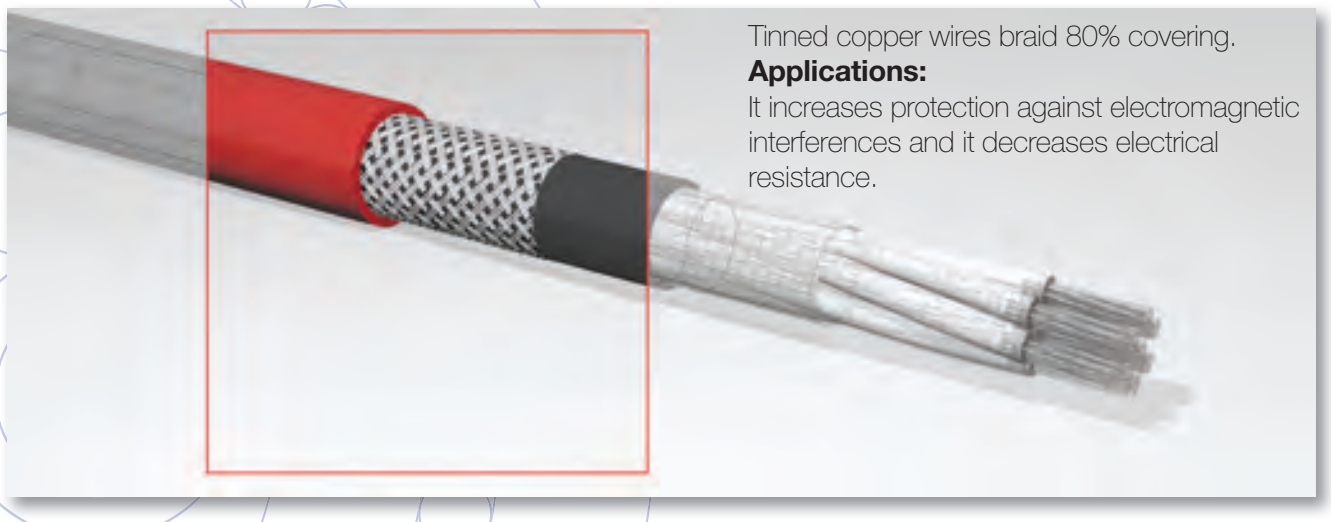
Mild galvanized steel wires over-lapped with steel tape 85% covering.
Applications:
It increases mechanical protection, cable solidity and tensile strenght.

STEEL WIRES BRAID ARMOUR



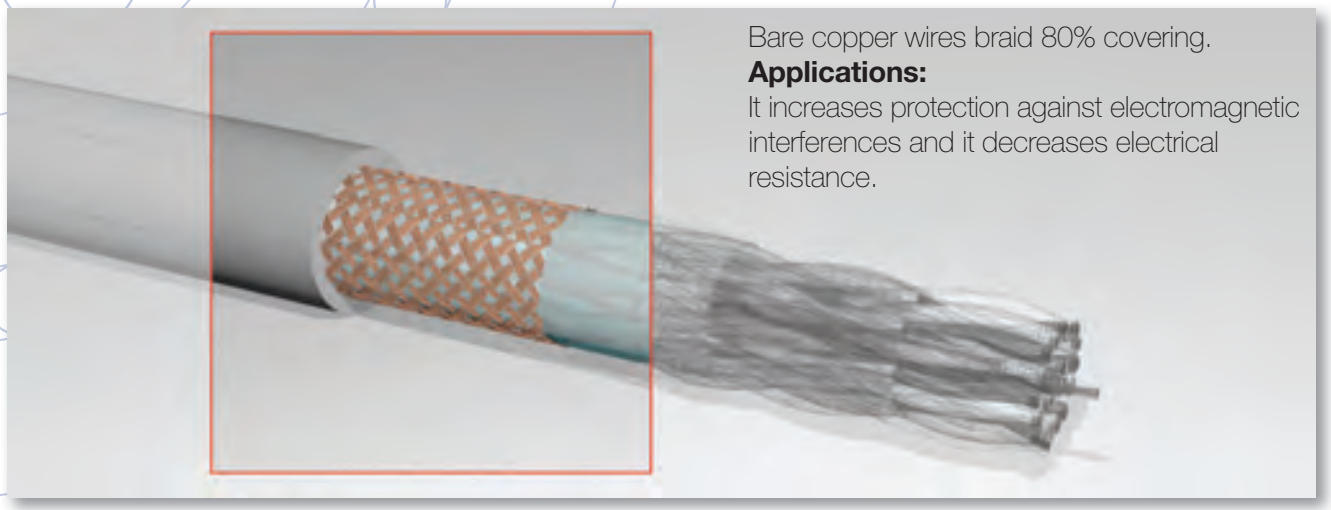
Mild galvanized steel wires braid 80% covering.
Wires diameter: 0,2 - 0,3 - 0,4 mm.
Applications:
It increases mechanical protection, allowing a lower bending radius.

TINNED COPPER BRAID SCREEN



Tinned copper wires braid 80% covering.
Applications:
It increases protection against electromagnetic interferences and it decreases electrical resistance.

BARE COPPER BRAID SCREEN



Bare copper wires braid 80% covering.
Applications:
It increases protection against electromagnetic interferences and it decreases electrical resistance.

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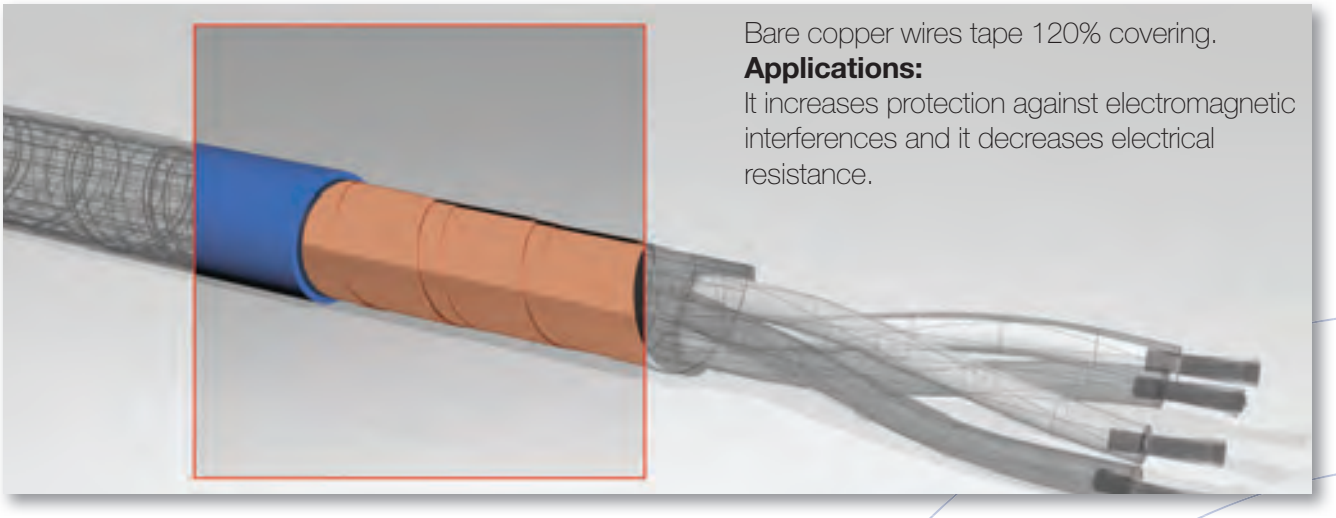
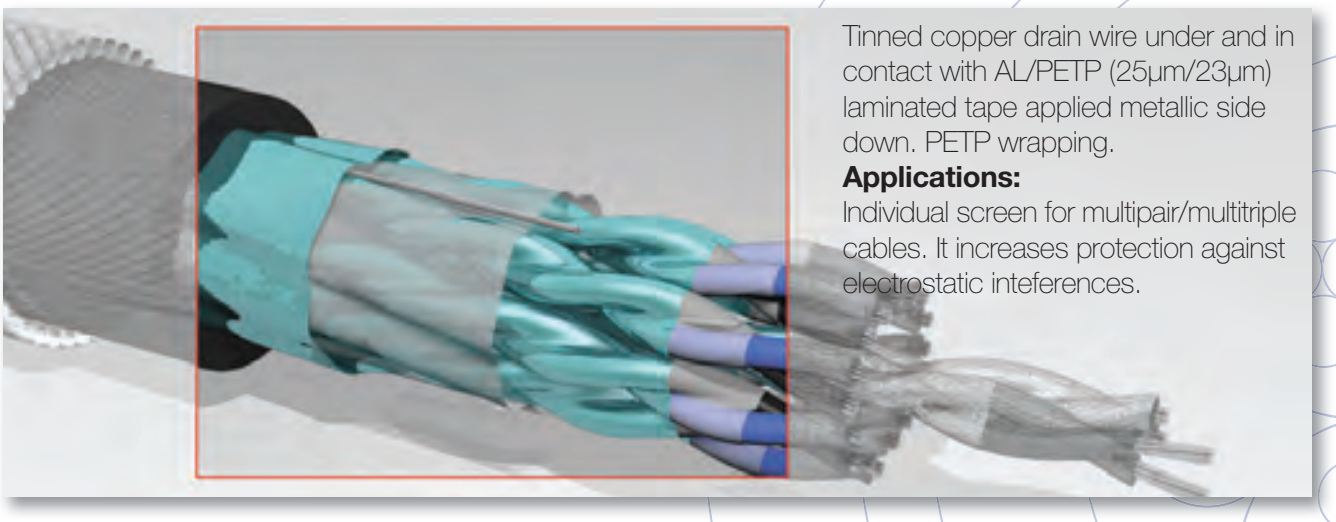
COPPER TAPE SCREEN



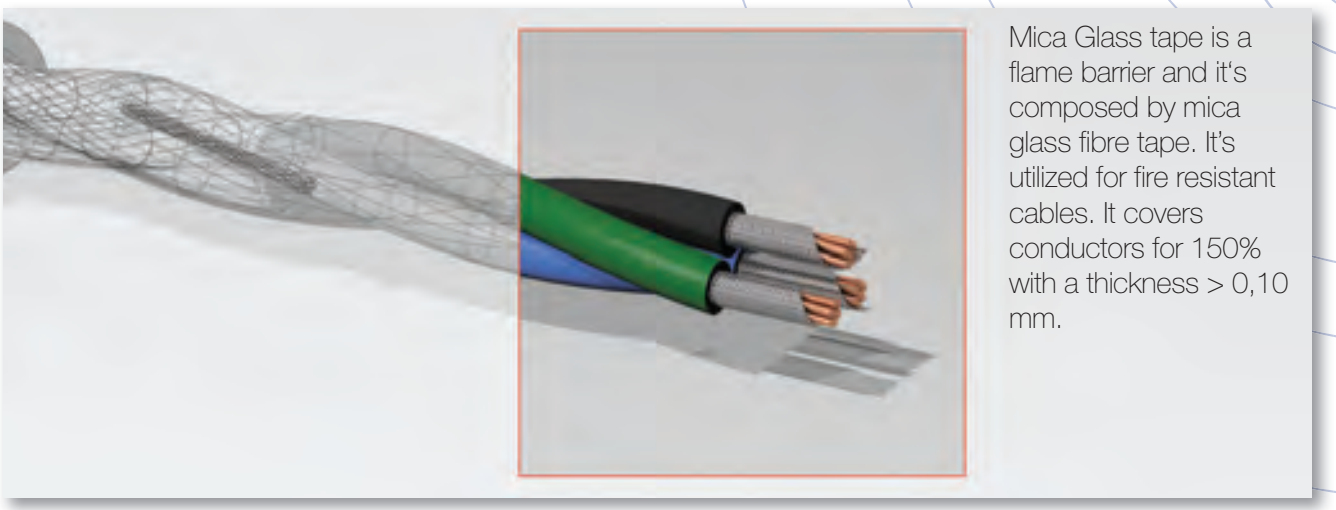
Bare copper wires tape 120% covering.
Applications:
It increases protection against electromagnetic interferences and it decreases electrical resistance.

INDIVIDUAL AND COLLECTIVE SCREEN



Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down. PETP wrapping.
Applications:
Individual screen for multipair/multitriple cables. It increases protection against electrostatic inteferences.

MICA GLASS TAPE



Mica Glass tape is a flame barrier and it's composed by mica glass fibre tape. It's utilized for fire resistant cables. It covers conductors for 150% with a thickness > 0,10 mm.

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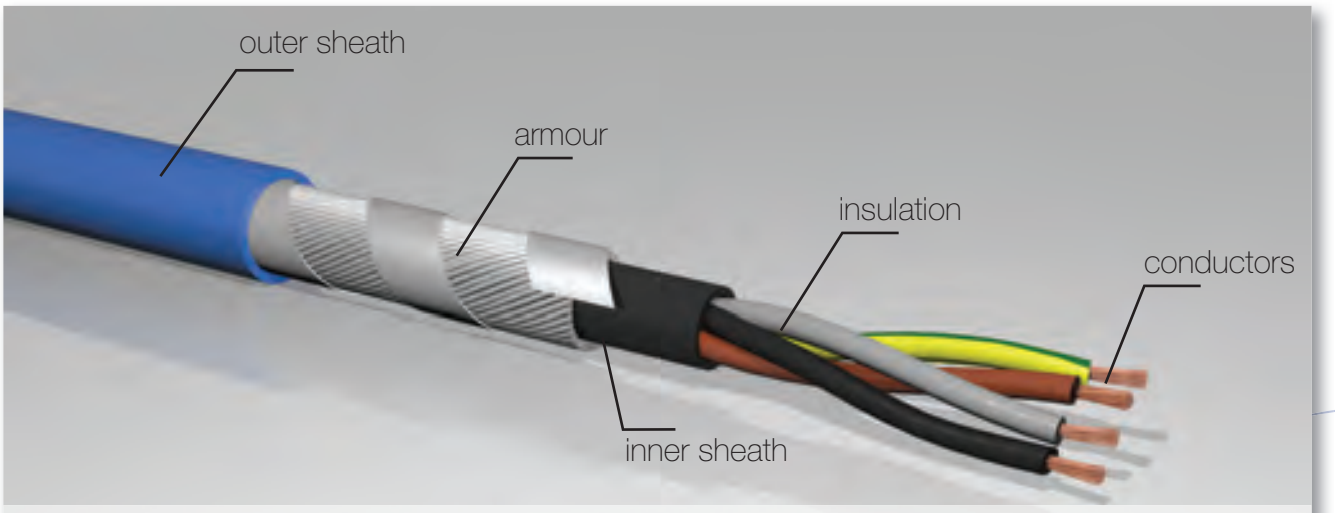

UNEL: FR2ORFR - **BS**: CU/PVC/PVC/SWA/PVC - **VDE**: YYRY

SPECIFICATIONS: in accordance with CEI 20-14

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
R2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722. (Table1)
Inner sheath: PVC inner sheath.

ARMOUR:
Mild galvanized steel wires wrapped in steel tape.

OUTER SHEATH:
Rz type PVC, according to CEI 20-11. Sheath colour: Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,3 Cat. A

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥100MΩ km.

VOLTAGE RATING:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-30 °C up to +70 °C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These armoured control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment, expecially when a high mechanical resistance is required.

ON REQUEST
Oil and petrol resistant outer sheath.
Cables twisted and screened by pairs.
Halogen-free materials.Fire resistant cables.
Core colours on request.

CABLES WITH STEEL WIRES AND STEEL TAPE ARMOUR

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	12,9	288
3G x 1,5	13,4	315
4G x 1,5	14,6	383
5G x 1,5	15,5	462
7G x 1,5	16,5	507
10G x 1,5	20,2	674
12G x 1,5	21,0	724
16G x 1,5	22,7	894
19G x 1,5	24,1	1116
24G x 1,5	26,7	1195
30G x 1,5	28,6	1460
36G x 1,5	30,9	1719
48G x 1,5	35,2	2222
2 x 2,5	14,7	356
3G x 2,5	15,3	399
4G x 2,5	16,3	472
5G x 2,5	17,4	567
7G x 2,5	19,4	650
10G x 2,5	22,9	913
12G x 2,5	24,3	963
16G x 2,5	26,4	1211
19G x 2,5	27,6	1476
24G x 2,5	31,1	1748
30G x 2,5	34,1	2162
36G x 2,5	35,2	2568
2 x 4	16,1	473
3G x 4	16,8	523
4G x 4	18,0	595
5G x 4	19,7	684
7G x 4	21,5	819
10G x 4	26,0	1131
12G x 4	27,2	1331
16G x 4	30,7	1792
19G x 4	32,1	2085

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 6	17,3	580
3G x 6	18,1	631
4G x 6	20,2	754
5G x 6	21,7	923
7G x 6	23,3	1117
10G x 6	28,4	1704
12G x 6	30,1	1953
16G x 6	32,9	2487
2 x 10	20,5	824
3G x 10	21,5	948
4G x 10	23,1	1116
5G x 10	25,4	1387
2 x 16	23,1	1274
3G x 16	24,2	1480
4G x 16	26,2	1733
2 x 25	26,5	1612
3G x 25	27,9	2146
4G x 25	30,7	2543

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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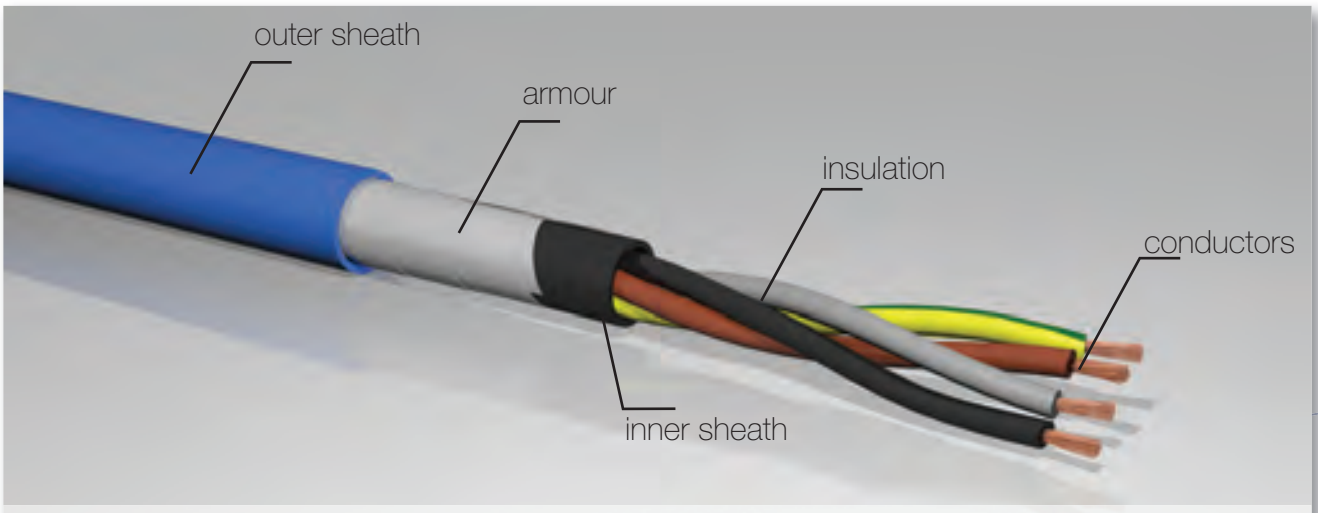

UNEL: FR2ORNR - **BS:** CU/PVC/PVC/DSTA/PVC - **VDE:** YYBY

SPECIFICATIONS: in accordance with CEI 20-14

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
R2 type PVC, according to CEI 20-11.

CORES DENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

INNER SHEATH:
PVC inner sheath.

ARMOUR:
Mild galvanized double steel tape 50% overlap.

OUTER SHEATH:
Rz type PVC, according to CEI 20-11.Sheath Colour: Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,3 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥100MΩ x km.

VOLTAGE RATING:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-30 °C up to +70 °C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These armoured control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment, expecially when a high mechanical resistance is required.

ON REQUEST
Oil and petrol resistant outer sheath.
Cables twisted and screened by pairs.
Fire resistant cables.
Halogen-free materials.
Core colours on request.

STEEL TAPE ARMOURED POWER CABLES

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	12,4	253
3G x 1,5	12,9	273
4G x 1,5	13,7	337
5G x 1,5	15,0	406
7G x 1,5	16,0	445
10G x 1,5	19,3	591
12G x 1,5	20,1	635
16G x 1,5	22,2	784
19G x 1,5	23,6	979
24G x 1,5	26,2	1048
30G x 1,5	28,1	1281
36G x 1,5	30,0	1508
48G x 1,5	34,7	1949
2 x 2,5	13,8	312
3G x 2,5	14,4	350
4G x 2,5	15,8	414
5G x 2,5	16,9	499
7G x 2,5	18,5	570
10G x 2,5	22,4	801
12G x 2,5	23,8	845
16G x 2,5	25,9	1062
19G x 2,5	27,1	1295
24G x 2,5	30,2	1534
30G x 2,5	33,6	1897
36G x 2,5	34,7	2253
2 x 4	15,6	415
3G x 4	16,3	459
4G x 4	17,5	522
5G x 4	19,2	600
7G x 4	21,0	719
10G x 4	25,5	1039
12G x 4	26,7	1168
16G x 4	30,2	1572
19G x 4	31,6	1829

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 6	16,8	509
3G x 6	17,6	554
4G x 6	19,7	661
5G x 6	21,2	810
7G x 6	22,8	980
10G x 6	27,9	1495
12G x 6	29,2	1714
16G x 6	32,4	2235
2 x 10	20,0	723
3G x 10	21,0	832
4G x 10	22,6	979
5G x 10	24,9	1217
2 x 16	22,6	1118
3G x 16	23,7	1299
4G x 16	25,7	1521
2 x 25	26,0	1414
3G x 25	27,4	1652
4G x 25	30,2	1957

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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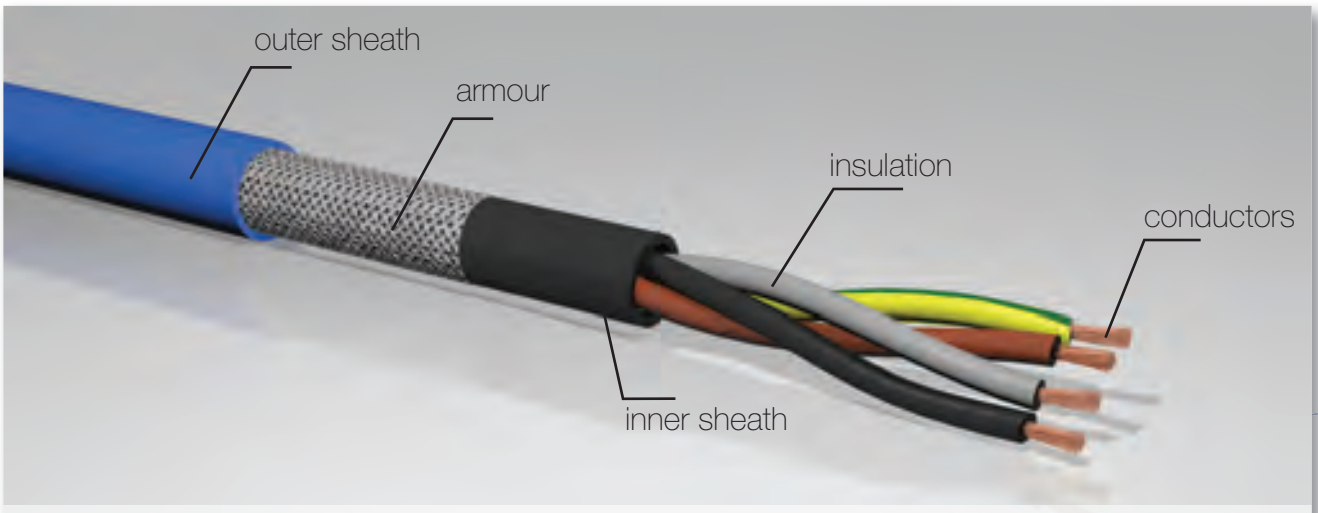

UNEL: FR2ORAR - **BS:** CU/PVC/PVC/GSWB/PVC - **VDE:** YYQY

SPECIFICATIONS: in accordance with CEI 20-14

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
R2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

INNER SHEATH:
PVC inner sheath.

ARMOUR:
Mild galvanized steel wires braid, 80% covering.

OUTER SHEATH:
Rz type PVC, according to CEI 20-11.Sheath Colour: Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,3 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥100MΩ x km.

VOLTAGE RATING:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These armoured control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment, expecially when a high mechanical resistance is required.

ON REQUEST
Oil and petrol resistant outer sheath.
Cables twisted and screened by pairs.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

STEEL WIRES BRAID ARMOURED CABLES

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	11,7	215
3G x 1,5	12,2	240
4G x 1,5	13,0	272
5G x 1,5	14,3	330
7G x 1,5	15,3	380
10G x 1,5	18,6	505
12G x 1,5	19,8	515
16G x 1,5	21,5	667
19G x 1,5	22,9	759
24G x 1,5	25,5	920
30G x 1,5	27,4	1145
36G x 1,5	29,3	1360
48G x 1,5	33,8	1760
2 x 2,5	13,1	250
3G x 2,5	13,7	300
4G x 2,5	15,1	360
5G x 2,5	16,2	435
7G x 2,5	17,8	498
10G x 2,5	21,7	700
12G x 2,5	23,1	742
16G x 2,5	25,2	936
19G x 2,5	26,4	1175
24G x 2,5	29,5	1412
30G x 2,5	32,7	1738
36G x 2,5	33,8	2090
2 x 4	14,9	355
3G x 4	15,6	390
4G x 4	16,8	470
5G x 4	18,5	525
7G x 4	20,3	645
10G x 4	24,8	938
12G x 4	26,0	1065
16G x 4	28,9	1428
19G x 4	30,7	1670

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 6	16,1	445
3G x 6	16,9	525
4G x 6	18,6	584
5G x 6	20,5	725
7G x 6	22,1	890
10G x 6	27,2	1380
12G x 6	28,5	1580
16G x 6	31,7	2088
2 x 10	18,9	670
3G x 10	20,3	750
4G x 10	21,9	910
5G x 10	24,2	1178
2 x 16	21,9	1060
3G x 16	23,0	1228
4G x 16	25,0	1430
2 x 25	25,3	1570
3G x 25	26,7	1750
4G x 25	29,1	1990

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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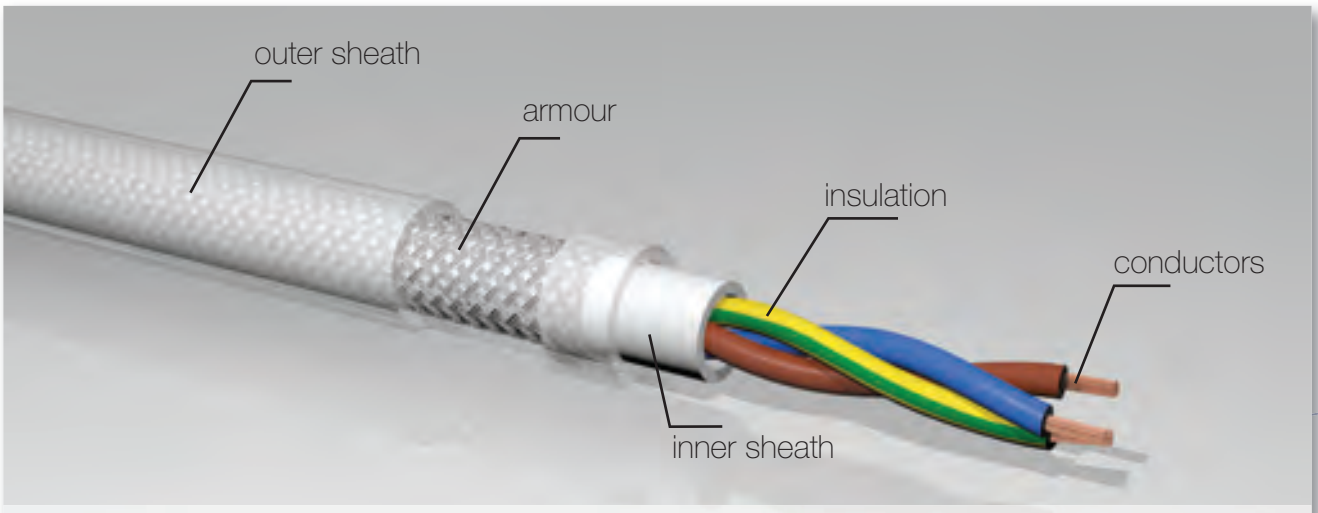

UNEL: FR2ORAR - **BS:** CU/PVC/PVC/GSWB/PVC - **VDE:** YYQY

SPECIFICATIONS: in accordance with CEI/UNEL STANDARDS

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
TI2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722 (Table 1).

INNER SHEATH:
PVC inner sheath.

ARMOUR:
Mild galvanized steel wires braid, 80% covering.

OUTER SHEATH:
TM2 type PVC, according to CEI 20-11.Sheath Colour:Transparent.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,3 Cat. A.

INSULATION RESISTANCE:
≥100MΩ × km.

ELECTRIC RESISTANCE:
According to CEI 20-29/cl.5 (Table 9).

VOLTAGE RATING:
300/300V up to 1mm² of section.300/500V over 1mm² of section.

TESTING VOLTAGE:
1500V a.c. up to 1mm² of section.2000V a.c. over 1mm² of section.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These armoured and oil resistant cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment expecially when a mechanical and chemical protection is required.

ON REQUEST
Cables according to Eni or Tecnimont standards.
Twisted and screened by pairs cables.
Steel wires armour.
Halogen-free and fire resistant cables.
Core colours on request.

STEEL WIRES BRAID AR MOURED CABLES WITH TRANSPARENT SHEATH

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 0,50	7,3	52
3G x 0,50	7,5	64
4G x 0,50	8,2	81
5G x 0,50	8,6	96
7G x 0,50	9,1	118
10G x 0,50	11,2	210
12G x 0,50	11,5	230
16G x 0,50	12,8	260
24G x 0,50	15,4	425
2 x 0,75	7,9	70
3G x 0,75	8,2	88
4G x 0,75	8,9	108
5G x 0,75	9,4	128
7G x 0,75	10,4	190
10G x 0,75	12,7	255
12G x 0,75	13,2	290
16G x 0,75	14,2	350
24G x 0,75	17,1	497
2 x 1	8,5	105
3G x 1	8,8	120
4G x 1	9,4	137
5G x 1	10,6	198
7G x 1	11,3	220
10G x 1	13,9	340
12G x 1	14,8	400
16G x 1	16,4	490
24G x 1	18,9	510
2 x 1,5	9,7	135
3G x 1,5	10,5	170
4G x 1,5	11,2	200
5G x 1,5	12,1	235
7G x 1,5	13,3	275
10G x 1,5	16,6	465
12G x 1,5	17,3	495
16G x 1,5	18,9	550
24G x 1,5	22,7	750

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 2,5	11,5	210
3G x 2,5	12,0	240
4G x 2,5	13,3	270
5G x 2,5	14,8	340
7G x 2,5	16,2	450
10G x 2,5	19,4	590
12G x 2,5	20,6	630
16G x 2,5	23,0	750
24G x 2,5	26,8	1190
2 x 4	13,3	270
3G x 4	13,9	310
4G x 4	15,8	400
5G x 4	17,0	480
2 x 6	15,3	390
3G x 6	16,1	445
4G x 6	17,8	580
5G x 6	19,2	700
2 x 10	18,1	640
3G x 10	19,0	700
4G x 10	20,6	860
5G x 10	23,2	1080
2 x 16	20,7	950
3G x 16	22,2	1130
4G x 16	24,1	1360
2 x 25	24,5	1450
3G x 25	25,9	1675
4G x 25	28,6	1910

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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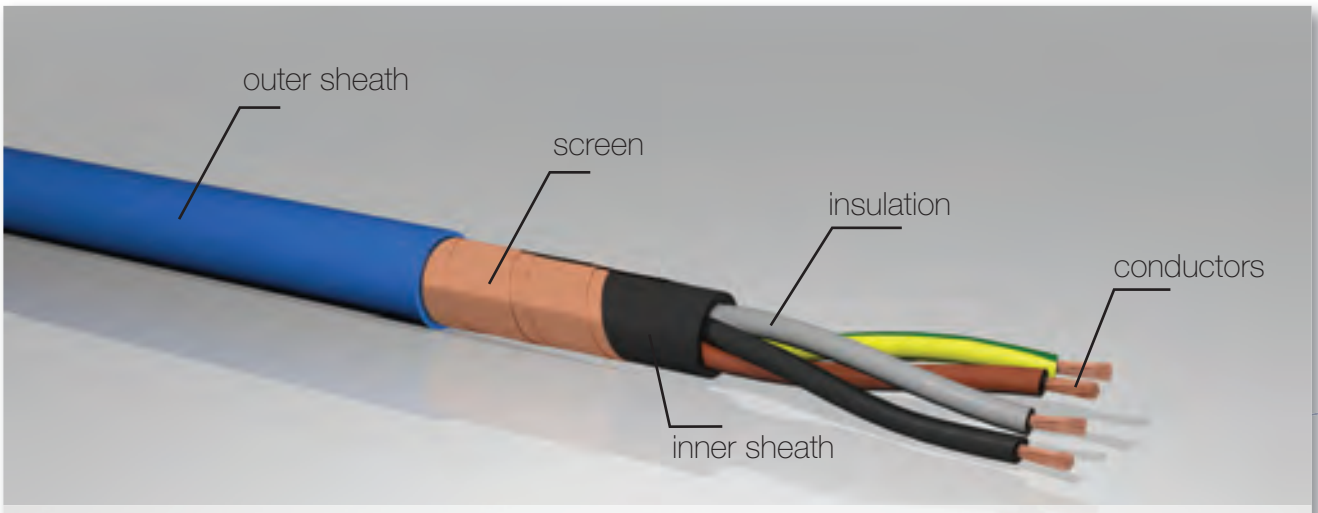
CEI STANDARD



UNEL: FR2ORH1R - **BS:** CU/PVC/PVC/DCT/PVC - **VDE:** YYCuBY

SPECIFICATIONS: in accordance with CEI 20-14

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
R2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

INNER SHEATH:
PVC inner shaeth.

SCREEN:
Bare copper double tape 50% overlap.

OUTER SHEATH:
Rz type PVC, according to CEI 20-11.
Sheat Colour: Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II.
IEC 60332,3 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These screened control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment.

ON REQUEST
Oil and petrol resistant outer sheath.
Cables twisted and screened by pairs.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

COPPER TAPE SCREENED CABLES

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	11,9	205
3G x 1,5	12,4	225
4G x 1,5	13,2	282
5G x 1,5	14,5	345
7G x 1,5	15,5	379
10G x 1,5	18,8	505
12G x 1,5	19,6	543
16G x 1,5	21,7	682
19G x 1,5	23,1	770
24G x 1,5	25,7	924
30G x 1,5	27,6	1145
36G x 1,5	29,5	1360
48G x 1,5	34,2	1776
2 x 2,5	13,3	257
3G x 2,5	13,9	290
4G x 2,5	15,3	348
5G x 2,5	16,4	427
7G x 2,5	18,0	488
10G x 2,5	21,9	698
12G x 2,5	23,3	735
16G x 2,5	25,4	940
19G x 2,5	26,6	1165
24G x 2,5	29,7	1385
30G x 2,5	33,1	1730
36G x 2,5	34,2	2080
2 x 4	15,1	350
3G x 4	15,8	390
4G x 4	17,0	447
5G x 4	19,1	515
7G x 4	20,5	625
10G x 4	25,0	918
12G x 4	26,2	1040
16G x 4	29,7	1425
19G x 4	31,1	1675

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 6	16,3	438
3G x 6	17,1	478
4G x 6	18,8	575
5G x 6	20,7	715
7G x 6	22,3	875
10G x 6	27,2	1360
12G x 6	28,7	1572
16G x 6	31,9	2076
2 x 10	19,5	635
3G x 10	20,5	738
4G x 10	22,1	876
5G x 10	24,4	1100
2 x 16	22,1	1015
3G x 16	23,2	1190
4G x 16	25,2	1400
2 x 25	25,5	1500
3G x 25	26,9	1720
4G x 25	29,7	1890

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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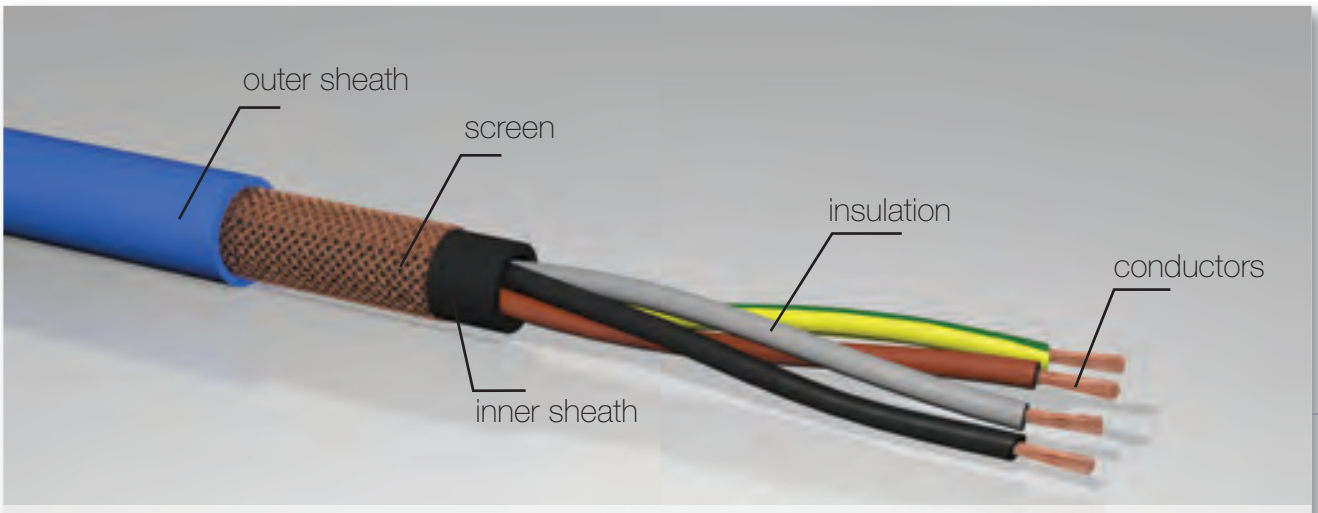
CEI STANDARD



UNEL: FR2ORH2R - **BS:** CU/PVC/PVC/CWB/PVC - **VDE:** YYCY

SPECIFICATIONS: in accordance with CEI 20-14

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
R2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

INNER SHEATH:
PVC inner sheath.

SCREEN:
Bare copper wires braid.

OUTER SHEATH:
Rz type PVC, according to CEI 20-11.
Sheath Colour: Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II.
IEC 60332,3 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥100MΩ × km.
Voltage rating:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These screened control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment.

ON REQUEST
Cables according to Eni or Tecnimont standards.
Screened and armoured cables.
Twisted and screened by pairs cables.
Halogen-free materials.
Core colours on request.

COPPER BRAID SCREENED CABLES

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	11,3	187
3G x 1,5	11,8	210
4G x 1,5	12,6	245
5G x 1,5	13,5	288
7G x 1,5	15,0	336
10G x 1,5	18,3	495
12G x 1,5	19,1	550
16G x 1,5	21,4	690
19G x 1,5	22,6	770
24G x 1,5	25,4	960
30G x 1,5	27,3	1140
36G x 1,5	29,2	1370
48G x 1,5	33,9	1750
2 x 2,5	13,1	256
3G x 2,5	13,7	275
4G x 2,5	15,1	335
5G x 2,5	16,2	420
7G x 2,5	17,8	478
10G x 2,5	21,7	655
12G x 2,5	23,1	700
16G x 2,5	25,2	915
19G x 2,5	26,4	1085
24G x 2,5	29,5	1335
30G x 2,5	32,7	1665
36G x 2,5	33,8	2020
2 x 4	14,6	343
3G x 4	15,6	382
4G x 4	16,5	452
5G x 4	18,2	507
7G x 4	20,0	610
10G x 4	24,7	915
12G x 4	25,9	1050
16G x 4	28,8	1425
19G x 4	30,8	1635

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 6	15,8	440
3G x 6	16,6	486
4G x 6	18,3	585
5G x 6	20,2	718
7G x 6	21,8	875
10G x 6	27,1	1362
12G x 6	28,8	1580
16G x 6	30,8	2085
2 x 10	18,9	680
3G x 10	20,3	745
4G x 10	21,9	885
5G x 10	24,2	1140
2 x 16	21,9	1055
3G x 16	23,0	1210
4G x 16	25,0	1415
2 x 25	25,3	1585
3G x 25	26,7	1755
4G x 25	29,1	1987

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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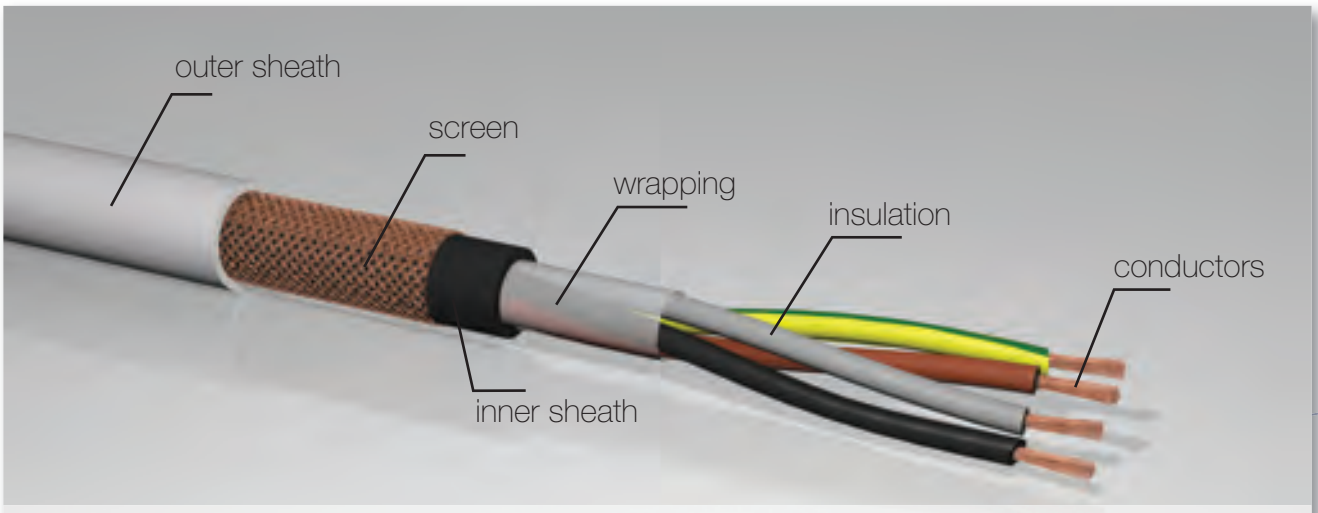

UNEL: FG7ORH2R - **BS:** CU/HEPR/PVC/CWB/PVC - **VDE:** 3GYCY

SPECIFICATIONS: in accordance with CEI 20-13

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
G7 type HEPR, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

WRAPPING:
PETP tape (23µm) 50% overlap.

INNER SHEATH:
PVC inner sheath.
Screen: Bare copper braid.

OUTER SHEATH:
Rz type PVC, according to CEI 20-11.
Sheath Colour:Gray RAL 7035.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II.
IEC 60332,3 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥2000MΩ × km.

VOLTAGE RATING:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-30°C up to +90°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8.

APPLICATIONS
These screened control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment. The rubber insulation is very usefull in case of short circuits or over heating, ac-cording to CEI 64-2 and CEI 64-8.

ON REQUEST
Halogen-free materials.
Fire resistant cables.
Core colours on request.

COPPER BRAID SCREENED AND HEPR INSULATED CABLES

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	10,5	163
3G x 1,5	11,0	191
4G x 1,5	11,7	218
5G x 1,5	12,6	253
7G x 1,5	14,0	298
10G x 1,5	17,5	460
12G x 1,5	18,3	516
16G x 1,5	20,5	645
19G x 1,5	21,6	728
24G x 1,5	24,2	907
30G x 1,5	26,0	1094
36G x 1,5	27,8	1311
48G x 1,5	32,3	1687
2 x 2,5	11,5	231
3G x 2,5	12,0	249
4G x 2,5	12,9	311
5G x 2,5	14,5	392
7G x 2,5	15,9	446
10G x 2,5	19,9	618
12G x 2,5	21,1	669
16G x 2,5	23,1	877
19G x 2,5	24,3	1025
24G x 2,5	27,1	1265
30G x 2,5	30,2	1590
36G x 2,5	31,3	1916
2 x 4	12,6	308
3G x 4	13,6	332
4G x 4	14,6	401
5G x 4	16,2	457
7G x 4	17,8	560
10G x 4	22,4	864
12G x 4	23,4	991
16G x 4	25,6	1386
19G x 4	27,0	1574

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 6	15,0	410
3G x 6	15,8	453
4G x 6	17,9	539
5G x 6	19,7	688
7G x 6	21,2	83
10G x 6	26,3	1302
12G x 6	27,6	1510
16G x 6	31,3	1985
2 x 10	17,4	655
3G x 10	18,3	707
4G x 10	20,2	842
5G x 10	22,5	1085
2 x 16	20,4	980
3G x 16	21,4	1145
4G x 16	23,2	1367
2 x 25	24,0	1510
3G x 25	25,3	1687
4G x 25	27,5	1869

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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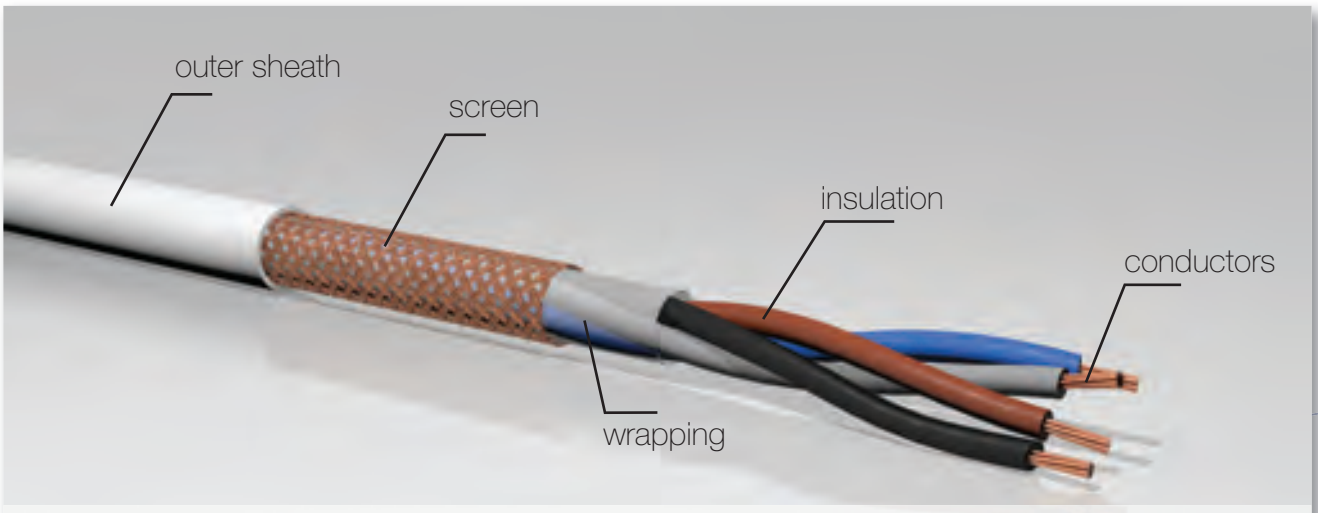
CEI STANDARD



UNEL: FR2OH2R - **BS:** CU/PVC/CWB/PVC - **VDE:** YCY

SPECIFICATIONS: in accordance with CEI 20-20

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
TI2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

WRAPPING:
PETP tape (23µm) 50% overlap.

SCREEN:
Bare copper wires braid.

OUTER SHEATH:
TM2 type PVC, according to CEI 20-11. Sheath Colour:Gray RAL 7035.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,3 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).0.22mm² ≤ 91Ω/km.0.35mm² ≤ 57Ω/km.

VOLTAGE RATING:
300/300V.

TESTING VOLTAGE:
1500V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 5.

APPLICATIONS
These screened control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment.

ON REQUEST
Screen finned copper.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

COPPER BRAID SCREENED CABLES

TYPE number of cores xcross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
1 x 0,50	3,1	22
2 x 0,50	5,1	54
3 x 0,50	5,3	61
4 x 0,50	5,8	73
5 x 0,50	6,4	88
7 x 0,50	6,9	106
8 x 0,50	7,4	118
10 x 0,50	8,5	141
12 x 0,50	8,9	162
16 x 0,50	10,0	206
19 x 0,50	10,5	230
24 x 0,50	12,1	275
36 x 0,50	14,2	425
48 x 0,50	16,2	559
1 x 0,75	3,4	25
2 x 0,75	5,7	58,
3 x 0,75	6,0	72
4 x 0,75	6,7	90
5 x 0,75	7,2	107
7 x 0,75	8,0	144
8 x 0,75	8,6	168
10 x 0,75	9,9	200
12 x 0,75	10,4	216
16 x 0,75	11,4	293
19 x 0,75	12,3	346
24 x 0,75	14,0	404
36 x 0,75	16,5	599
48 x 0,75	18,9	790
1 x 1	3,7	41
2 x 1	6,3	83
3 x 1	6,6	95
4 x 1	7,2	110
5 x 1	8,0	133
7 x 1	8,7	168
8 x 1	9,4	197
10 x 1	10,9	241
12 x 1	11,7	269
16 x 1	13,1	346
19 x 1	14,0	382
24 x 1	16,0	528
36 x 1	18,8	787
48 x 1	21,7	1043

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	7,7	110
3G x 1,5	8,1	127
4G x 1,5	9,0	158
5G x 1,5	9,9	182
7G x 1,5	10,9	240
8G x 1,5	11,8	269
10G x 1,5	13,7	328
12G x 1,5	14,4	356
16G x 1,5	16,2	462
19G x 1,5	17,2	538
24G x 1,5	19,6	707
36G x 1,5	23,4	1027
48G x 1,5	27,0	1325
2 x 2,5	9,3	139
3G x 2,5	9,8	178
4G x 2,5	10,9	211
5G x 2,5	12,1	259
7G x 2,5	13,3	331
8G x 2,5	14,6	375
10G x 2,5	16,9	498
12G x 2,5	17,7	538
16G x 2,5	19,9	763
19G x 2,5	21,1	936
24G x 2,5	24,3	1070
36G x 2,5	28,9	1610
48G x 2,5	33,3	2243
2 x 4	11,0	207
3G x 4	11,8	255
4G x 4	12,9	346
5G x 4	14,3	412
2 x 6	12,6	278
3G x 6	13,6	355
4G x 6	15,1	480
5G x 6	16,7	575

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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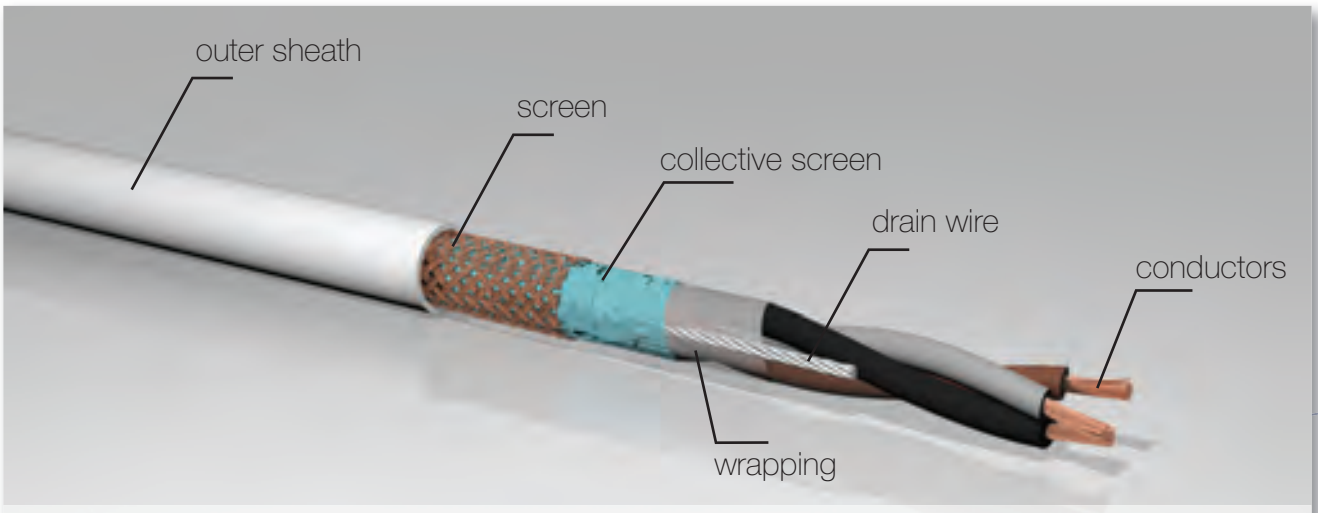

UNEL: FR2OHH2R - **BS:** CU/PVC/OSCR/CWB/PVC - **VDE:** Y(ST)CY

SPECIFICATIONS: in accordance with CEI 20-20

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
TI2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP laminated tape applied metallic side down.

SCREEN:
Bare copper wires braid.

OUTER SHEATH:
TM2 type PVC, according to CEI 20-11.
Sheath Colour:Gray RAL 7035.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,2 Cat. A.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

VOLTAGE RATING:
300/300V up to 1mm² of section.
300/500V over 1mm² of section.

TESTING VOLTAGE:
1500V up to 1mm² of section.
2000V over 1mm² of section.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 5.

APPLICATIONS
These screened control and signal cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment. They provide a good screening against electromagnetic (copper wires braid) and electrostatic (AL/PETP tape) interferences.

ON REQUEST
Halogen-free materials.
Fire resistant cables.
Core colours on request.

CABLES WITH COPPER BRAID AND COLLECTIVE SCREEN

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
1 x 0,50	3,1	22
2 x 0,50	5,1	54
3 x 0,50	5,3	61
4 x 0,50	5,8	73
5 x 0,50	6,4	88
7 x 0,50	6,9	106
8 x 0,50	7,4	118
10 x 0,50	8,5	141
12 x 0,50	8,9	162
16 x 0,50	10,0	206
19 x 0,50	10,5	230
24 x 0,50	12,1	275
36 x 0,50	14,2	425
48 x 0,50	16,2	559

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
1 x 0,75	3,4	25
2 x 0,75	5,7	58
3 x 0,75	6,0	72
4 x 0,75	6,7	90
5 x 0,75	7,2	107
7 x 0,75	8,0	14
48 x 0,75	8,6	168
10 x 0,75	9,9	200
12 x 0,75	10,4	216
16 x 0,75	11,4	293
19 x 0,75	12,3	346
24 x 0,75	14,0	404
36 x 0,75	16,5	599
48 x 0,75	18,9	790
1 x 1	3,7	41
2 x 1	6,3	83
3 x 1	6,6	95
4 x 1	7,2	110
5 x 1	8,0	133
7 x 1	8,7	168
8 x 1	9,4	197
10 x 1	10,9	241
12 x 1	11,7	269
16 x 1	13,1	346
19 x 1	14,0	382
24 x 1	16,0	528
36 x 1	18,8	787
48 x 1	21,7	1043

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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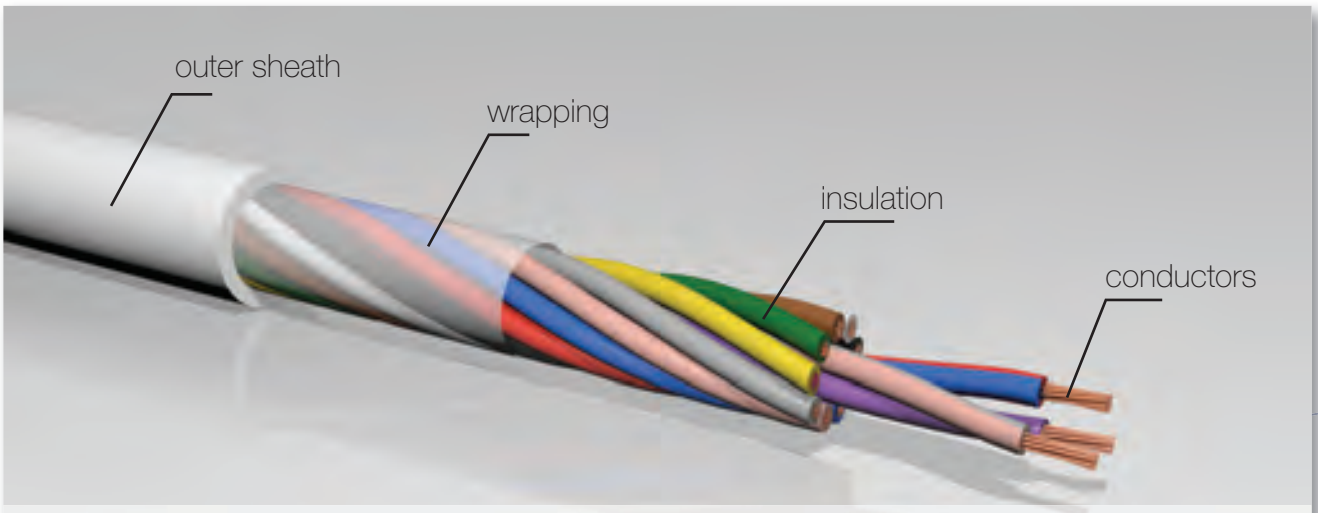

UNEL: FR2OR - **BS:** CU/PVC/PVC - **VDE:** YY

SPECIFICATIONS: in accordance with CEI/DIN STANDARDS

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

INSULATION:
TI2 type PVC, according to CEI 20-11.

CORES IDENTIFICATION BY COLOURS:
Under 0,75mm² of section: colours coded in accordance with DIN 47100 (Tab.2).Over 0,75mm² of section: colours coded in accordance with UNEL 00722 (Table 1).

WRAPPING:
PETP tape (23µm) 50% overlap.

OUTER SHEATH:
TM2 type PVC, according to CEI 20-11. Sheath Colour:Gray RAL 7035.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22/II. IEC 60332,3 Cat. A.

OIL RESISTANT TEST:
Oil resistant according to CNOMO E.03.04 150N.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

VOLTAGE RATING:
300/300V up to 1mm² of section.300/500V over 1mm² of section.

TESTING VOLTAGE:
1500V up to 1mm² of section. 2000V over 1mm² of section.

WORKING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 5.

APPLICATIONS
These oil resistant cables are utilized in industrial areas for installations provided with electronic control or monitoring equipment expecially when a chemical protection is required.

ON REQUEST
Steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

OIL RESISTANT CABLES

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 0,50	4,6	42
3 x 0,50	4,8	48
4 x 0,50	5,3	57
5 x 0,50	5,9	69
6 x 0,50	6,4	79
7 x 0,50	6,6	86
8 x 0,50	7,2	105
10 x 0,50	8,0	117
12 x 0,50	8,4	134
16 x 0,50	9,5	173
19 x 0,50	10,0	202
24 x 0,50	11,5	247
2 x 0,75	5,4	49
3 x 0,75	5,7	59
4 x 0,75	6,2	72
5 x 0,75	6,9	86
6 x 0,75	7,5	115
7 x 0,75	7,5	116
8 x 0,75	8,2	141
10 x 0,75	9,4	171
12 x 0,75	10,1	185
16 x 0,75	11,3	285
19 x 0,75	11,9	312
24 x 0,75	13,8	366
2 x 1	6,0	62
3 x 1	6,3	74
4 x 1	7,1	86
5 x 1	7,7	107
7 x 1	8,6	139
8 x 1	9,4	161
10 x 1	10,8	202
12 x 1	11,3	230
16 x 1	12,7	293
19 x 1	13,6	326
24 x 1	15,6	466

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
2 x 1,5	7,6	90
3G x 1,5	8,0	101
4G x 1,5	8,7	133
5G x 1,5	9,6	158
7G x 1,5	10,8	202
8G x 1,5	11,8	230
10G x 1,5	13,5	306
12G x 1,5	14,2	330
16G x 1,5	16,0	424
19G x 1,5	17,0	502
24G x 1,5	19,4	622
2 x 2,5	9,4	117
3G x 2,5	9,9	157
4G x 2,5	10,8	192
2 x 4	10,8	186
3G x 4	11,6	230
4G x 4	12,9	310

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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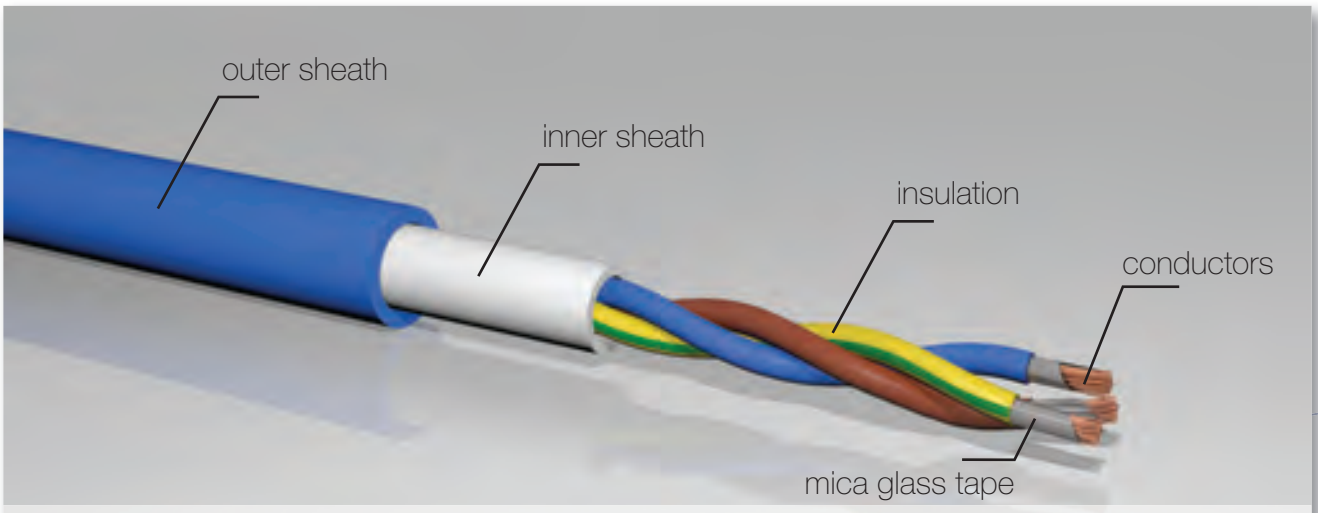
CEI STANDARD



UNEL: FTG10OM1 - **BS:** CU/MGT/EPR/LSZH - **VDE:** HH

SPECIFICATIONS: in accordance with CEI/UNEL STANDARDS

CONDUCTORS:
Solid (class 1), Stranded (class 2), Flexible (class 5) copper wires according to CEI 20-29 (Table 8).

FLAME PROTECTION:
Mica glass tape, with a tickness > 0,10 mm.

INSULATION:
G10 type cross linked rubber, acc. to CEI 20-11CEI 20-38/I.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with UNEL 00722.(Table 1)

INNER SHEATH:
M1 type polymer compound.

OUTER SHEATH:
M1 type polymer compound in accordance with CEI 20-11, CEI 20-38/I and tested acc. to CEI 20-37/2-1 (Table 12).
Sheath Colour: Blue RAL 5015 or Red RAL 3000.

FIRE CHARACTERISTICS:
Fire resistant acc. to CEI 20-36 (Table 10).
Flame retardant acc. to CEI 20-22/III.

ELECTRIC RESISTANCE:
According to CEI 20-29 (Table 9).

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
600/1000V max. 1200V.

TESTING VOLTAGE:
4000V a.c.

OPERATING TEMPERATURE:
-40°C up to +90°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6.

APPLICATIONS
These cables take their place in fire-fighting systems, alarm automatic doors and emergency lighting systems of public places and buildings. They are fire resistant and they produce low emissions.

ON REQUEST
Screen: tinned/bare copper wires braid or copper tape.
Armour: steel wires, steel tape or steel wires braid.
Core colours on request.

FIRE RESISTANT CABLES - LSZH

TYPE number of cores x cross section n x mm²	OUTER DIAMETER Ø mm	AVERAGE WEIGHT kg x km
1 x 1,5	6,9	68
2 x 1,5	12,5	190
3G 1,5	13,5	250
4G 1,5	14,5	272
1 x 2,5	7,4	72
2 x 2,5	13,5	240
3G x 2,5	14,6	281
4G x 2,5	15,7	330
1 x 4	7,9	98
2 x 4	14,5	290
3G x 4	15,7	355
4G x 4	17,5	443
1 x 6	8,5	115
2 x 6	15,7	348
3G x 6	17,4	440
4G x 6	19,3	600
1 x 10	9,7	170
2 x 10	19,4	490
3G x 10	20,4	635
4G x 10	23,0	810
1 x 16	10,8	234
2 x 16	22,4	705
3G x 16	23,6	870
4G x 16	25,6	1075
1 x 25	12,1	318
2 x 25	25,0	885
3G x 25	26,5	1218
4G x 25	29,3	1535

Max cable construction 4x240 mmq
G is for: with green/yellow (in earth) core

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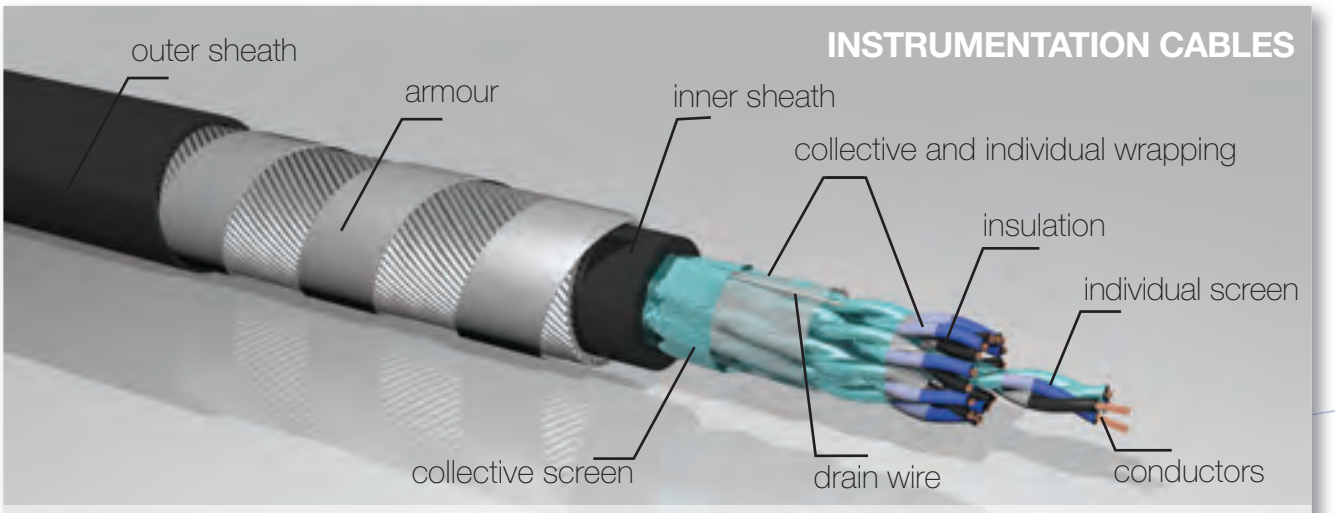
CEI STANDARD



UNEL: FR2XHOHRFR - **BS:** CU/PVC/ISCR/OSCR/PVC/SWA/PVC - **VDE:** Y(St)YRY PiMF

SPECIFICATIONS: in accordance with CEI/ENI-SNAM STANDARDS

CONDUCTORS:
Stranded copper wires (class 5) according toCEI 20-29 (Table 8).

INSULATION:
R2 type PVC or polyethylene LDPEacc. to CEI 20-11.

PAIRS/TRIPLES IDENTIFICATION BY COLOURS:
Pairs: black numbered - blue.
Triples: black numbered - blue - brown.

INDIVIDUAL AND COLLECTIVE WRAPPING:
PETP tape 50% overlap acc. to ENI-SNAM.

INDIVIDUAL SCREEN:
7x0.30mm Tinned copper drain wire under and in contact with alluminium/ PETP laminated tape applied metallic side down with a tickness of 25/23 µm, acc. to ENI/SNAM.

COLLECTIVE SCREEN:
7x0.30mm Tinned copper drain wire under and in contact with alluminium/ PETP laminated tape applied metallic side down with a tickness of 50/36 µm, acc. to ENI-SNAM.

INNER SHEATH:
PVC flame retardant.

ARMOUR:
Mild galvanized steel wires wrapped with steel tape acc. to CEI 20-14 for conductors >6.

OUTER SHEATH:
Rz type PVC acc. to CEI 20-11.
Sheat Colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22 II. IEC 60332,3 Cat. A.

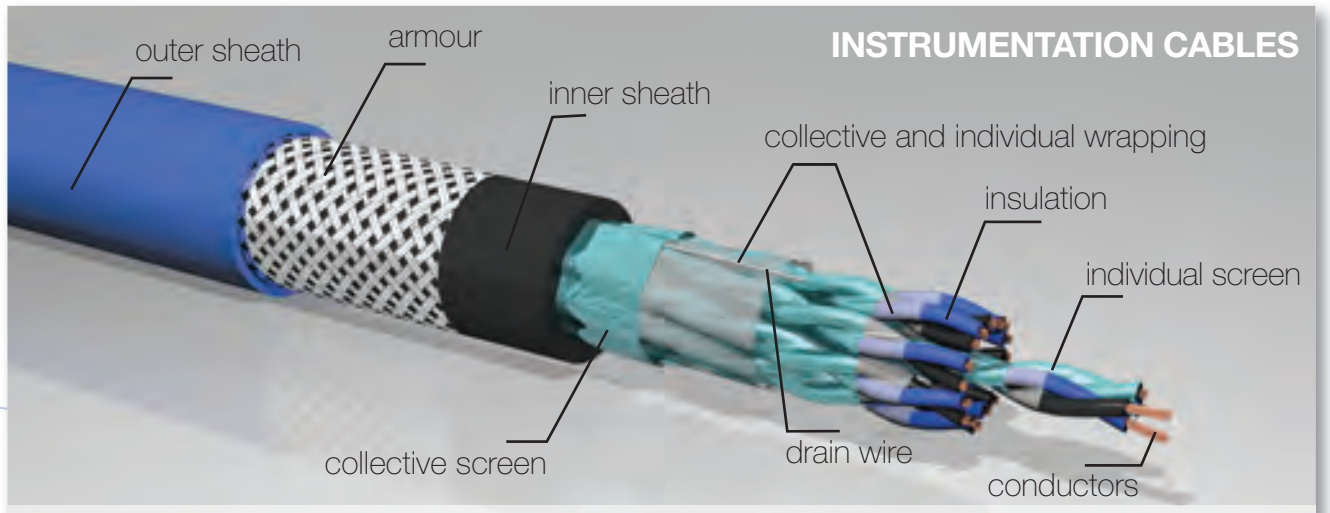
HIDROCARBON RESISTANCE:
Acc. to ENI 0181.00 or CEI 20-11 B3.

ELECTRIC RESISTANCE:
Acc. to CEI 20-29 cl. 5 (Table 9).

MINIMUM BENDING RADIUS:
Cable outer diameter x 6/8.

APPLICATIONS
These instrumentation cables are designed to connect electrical instrument circuit and to provide communication services. They have a good screen for electrostatic interferences. Usually they take their place in industrial plants as refinery or petrol deposit, according to Eni 0.181.00. They have a protection against hydrocarbon and chemical agents.

ON REQUEST
Armour with steel tape or with steel wires braid acc. to CEI 20-14



UNEL: FR2XHOHRAR - **BS:** CU/PVC/ISCR/OSCR/PVC/GSWB/PVC - **VDE:** Y(St)YQY PiMF

SPECIFICATIONS: in accordance with CEI/TECNIMONT STANDARDS

CONDUCTORS:
Stranded copper wires (class 5) according toCEI 20-29 (Table 8).

INSULATION:
R2 type PVC acc. to CEI 20-11.

PAIRS/TRIPLES IDENTIFICATION BY COLOURS:
Pairs: black numbered - blue.Triples: black numbered - blue – brown.

INDIVIDUAL AND COLLECTIVE WRAPPING:
Polyester tape overlap acc. to MEU standards.

INDIVIDUAL SCREEN:
7x0.30mm Tinned copper drain wire under and in contact with alluminium/ PETP laminated tape applied metallic side down with a tickness of 25/23 m, acc. to MEU standards.

COLLECTIVE SCREEN:
7x0.30mm Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down with a tickness of 50/36 m, acc. to MEU standards.

INNER SHEATH:
PVC flame retardant.

ARMOUR:
Mild galvanized steel wires braid, 80% covering.

OUTER SHEATH:
Rz qulity PVC acc. to CEI 20-11. Sheat Colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to CEI 20-22 II. IEC 60332,2 Cat. A.

HIDROCARBON RESISTANCE:
Acc. to ENI 0181.00 or CEI 20-11 B3.

ELECTRIC RESISTANCE:
Acc. to CEI 20-29 cl. 5 (Table 9)

MINIMUM BENDING RADIUS:
Cable outer diameter x 6/8.

APPLICATIONS
These cables are utilized in industrial plants such as refinery or petrol deposit, according to MEU 817.01/02 standards. They have a good screen against electrostatic interferences.

ON REQUEST
Armour with steel wires and steel tape.

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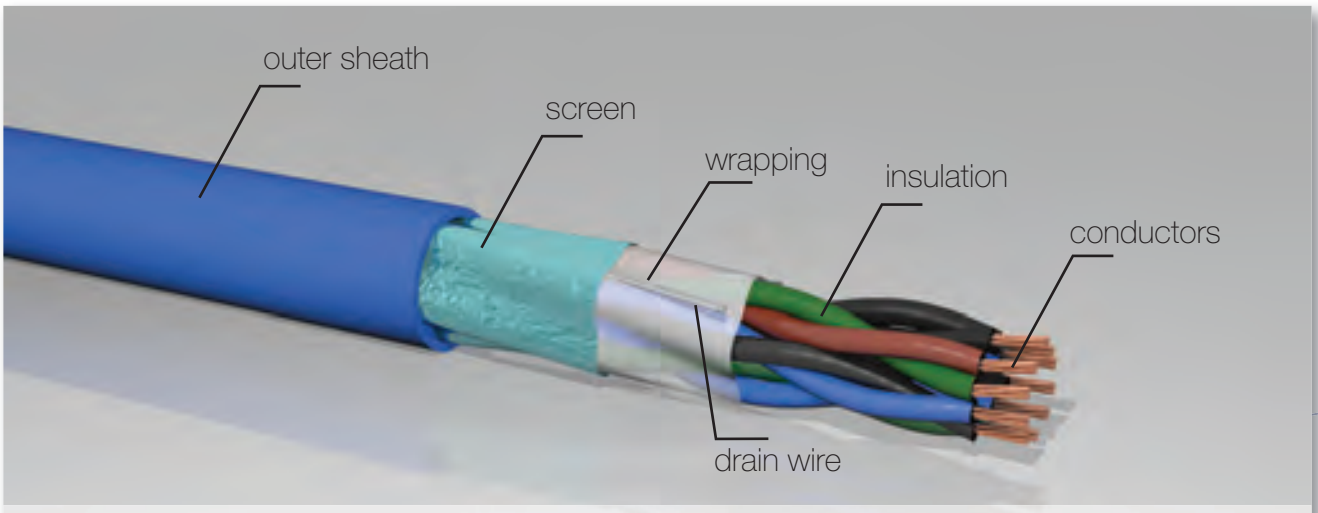

BS: CU/PE/OSCR/PVC - **VDE**: 2Y(St)Y - **UNEL**: REXOHR

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 1 TYPE 1 - PE insulated

CONDUCTORS:
Solid (class 1), stranded (class 2) or flexible (class 5)copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS/TRIPLES IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS 5308 part 1(Table 4).

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655. Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.Outer sheath additional characteristics: Minimum oxygen index: 30%.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category C.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6

APPLICATIONS
These instrumentation cables can be utilized in process plants to connect electrical instrument circuits and to provide communication services. Usually they take their place in industrial plants as refinery or petrol deposit. However, they can't be suitable for underground applications.

ON REQUEST
Halogen-free materials.
Fire resistant cables.
Core colours on request.

MULTIPAIR CABLES WITH COLLECTIVE SCREEN

TYPE number of pairs/triples x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
1P x 0.50	16 x 0.20	0.6	7.0	61
2(Q) x 0.50	16 x 0.20	0.6	7.9	82
5P x 0.50	16 x 0.20	0.6	13.1	206
10P x 0.50	16 x 0.20	0.6	17.1	340
20P x 0.50	16 x 0.20	0.6	22.3	569
1T x 0.50	16 x 0.20	0.6	7.3	68
1P x 0.75	24 x 0.20	0.6	7.4	75
2P(Q) x 0.75	24 x 0.20	0.6	8.3	97
5P x 0.75	24 x 0.20	0.6	14.3	253
10P x 0.75	24 x 0.20	0.6	18.7	447
20P x 0.75	24 x 0.20	0.6	24.5	918
1T x 0.75	24 x 0.20	0.6	7.7	80
1P x 1	1 x 1.13	0.6	7.5	85
2P(Q) x 1	1 x 1.13	0.6	8.4	115
5P x 1	1 x 1.13	0.6	14.1	291
10P x 1	1 x 1.13	0.6	18.4	495
20P x 1	1 x 1.13	0.6	24.4	950
1T x 1	1 x 1.13	0.6	7.7	104
1P x 1,5	7 x 0.53	0.6	8.3	98
2P(Q) x 1,5	7 x 0.53	0.6	9.7	156
5P x 1,5	7 x 0.53	0.6	16.4	359
10P x 1,5	7 x 0.53	0.6	21.6	670
20P x 1,5	7 x 0.53	0.6	28.5	1231
1T x 1,5	7 x 0.53	0.6	8.9	120

P is for: Pair/s. (Q) is for: Quad formation. T is for: Triple.

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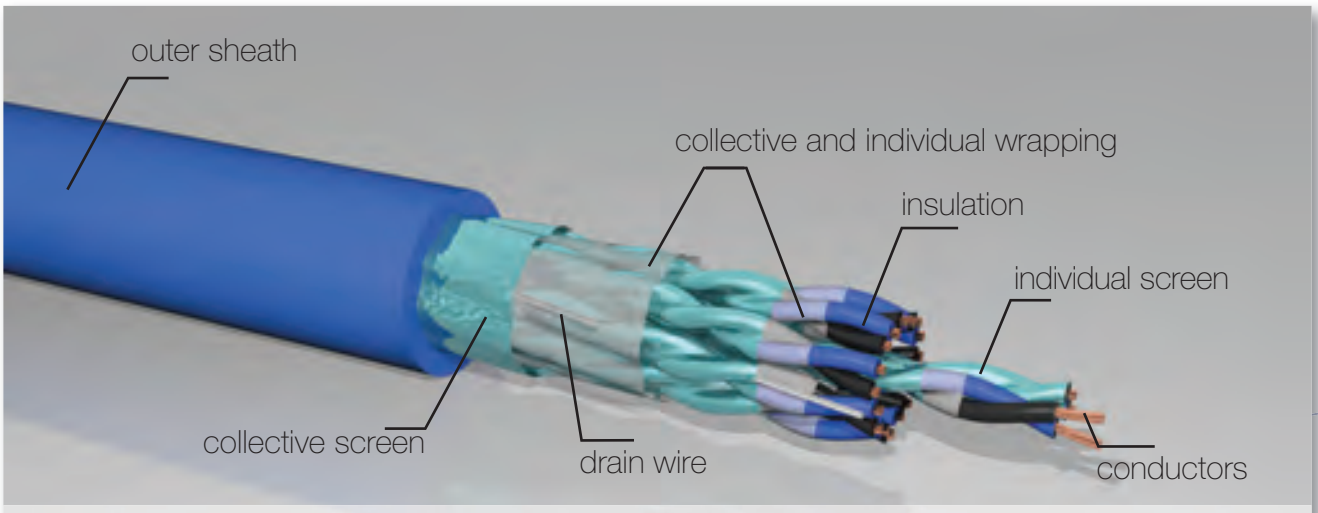

BS: CU/PE/ISCR/OSCR/PVC - **VDE**: 2Y(St)Y PiMF - **UNEL**: REXHOHR

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 1 TYPE 1 - PE insulated

CONDUCTORS:
Solid (class 1), stranded (class 2) or flexible (class 5)copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 to BS 6234.

PAIRS IDENTIFICATION BY COLOURS:
Pairs: black numbered - blue.

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

SCREEN ISOLATION TAPE:
Numbered PETP tape applied over each individually screened pair.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655.
Sheath colour:
Blue RAL 5015, Black RAL 9005, Green RAL 6018.Outer sheath additional characteristics: Minimum oxygen index: 30%.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS4066/IEC 60332 part 3 category C.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6

APPLICATIONS
These instrumentation cables can be utilized in process plants to connect electrical instrument circuits and to provide communication services. Usually they take their place in industrial plants as refinery or petrol deposit. However, they can't be suitable for underground applications.

ON REQUEST
Halogen-free materials.
Fire resistant cables.
Core colours on request.

MULTIPAIR CABLES WITH INDIVIDUAL AND COLLECTIVE SCREEN

TYPE number of pairs x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P x 0.50	16 x 0.20	0.6	12.0	162
5P x 0.50	16 x 0.20	0.6	15.2	249
10P x 0.50	16 x 0.20	0.6	21.1	480
20P x 0.50	16 x 0.20	0.6	27.3	777
2P x 0.75	24 x 0.20	0.6	12.8	191
5P x 0.75	24 x 0.20	0.6	16.3	272
10P x 0.75	24 x 0.20	0.6	22.7	549
20P x 0.75	24 x 0.20	0.6	29.8	960
2P x 1	1 x 1.13	0.6	12.8	198
5P x 1	1 x 1.13	0.6	16.2	290
10P x 1	1 x 1.13	0.6	22.6	591
20P x 1	1 x 1.13	0.6	29.8	1008
2P x 1,5	7 x 0.53	0.6	14.7	250
5P x 1,5	7 x 0.53	0.6	18.8	397
10P x 1,5	7 x 0.53	0.6	26.5	802
20P x 1,5	7 x 0.53	0.6	34.4	1401

P is for: Pair/s. (Q) is for: Quad formation.

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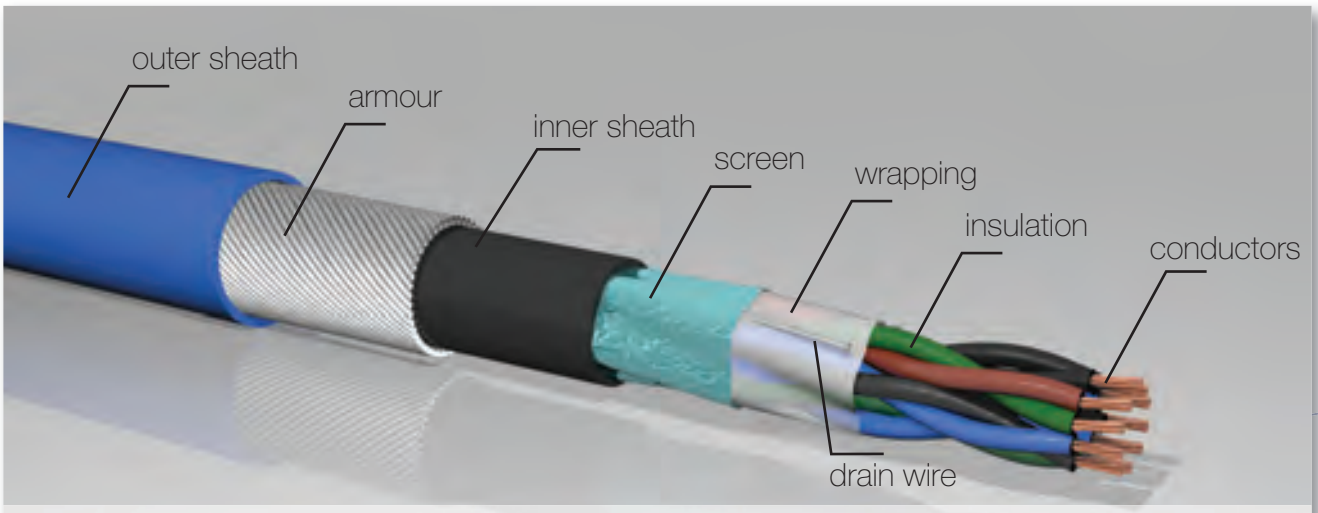

BS: CU/PE/OSCR/PE/SWA/PVC - **VDE**: 2Y(St)2YRY - **UNEL**: REXOHEFR

BS STANDARD

SPECIFICATIONS: in accordance with
BS 5308 PART 1 TYPE 2 - PE insulated

CONDUCTORS:
Solid (class 1), stranded (class2) or flexible (class 5)copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS/TRIPLES IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS 5308 part 1(Table 4).

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
Polyethylene bedding type 2C or 03 acc. to BS 6234, colour black. PVC flame retardant.

ARMOUR:
Mild galvanized steel wires acc. to BS EN10257-1.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655. Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018. Outer sheath additional characteristics: Minimum oxygen index: 30%.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS4066/ IEC60332 part 3 category C.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5

APPLICATIONS
These armoured cables are designed to connect electrical instrument circuits and to provide communication services in and around process plants. They are usually utilized in the petrochemical industry and they are also suitable for underground applications.

ON REQUEST
Steel tape or steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

MULTIPAIR ARMOURED CABLES WITH COLLECTIVE SCREEN

TYPE number of pairs/ triples x cross sect.	CONDUCTOR CONSTRUTION	INSULATION THICKNESS	NOMINAL DIAMETER UNDER ARMOUR	ARMOUR WIRE DIAMETER	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	mm	mm	Kg x Km
1P x 0.50	16 x 0.20	0.6	7.0	0.90	11.4	248
2PQ x 0.50	16 x 0.20	0.6	7.9	0.90	12.3	297
5P x 0.50	16 x 0.20	0.6	13.1	0.90	17.9	560
10P x 0.50	16 x 0.20	0.6	17.2	1.25	22.9	970
20P x 0.50	16 x 0.20	0.6	22.3	1.60	29.1	1640
1T x 0.50	16 x 0.20	0.6	7.3	0.90	11.7	269
1P x 0.75	24 x 0.20	0.6	7.3	0.90	11.7	280
2PQ x 0.75	24 x 0.20	0.6	8.3	0.90	12.9	332
5P x 0.75	24 x 0.20	0.6	14.3	1.25	19.8	750
10P x 0.75	24 x 0.20	0.6	18.7	1.60	25.3	1261
20P x 0.75	24 x 0.20	0.6	24.5	1.60	31.3	1890
1T x 0.75	24 x 0.20	0.6	7.7	0.90	12.1	298
1P x 1	1 x 1.13	0.6	7.4	0.90	11.8	293
2P(Q) x 1	1 x 1.13	0.6	8.4	0.90	13.0	345
5P x 1	1 x 1.13	0.6	14.2	1.25	19.7	790
10P x 1	1 x 1.13	0.6	18.4	1.25	24.4	1310
20P x 1	1 x 1.13	0.6	24.4	1.60	31.2	2037
1T x 1	1 x 1.13	0.6	7.7	0.90	12.3	310
1P x 1,5	7 x 0.53	0.6	8.3	0.90	12.9	331
2P(Q) x 1,5	7 x 0.53	0.6	9.7	0.90	14.3	420
5P x 1,5	7 x 0.53	0.6	16.4	1.25	22.1	942
10P x 1,5	7 x 0.53	0.6	21.6	1.60	28.4	1498
20P x 1,5	7 x 0.53	0.6	28.5	1.60	35.7	2397
1T x 1,5	7 x 0.53	0.6	8.9	0.90	13.5	351

P is for: Pair/s. (Q) is for: Quad formation. T is for: Triple.

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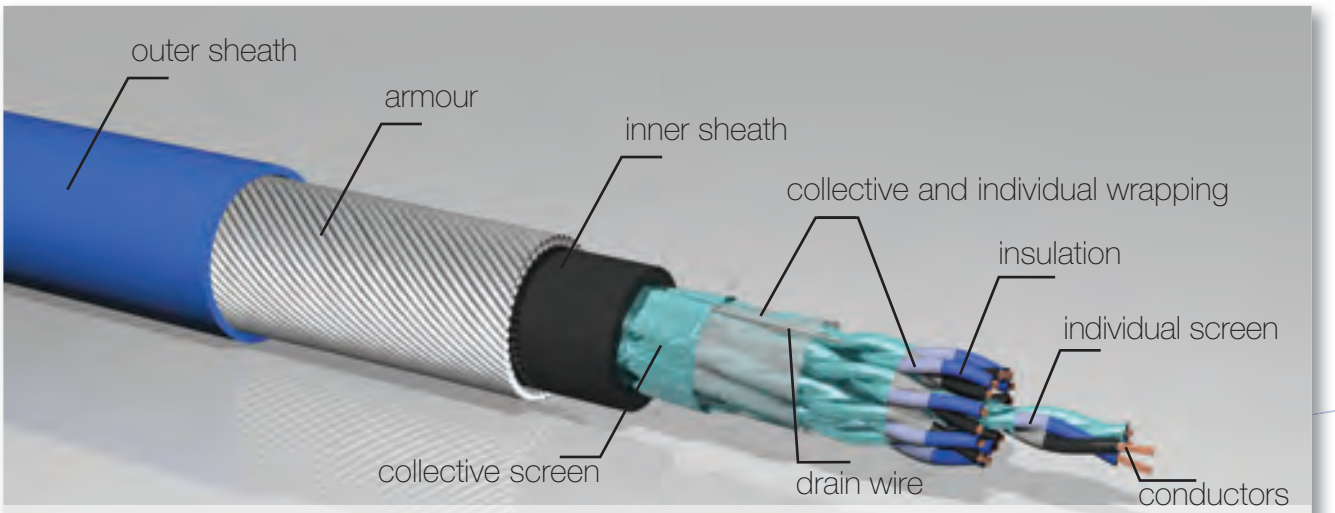


BS: CU/PE/ISCR/OSCR/PE/SWA/PVC - **VDE**: 2Y(St)2YRY PiMF - **UNEL**: REXHOHEFR

BS STANDARD

SPECIFICATIONS: in accordance with
BS 5308 PART 1 TYPE 2 - PE insulated

CONDUCTORS:
Solid (class 1), stranded (class 2) or flexible (class 5)copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS IDENTIFICATION BY COLOURS:
Pairs: black numbered - blue.
OR BS 5308 Part. 1 (Table 4).

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

SCREEN ISOLATION TAPE:
Numbered PETP tape applied over each individually screened pair.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
Polyethylene bedding type 2C or 03 acc. to BS 6234.
PVC flame retardant, black colour.

ARMOUR:
Mild galvanized steel wires acc to BS EN10257-1.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS7655.
Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.
Outer sheath additional characteristics:
Minimum oxygen index: 30%.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS4066/ IEC60332 part 3 category C.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5

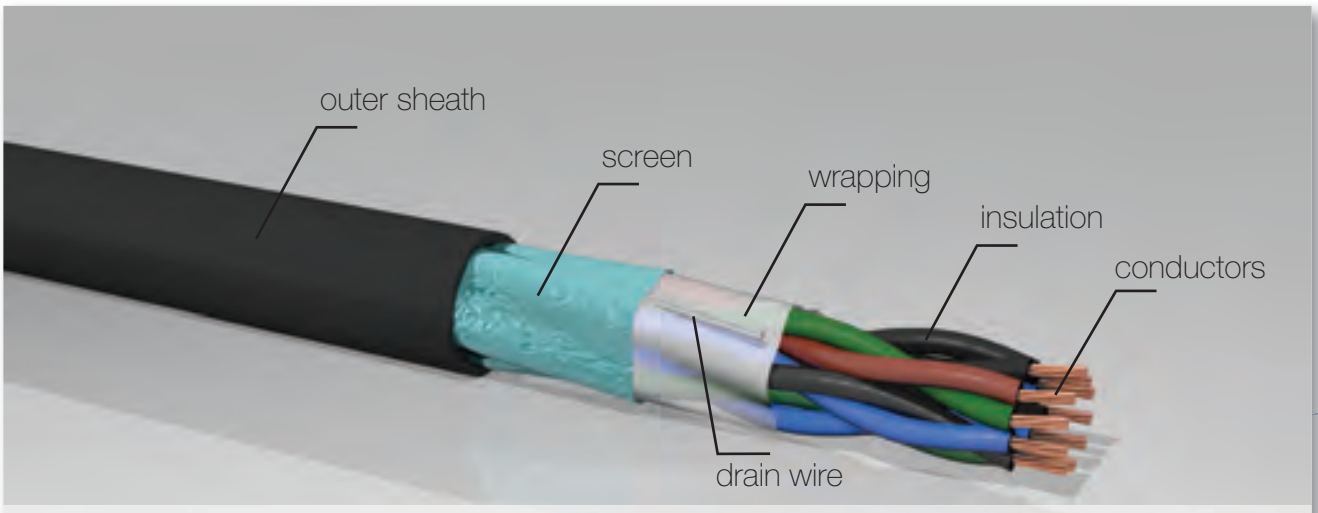
APPLICATIONS
These armoured cables are designed to connect electrical instrument circuits and to provide communication services in and around process plants. They are usually utilized in the petrochemical industry and they are also suitable for underground applications.

ON REQUEST
Steel tape or steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

MULTIPAIR ARMOURED CABLES WITH INDIVIDUAL AND COLLECTIVE SCREEN

TYPE number of pairs/ triples x cross sect. n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	NOMINAL DIAMETER UNDER ARMOUR mm	ARMOUR WIRE DIAMETER mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P x 0.50	16 x 0.20	0.6	12.0	0.90	16.8	462
5P x 0.50	16 x 0.20	0.6	15.2	1.25	20.9	761
10P x 0.50	16 x 0.20	0.6	21.1	1.60	27.9	1298
20P x 0.50	16 x 0.20	0.6	27.3	1.60	34.3	1871
2P x 0.75	24 x 0.20	0.6	12.8	0.90	17.6	497
5P x 0.75	24 x 0.20	0.6	16.3	1.25	22.0	921
10P x 0.75	24 x 0.20	0.6	22.7	1.60	29.5	1609
20P x 0.75	24 x 0.20	0.6	29.8	2.00	37.8	2422
2P x 1	1 x 1.13	0.6	12.8	0.90	17.6	516
5P x 1	1 x 1.13	0.6	16.2	1.25	21.9	952
10P x 1	1 x 1.13	0.6	22.6	1.60	29.7	1668
20P x 1	1 x 1.13	0.6	29.8	2.00	37.8	2540
2P x 1,5	7 x 0.53	0.6	14.7	1.25	20.4	730
5P x 1,5	7 x 0.53	0.6	18.8	1.60	25.4	1179
10P x 1,5	7 x 0.53	0.6	26.5	1.60	33.5	1820
20P x 1,5	7 x 0.53	0.6	34.4	2.00	42.6	3026

P is for: Pair/s.



BS: CU/PE/OSCR/LSZH - **VDE**: 2Y(St)H - **UNEL**: REXOHM1

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 1 TYPE 1 - PE / LSF

CONDUCTORS:
Stranded (class2) or flexible (class 5) copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS 5308 part 1(Table 4).

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
LSF outer sheath acc. to BS 6724 and tested in accordance with BS 6425 Part 1 (Tables 11 and 12). Sheath colour: Black RAL 9005.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category C.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-40°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6

APPLICATIONS
These cables are utilized in electrical instrument circuits to provide communication services in and around process plants. They are especially designed for use in areas where fire could create dense smoke and toxic fumes.These cables are not suitable for underground applications.

ON REQUEST
Fire resistant cables.
Core colours on request.

MULTIPAIR CABLES WITH COLLECTIVE SCREEN - LSZH

TYPE number of pairs x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
1P x 0,50	16 x 0.20	0.6	7.0	59
2P(Q) x 0,50	16 x 0.20	0.6	7.9	81
5P x 0,50	16 x 0.20	0.6	13.1	197
10P x 0,50	16 x 0.20	0.6	17.2	340
20P x 0,50	16 x 0.20	0.6	22.3	568
30P x 0,50	16 x 0.20	0.6	26.9	792
50P x 0,50	16 x 0.20	0.6	33.9	1270
1P x 0,75	24 x 0.20	0.6	7.3	75
2P(Q) x 0,75	24 x 0.20	0.6	8.3	105
5P x 0,75	24 x 0.20	0.6	14.3	250
10P x 0,75	24 x 0.20	0.6	18.7	448
20P x 0,75	24 x 0.20	0.6	24.5	919
30P x 0,75	24 x 0.20	0.6	29.5	1201
50P x 0,75	24 x 0.20	0.6	37.4	1920
1P x 1	7 x 0.53	0.6	8.3	100
2P(Q) x 1	7 x 0.53	0.6	9.7	151
5P x 1	7 x 0.53	0.6	16.4	360
10P x 1	7 x 0.53	0.6	21.6	670
20P x 1	7 x 0.53	0.6	28.5	1227
30P x 1	7 x 0.53	0.6	34.3	1730
50P x 1	7 x 0.53	0.6	43.6	2698

P is for: Pair/s. (Q) is for: Quad formation.

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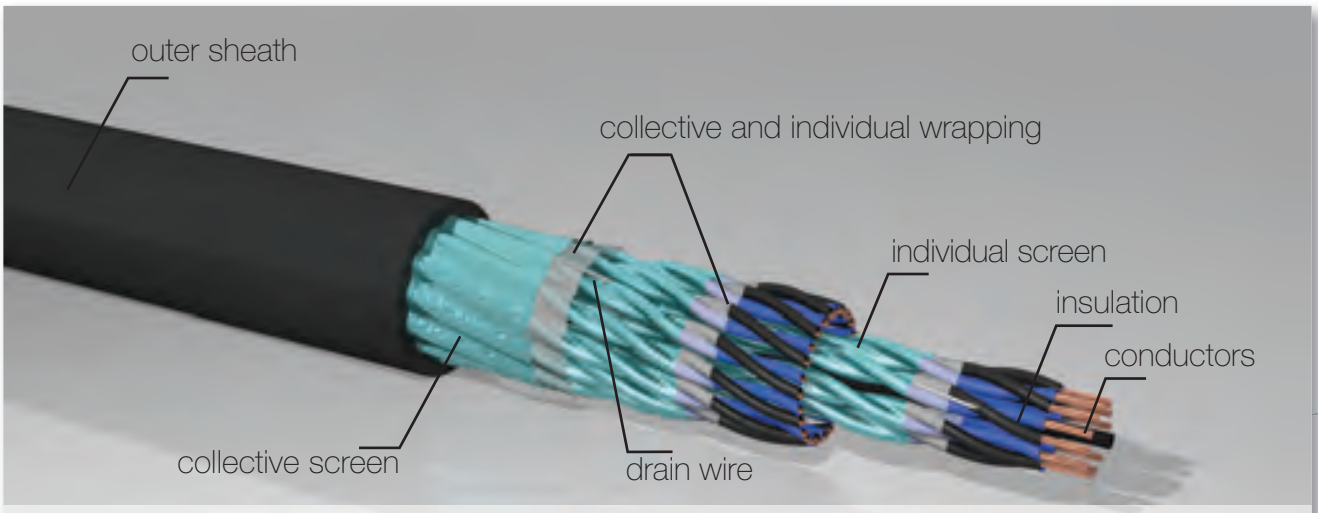

BS: CU/PE/ISCR/OSCR/LSZH - **VDE**: 2Y(St)H PIMF - **UNEL**: REXHOHM1

BS STANDARD

SPECIFICATIONS: in accordance with
BS 5308 PART 1 TYPE 1 - PE / LSF

CONDUCTORS:
Stranded (class2) or flexible (class 5) copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS IDENTIFICATION BY COLOURS:
Pairs: black numbered - blue.
OR BS 5308 Part 1 (Table 4).

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down.

SCREEN ISOLATION TAPE:
Numbered PETP tape applied over each individually screened pair.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
LSF outer sheath acc. to BS 6724 and tested in accordance with BS 6425 Part 1 (Tables 11 and 12).
Sheath colour: Black RAL 9005.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category C (NMV1.5)

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-40°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6

APPLICATIONS
These control and instrumentation cables are utilized in process plants to connect electrical instrument circuits and provide communication services. They are ideal for use in areas where fire could create dense smoke and toxic fumes but they are not suitable for underground applications.

ON REQUEST
Fire resistant cables.
Core colours on request.

MULTIPAIR CABLES WITH INDIV. AND COLLECTIVE SCREEN - LSZH

TYPE number of pairs x cross section	CONDUCTOR CONSTRUCTION	INSULATION THICKNESS	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	Kg x Km
2P x 0,50	16 x 0.20	0.6	12.0	159
5P x 0,50	16 x 0.20	0.6	15.2	250
10P x 0,50	16 x 0.20	0.6	21.1	478
20P x 0,50	16 x 0.20	0.6	27.3	780
30P x 0,50	16 x 0.20	0.6	32.3	1098
50P x 0,50	16 x 0.20	0.6	41.7	1590
2P x 0,75	24 x 0.20	0.6	12.8	187
5P x 0,75	24 x 0.20	0.6	16.3	270
10P x 0,75	24 x 0.20	0.6	22.7	550
20P x 0,75	24 x 0.20	0.6	29.8	963
30P x 0,75	24 x 0.20	0.6	35.5	1320
50P x 0,75	24 x 0.20	0.6	45.0	2119
2P x 1,5	7 x 0.53	0.6	14.7	251
5P x 1,5	7 x 0.53	0.6	18.8	400
10P x 1,5	7 x 0.53	0.6	26.5	807
20P x 1,5	7 x 0.53	0.6	34.4	1399
30P x 1,5	7 x 0.53	0.6	41.0	2044
50P x 1,5	7 x 0.53	0.6	52.2	3250

P is for: Pair/s.

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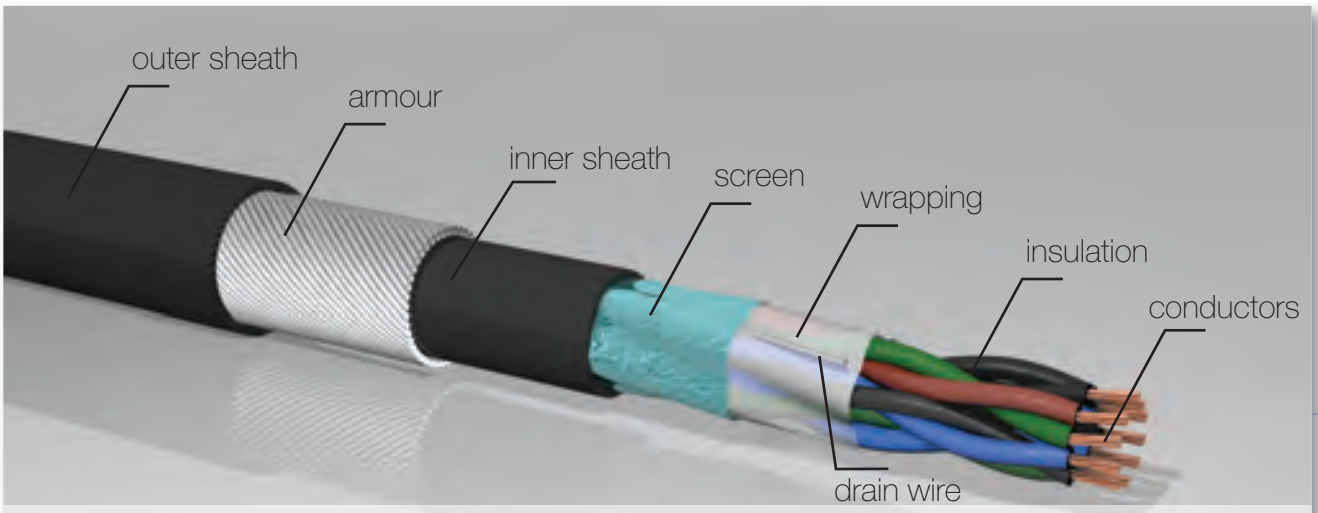

BS: CU/PE/OSCR/LSZH/SWA/LSZH - **VDE**: 2Y(St)HRH - **UNEL**: REXOHM1FM1

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 1 TYPE 2 - PE / LSF

CONDUCTORS:
Stranded (class2) or flexible (class 5) copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS 5308 part 1(Table 4)

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
LSF inner sheath acc. to BS 6724 and tested in accordance with BS 6425 Part 1 (Tables 11 and 12). Colour: black.

ARMOUR:
Mild galvanized steel wires acc. to BS EN10257-1.

OUTER SHEATH:
LSF outer sheath acc. to BS 6724 and tested in accordance with BS 6425 Part 1 (Tables 11 and 12). Sheath colour: Black RAL 9005.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category C (NMV1.5). Will also meet BS4066/ IEC60332 part 3 category A (NMV7).

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-40°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5

APPLICATIONS
These armoured cables are designed to connect electrical instrument circuits and to provide communication service in and around process plants. These cables are suitable for direct burial applications and are utilized in areas where fire could create dense smoke and toxic fumes. They are ideal for the petrochemical industry.

ON REQUEST
Steel tape or steel wires braid armour.
Fire resistant cables.
Core colours on request.

MULTIPAIR ARMOURED CABLES WITH COLLECTIVE SCREEN - LSZH

TYPE number of pairs/ triples x cross sect.	CONDUCTOR CONSTRUCTION	INSULATION THICKNESS	NOMINAL DIAMETER UNDER ARMOUR	ARMOUR WIRE DIAMETER	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	mm	mm	Kg x Km
P x 0,50	16 x 0.20	0.6	7.0	0.90	11.4	249
2P(Q)x0,50	16 x 0.20	0.6	7.9	0.90	12.3	297
5P x 0,50	16 x 0.20	0.6	13.1	0.90	17.9	561
10P x 0,50	16 x 0.20	0.6	17.2	1.25	22.9	970
20P x 0,50	16 x 0.20	0.6	22.3	1.60	29.1	1640
30P x 0,50	16 x 0.20	0.6	26.9	1.60	33.9	2345
50P x 0,50	16 x 0.20	0.6	33.9	2.00	42.1	3683
1P x 0,75	24 x 0.20	0.6	7.3	0.90	11.7	278
2P(Q)x0,75	24 x 0.20	0.6	8.3	0.90	12.9	333
5P x 0,75	24 x 0.20	0.6	14.3	1.25	19.8	751
10P x 0,75	24 x 0.20	0.6	18.7	1.60	25.3	1260
20P x 0,75	24 x 0.20	0.6	24.5	1.60	31.3	1888
30 x 0,75	24 x 0.20	0.6	29.5	2.00	37.5	2682
50P x 0,75	24 x 0.20	0.6	37.4	2.00	45.8	4224
1P x 0,75	7 x 0.53	0.6	8.4	0.90	12.9	372
2P(Q)x0,75	7 x 0.53	0.6	9.7	0.90	14.3	468
5P x 0,75	7 x 0.53	0.6	16.4	1.25	22.1	1063
10P x 0,75	7 x 0.53	0.6	21.6	1.60	28.4	1181
20P x 0,75	7 x 0.53	0.6	28.5	1.60	35.7	2650
30P x 0,75	7 x 0.53	0.6	43.3	2.00	42.5	3454
50P x 0,75	7 x 0.53	0.6	43.6	2.50	53.4	5499

P is for: Pair/s. (Q) is for: Quad formation.

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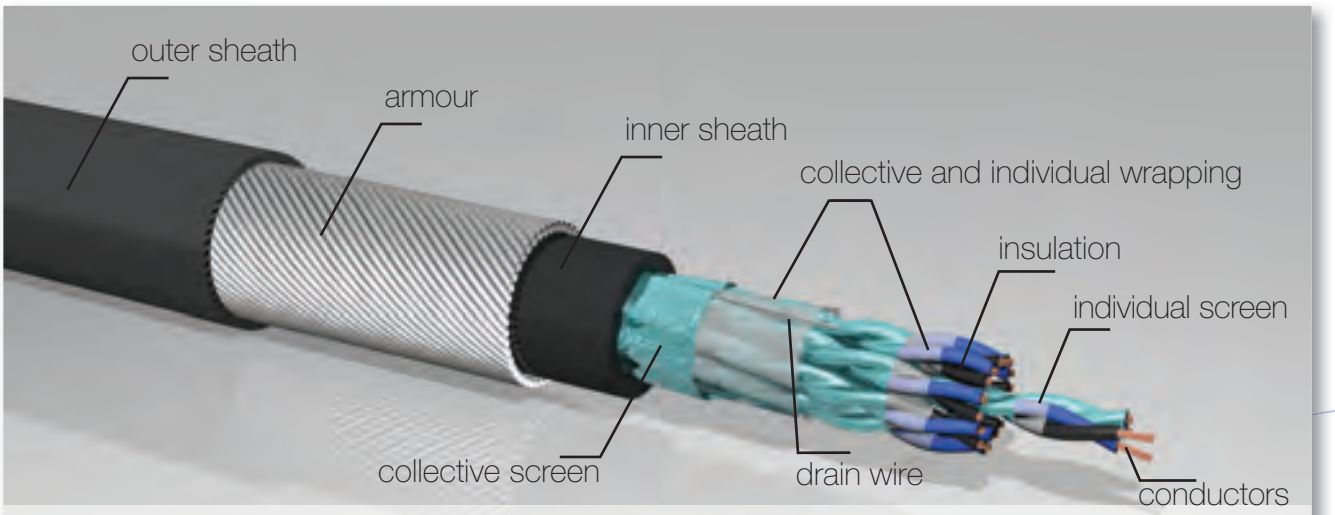

BS: CU/PE/ISCR/OSCR/LSZH/SWA/LSZH - **VDE**: 2Y(St)HRH - PIMF - **UNEL**: REHM1FM1

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 1 TYPE 2 - PE / LSF

CONDUCTORS:
Stranded (class2) or flexible (class 5) copper wires according to BS 6360.

INSULATION:
Polyethylene insulation type 03 acc. to BS 6234.

PAIRS IDENTIFICATION BY COLOURS:
Pairs: black numbered - blue.

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down.

SCREEN ISOLATION TAPE:
Numbered PETP tape applied over each individually screened pair.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
LSF inner sheath acc. to BS 6724/ BS 6425 Part 1(Tables 11 and 12). Colour: black.

ARMOUR:
Mild galvanized steel wires acc. to BS EN10257-1.

OUTER SHEATH:
LSF outer sheath acc. to BS 6724/ BS 6425 (Tables 11 and 12) Sheath colour: Black RAL 9005.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category C (NMV1.5). Will also meet BS 4066/ IEC 60332 part 3 category A (NMV7).

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-40°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5

APPLICATIONS
These armoured cables are designed to connect electrical instrument circuits and to provide communication service in and around process plants. These cables are suitable for direct burial applications and are utilized in areas where fire could create dense smoke and toxic fumes. They are ideal for the petrochemical industry.

ON REQUEST
Steel tape or steel wires braid armour.
Fire resistant cables.
Core colours on request.

MULTIPAIR ARMOURED CABLES WITH INDIV. AND COLLECTIVE SCREEN - LSZH

TYPE number of pairs/ triples x cross sect. n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	NOMINAL DIAMETER UNDER ARMOUR mm	ARMOUR WIRE DIAMETER mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P x 0,50	16 x 0.20	0.6	12.0	0.90	16.8	458
5P x 0,50	16 x 0.20	0.6	15.2	1.25	20.9	760
10P x 0,50	16 x 0.20	0.6	21.1	1.60	27.9	1297
20P x 0,50	16 x 0.20	0.6	27.3	1.60	34.3	1872
30P x 0,50	16 x 0.20	0.6	32.3	2.00	40.5	2721
50P x 0,50	16 x 0.20	0.6	41.7	2.50	51.5	4700
2P x 0,75	24 x 0.20	0.6	12.8	0.90	17.6	499
5P x 0,75	24 x 0.20	0.6	16.3	1.25	22.0	920
10P x 0,75	24 x 0.20	0.6	22.7	1.60	29.5	1610
20P x 0,75	24 x 0.20	0.6	29.8	2.00	37.8	2417
30P x 0,75	24 x 0.20	0.6	35.3	2.00	43.9	3130
50P x 0,75	24 x 0.20	0.6	45.0	2.50	55.0	4920
2P x 1,5	7 x 0.53	0.6	14.7	1.25	20.4	730
5P x 1,5	7 x 0.53	0.6	18.8	1.60	25.4	1178
10P x 1,5	7 x 0.53	0.6	26.5	1.60	33.5	1820
20P x 1,5	7 x 0.53	0.6	34.4	2.00	42.6	3033
30P x 1,5	7 x 0.53	0.6	41.0	2.50	50.8	4591
50P x 1,5	7 x 0.53	0.6	52.2	2.20	62.6	6190

P is for: Pair/s.

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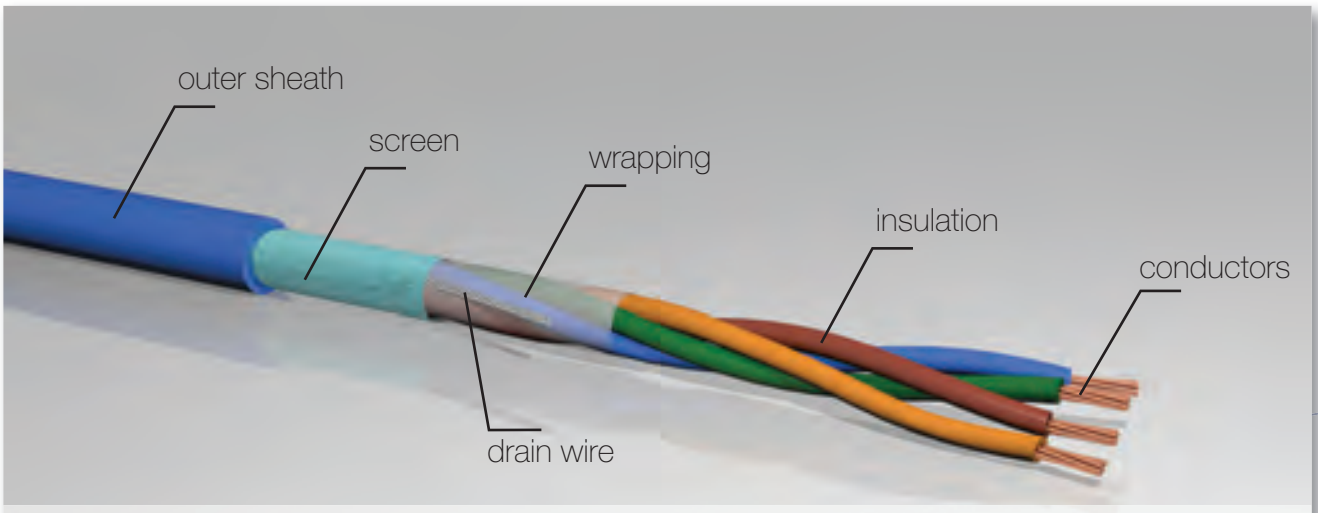

BS: CU/PVC/OSCR/PVC - **VDE:** Y(St)Y - **UNEL:** RR2OHR

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 2 TYPE 1 - PVC insulated

CONDUCTORS:
Solid (class 1), stranded (class2) or flexible (class 5) copper wires according to BS 6360.

INSULATION:
PVC insulation in acc. to BS 6346.

PAIRS IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS 5308 part 2 (Table 5).

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655.
Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part1/part 3.

VOLTAGE RATING:
300/500V.

WORKING TEMPERATURE:
-30° C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6

APPLICATIONS
These PVC insulated cables are utilized in electrical instrument circuits to provide communication services. They can be used in areas where fire could create dense smoke and toxic fumes.

ON REQUEST
Halogen-free materials.
Fire resistant cables.
Core colours on request.

PVC INSULATED MULTIPAIR CABLES WTH COLLECTIVE SCREEN

TYPE number of pairs x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P(Q) x 0,75	7 x 0.37	0,8	6,7	75
3P x 0,75	7 x 0.37	0,8	7	88
4P x 0,75	7 x 0.37	0,8	7,7	110
6P x 0,75	7 x 0.37	0,9	9,3	145
10P x 0,75	7 x 0.37	1,1	12	225
12P x 0,75	7 x 0.37	1,1	12,4	250
20P x 0,75	7 x 0.37	1,1	15,3	390
40P x 0,75	7 x 0.37	1,1	20,2	690
2P(Q) x 1,50	7 x 0,53	0,8	7,5	90
3P x 1,50	7 x 0,53	0,9	8,2	120
4P x 1,50	7 x 0,53	0,9	8,9	150
6P x 1,50	7 x 0,53	1,1	10,9	220
10P x 1,50	7 x 0,53	1,2	13,8	330
12P x 1,50	7 x 0,53	1,2	14,3	370
20P x 1,50	7 x 0,53	1,3	17,7	580
40P x 1,50	7 x 0,53	1,5	23,6	1080

P is for: Pair/s. (Q) is for: Quad formation.

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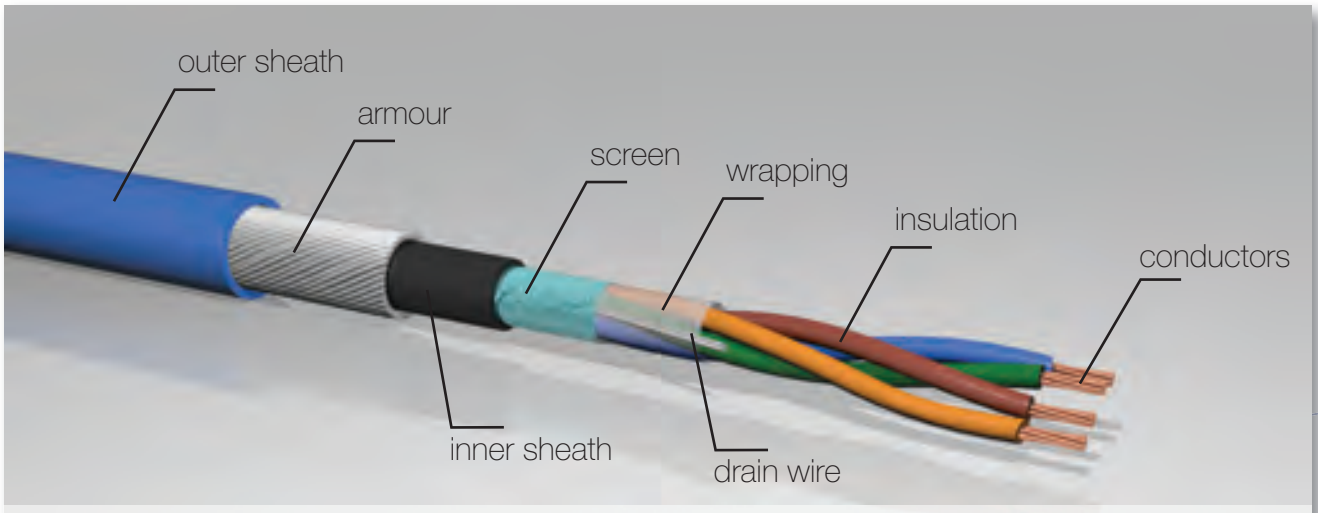

BS: CU/PVC/OSCR/PVC/SWA/PVC - **VDE**: Y(St)YRY - **UNEL**: RR2XOHRFR

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 2 TYPE 2 - PVC insulated

CONDUCTORS:
Solid (class 1), stranded (class2) or flexible (class 5) copper wires according to BS 6360.

INSULATION:
PVC insulation acc. to BS 6346. Cores identification by colours: Colours coded in accordance with BS 5308 part 2 (Table 5).

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath acc. to BS 7655. Colour: black.

ARMOUR:
Mild galvanized steel wires to BS EN 10257-1.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655. Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category A.

VOLTAGE RATING:
300/500V.

WORKING TEMPERATURE:
-30° C up to +70°C.

MINIMUM BENDING RADIUS
Cable outer diameter x 8 / 8,5

APPLICATIONS
These armoured and PVC insulated cables are utilized in electrical instrument circuits to provide communication services. They can be used in areas where fire could create dense smoke and toxic fumes.

ON REQUEST
Steel tape or steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

PVC INSUL. MULTIPAIR ARMOURED CABLES WITH COLLECTIVE SCREEN

TYPE number of pairs x cross section	CONDUCTOR CONSTRUCTION	NOMINAL DIAMETER UNDER ARMOUR	ARMOUR WIRE DIAMETER	OUTHER SHEATH THICKNESS	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	mm	mm	Kg x Km
2P(Q)x 0,75	7 x 0,37	6,7	0,9	1,3	11,1	180
3P x 0,75	7 x 0,37	7,1	0,9	1,3	11,5	210
4P x 0,75	7 x 0,37	7,7	0,9	1,4	12,3	240
6P x 0,75	7 x 0,37	9,3	0,9	1,4	13,9	310
10P x 0,75	7 x 0,37	12	0,9	1,5	16,8	450
12P x 0,75	7 x 0,37	12,4	0,9	1,5	17,2	490
20P x 0,75	7 x 0,37	15,3	1,25	1,6	20,9	710
40P x 0,75	7 x 0,37	20,3	1,60	1,8	27	1190
2P(Q) x 1,50	7 x 0,53	7,5	0,9	1,4	12,1	230
3P x 1,50	7 x 0,53	8,2	0,9	1,4	12,8	270
4P x 1,50	7 x 0,53	8,9	0,9	1,4	13,5	310
6P x 1,50	7 x 0,53	10,9	0,9	1,4	15,5	410
10P x 1,50	7 x 0,53	13,8	1,25	1,6	19,4	620
12P x 1,50	7 x 0,53	14,3	1,25	1,6	20	680
20P x 1,50	7 x 0,53	17,6	1,60	1,7	24,3	1000

P is for: Pair/s. (Q) is for: Quad formation.

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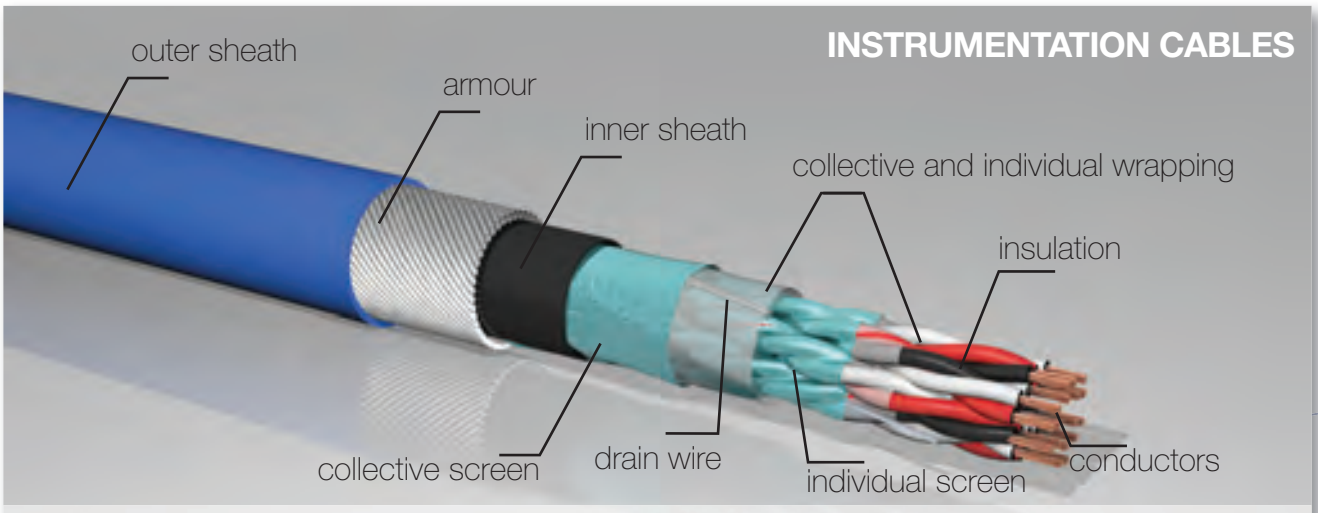


BS: CU/PVC/ISCR/OSCR/PVC/SWA/PVC - **VDE**: Y(St)YRY PiMF - **UNEL**: FR2XHOHRFR

BS STANDARD

SPECIFICATIONS: in accordance with
BS 5308 PART 2 TYPE 2 - PVC insulated

CONDUCTORS:
Stranded (class2) copper conductors wires according to BS 6360.

INSULATION:
PVC insulation acc. to BS 6346.

TRIPLES IDENTIFICATION BY COLOURS:
Red, white numbered, black.

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath acc. to BS 7655.
Colour: black.

ARMOUR:
Mild galvanized steel wires acc.to BS EN10257-1.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655.
Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332.part 3 category A.

VOLTAGE RATING:
300/500V.

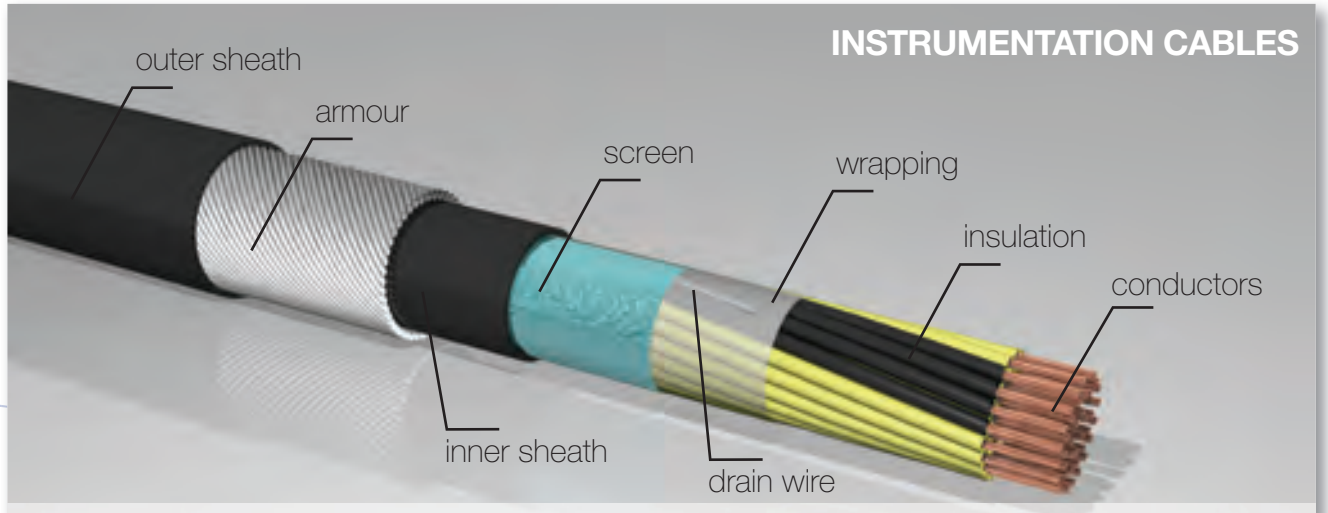
OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5.

APPLICATIONS
These armoured and PVC insulated cables are utilized in electrical instrument circuits to provide communication services. They can be used in areas where fire could create dense smoke and toxic fumes.

ON REQUEST
Steel tape or steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

INSTRUMENTATION CABLES



BS: CU/PVC/OSCR/PVC/SWA/PVC - **VDE**: Y(St)YRY - **UNEL**: FR2OHRFR

SPECIFICATIONS: in accordance with
BS 5308 PART 2 TYPE 2 - PVC insulated

CONDUCTORS:
Stranded (class2) copper wires according to BS 6360.

INSULATION:
PVC insulation acc. to BS 6346.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS5308 part 2.(Table 5)

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath acc. to BS 7655.
Inner sheath colour: black.

ARMOUR:
Mild galvanized steel wires acc. to BS EN10257-1.

OUTER SHEATH:
PVC outer sheath type TM1 according to BS 7655.
Sheath colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332.part 3 category A.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5

APPLICATIONS
These armoured and PVC insulated cables are utilized in electrical instrument circuits to provide communication services. They can be used in areas where fire could create dense smoke and toxic fumes.

ON REQUEST
Steel tape or steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

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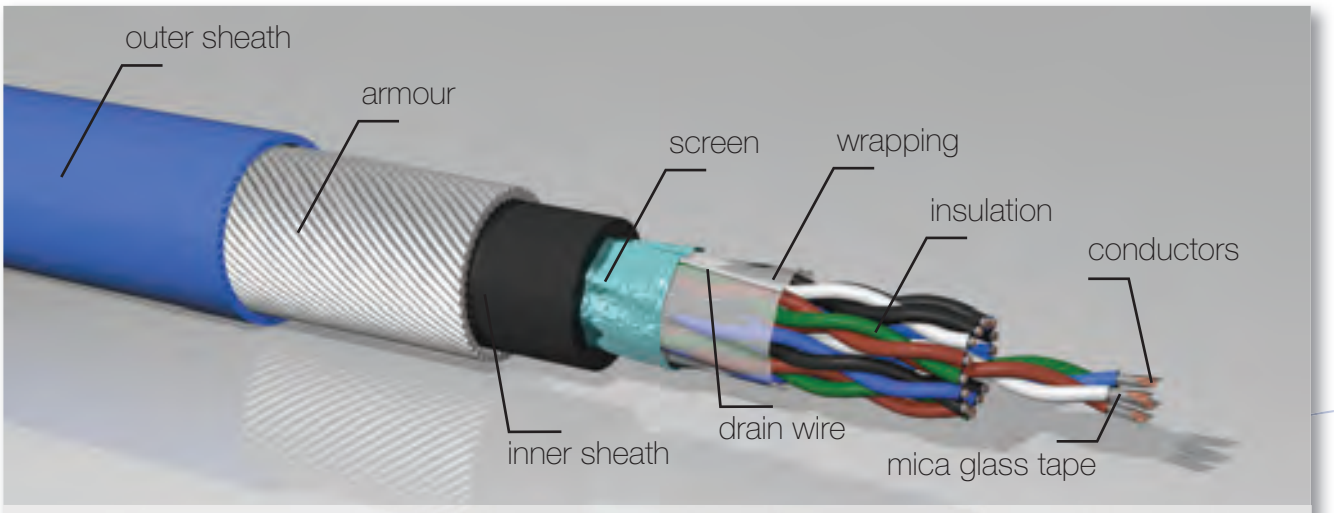

BS: CU/MGT/XLPE/OSCR/LSZH/SWA/LSZH - **VDE**: MGT/2X(St)HRH - **UNEL**: FTE4XOHM1FM1

BS STANDARD

SPECIFICATIONS: Acc. to BS 5308 PART 1 TYPE 2 - XLPE / LSF

Also meets relevant Cooper Energy Service specifications.

CONDUCTORS:
Stranded (class 2) or flexible (class 5) copper wires according to BS 6360.

FLAME PROTECTION:
Mica glass tape, with a tickness > 0,10 mm.

INSULATION:
XLPE type GP8 acc. to BS 7655.
Pairs/Triples identification by colours: Colours coded in accordance with BS 5308 part 1. (Table 4)

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
LSF inner sheath type LTS1 acc. to BS 6724/BS 6425.

ARMOUR:
Mild galvanized steel wires acc. to BS EN10257-1.

OUTER SHEATH:
LSF outer sheath type LTS1 acc. to BS 6724 LSF and tested in accordance with BS 6425 Part 1 (Tables 11 and 12).
Sheath colour: Black RAL 9005, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 3 category A. Fire resistant acc. to IEC 60331. (Table 10)

VOLTAGE RATING:
300/500V

OPERATING TEMPERATURE:
-40°C up to +90°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5.

APPLICATIONS
Suitable for the petrochemical industry, these armoured cables are designed to connect electrical instrument circuits and to provide communication services. These cables are essential to maintain circuit integrity when exposed to fire and where life can be endangered by smoke and toxic fumes. They are fire resistant.

ON REQUEST
Steel tape or steel wires braid armour.
Core colours on request.

MULTIPAIR ARMOURED CABLES WITH COLLEC. SCREEN - LSZH, FIRE RESITANT

TYPE number of pairsx cross section	CONDUCTOR CONSTRUCTION	NOMINAL DIAMETER UNDER ARMOUR	ARMOUR WIRE DIAMETER	OUTHER SHEATH THICKNESS	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	mm	mm	Kg x Km
1P x 1,5	7 x 0.53	0.6	8.7	0.9	13.3	335
2P(Q) x 1,5	7 x 0.53	0.6	10.1	0.9	14.7	417
5P x 1,5	7 x 0.53	0.6	17.7	1.6	20.9	1126
10P x 1,5	7 x 0.53	0.6	24.0	1.6	31.0	1695
1T x 1,5	7 x 0.53	0.6	9.2	0.9	13.8	373
1P x 2,5	7 x 0.67	0.7	10.0	0.9	14.6	396
2P(Q) x 2,5	7 x 0.67	0.7	11.8	0.9	16.6	533
5P x 2,5	7 x 0.67	0.7	20.9	1.6	27.7	1424

P is for: Pair/s. (Q) is for: Quad formation. T is for: Triple.

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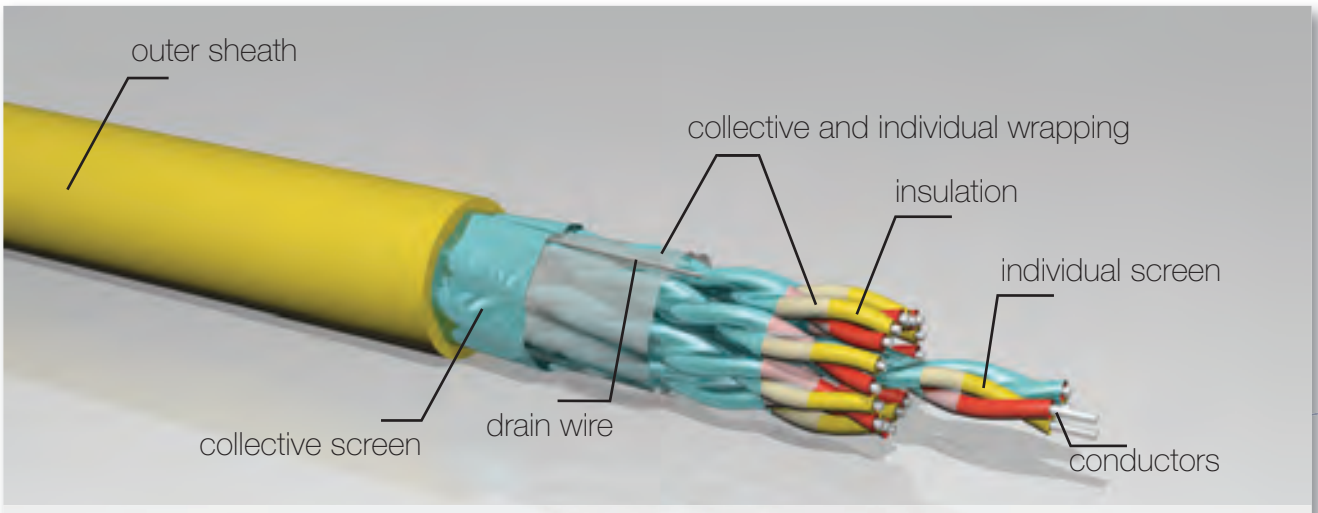

BS: NICR-NI/PVC/ISCR/OSCR/PVC - **VDE**: Y(St)Y PiMF - **UNEL**: UR2XHOHR

BS STANDARD

SPECIFICATIONS: in accordance with BS 5308 PART 2 TYPE 1 - PVC insulated

CONDUCTORS:
Solid NiCr/Ni conductors (KX) acc. to BS 6360.

INSULATION:
PVC insulation acc. to BS 6346.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with ANSI MC 96.1 (Table 6). Positive: yellow. Negative: red (numbered for multipair).

INDIVIDUAL SCREEN:
Tinned copper drain wire 20 AWG under and in contact with AL/PETP laminated tape applied metallic side down.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire 20 AWG under and in contact with AL/PETP laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath acc. to BS 7655. Sheath colour: Yellow RAL 1021, acc. to ANSI MC 96.1 (Table 6).

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part1.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30° C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 6.

APPLICATIONS
These thermocouple cables are utilized to connect different type of termocouples in industrial plants as refineries, oil and petrol plants. They are suitable for chemical and petrochemical environments.

ON REQUEST
Conductors: Jx-Tx-Vx-Wx-Sx-Rx.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

THERMOCOUPLE CABLES WITH INDIV. AND COLLECTIVE SCREEN

TYPE number of pairs x cross section n x mm²	AWG SIZE	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
1P	16	0,8	7,4	90
2P	20	0,9	10,2	140
5P	20	1,2	13,5	280
10P	20	1,2	18,6	490
15P	20	1,3	21,5	690
20P	20	1,3	23,9	870
30P	20	1,5	28,8	1270
50P	20	2	37,6	2110

P is for: Pair/s.

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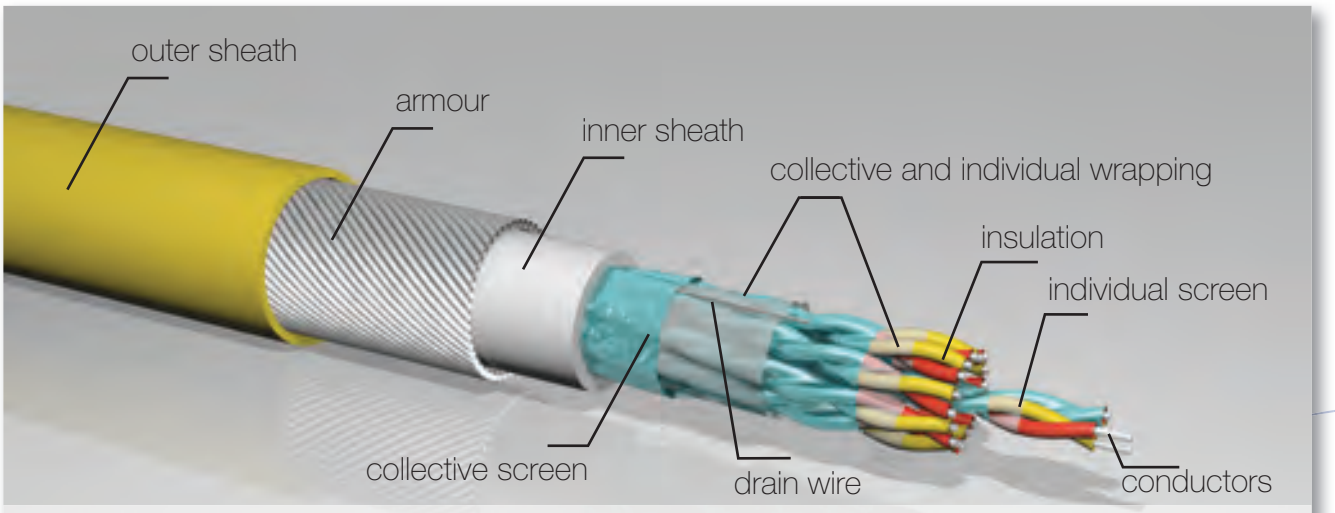

BS: NICR-NI/PVC/ISCR/OSCR/PVC/SWA/PVC - **VDE**: Y(St)YRY PiMF - **UNEL**: UR2XHOHRFR

BS STANDARD

SPECIFICATIONS: in accordance with
BS 5308 PART 2 TYPE 2 - PVC insulated

CONDUCTORS:
Solid NiCr/Ni conductors (KX) acc. to BS 6360.

INSULATION:
PVC insulation acc. to BS 7655.

CORES IDENTIFICATION BY COLOURS:
Colours coded in accordance with ANSI MC 96.1.(Table 6)
Positive: yellow. Negative: red (numbered for multipair).

INDIVIDUAL SCREEN:
Tinned copper drain wire 20 AWG under and in contact with AL/PETP laminated tape applied metallic side down.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire 20 AWG under and in contact with AL/PETP laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath acc. to BS 7655.

ARMOUR:
Mild galvanized steel wires acc. to BS 1442.

OUTER SHEATH:
PVC outer sheath acc. to BS 7655.
Sheath colour: Yellow RAL 1021, acc. to ANSI MC 96.1 (Table 6)

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066/ IEC 60332 part 1.

VOLTAGE RATING:
300/500V.

OPERATING TEMPERATURE:
-30° C up to +70°C.

MINIMUM BENDING RADIUS:
Cable outer diameter x 8 / 8,5.

APPLICATIONS
These thermocouple cables are utilized to connect different type of termocouples in industrial plants as refineries, oil and petrol plants. They are suitable for chemical and petrochemical environments. These armoured cables are also suitable for direct burial applications.

ON REQUEST
Conductors: Jx-Tx-Vx-Wx-Sx-Rx.
Steel tape or steel wires braid armour.
Halogen-free materials.
Fire resistant cables.
Core colours on request.

THERMOCOUPLE ARMOURED CABLES WITH INDIV. AND COLLECTIVE SCREEN

TYPE number of pairsx cross section n x mm²	AGW SIZE	NOMINAL DIAMETER UNDER ARMOUR mm	ARMOUR WIRE DIAMETER mm	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
1P	16	7,4	0,9	1,3	11,6	210
2P	20	10,2	0,9	1,4	14,6	310
5P	20	13,5	1,2	51,5	18,9	550
10P	20	18,6	1,2	51,7	24,4	900
15P	20	21,5	1,6	1,7	28,1	1210
20P	20	23,9	1,6	1,8	30,7	1490
30P	20	28,8	1,6	1,9	35,7	2090
50P	20	37,6	2	2,2	45,9	3410

P is for: Pair/s

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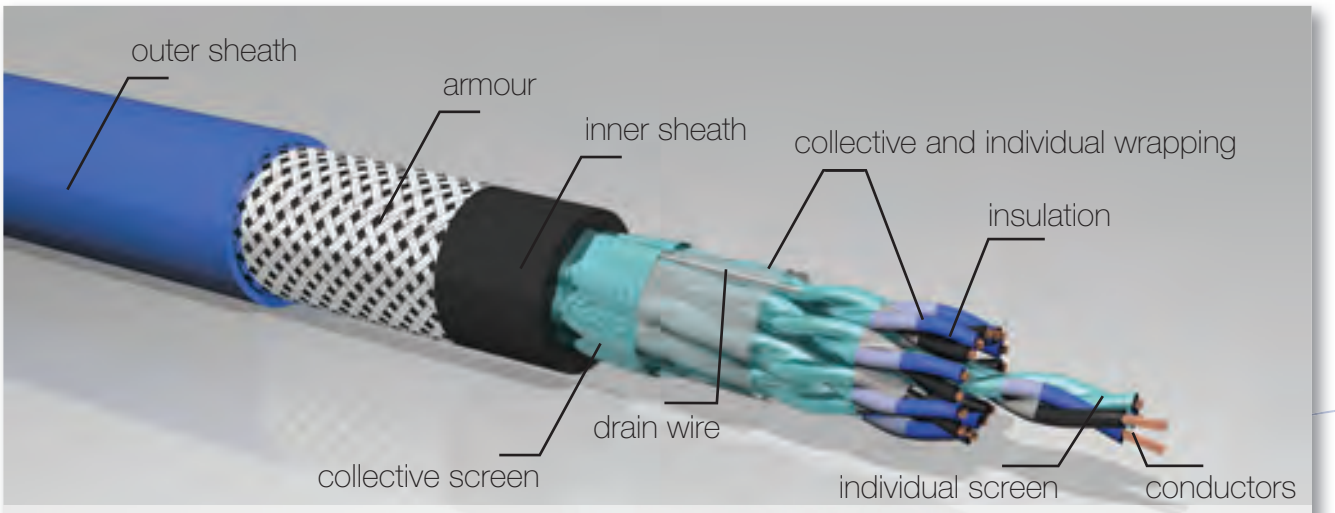

BS: TCU/GP4/IS/OS/SW4/GSWB/SW4 - **IEC**: TCU/EPR/ISCR/OSCR/SHF2/GSWB/SHF2

BS STANDARD

SPECIFICATIONS: in accordance with BS 6883 OR IEC 60092.376/375

CONDUCTORS:
Stranded tinned copper wires (class 2) according to BS 6360/IEC 60228.

INSULATION EPR/GP4:
EPR/GP4 type acc. to BS 7655/IEC 600923.

PAIRS/TRIPLES IDENTIFICATION BY COLOURS:
Pairs: black - white.
Triples: black numbered - white - red.

INDIVIDUAL AND COLLECTIVE WRAPPING:
Polyester tape 50% overlap acc. to MEU standards.

INDIVIDUAL SCREEN:
7x0.30mm Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down with a tickness of 25/23 µm, acc. to MEU standards.

COLLECTIVE SCREEN:
7x0.30mm Tinned copper drain wire under and in contact with AL/PETP laminated tape applied metallic side down with a tickness of 50/36 µm, acc. to MEU standards.

INNER SHEATH:
EVA COMPOUND type SW4/SHF2 acc. to BS 7655/IEC 60092.359.

ARMOUR:
Mild galvanized steel wires braid, 80% covering.

OUTER SHEATH:
EVA COMPOUND type SW4/SHF2 acc. to BS 7655/IEC 60092.359.
Sheat Colour: Blue RAL 5015, Black RAL 9005, Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to BS 4066 - IEC 60332-3.

VOLTAGE RATING:
150/250V or 600/1000V.

ELECTRIC RESISTANCE:
Acc. to BS 6360 or IEC 60228.

HALOGEN FREE:
IEC 60754-1.... -2

SMOKE EMISSION:
IEC 61034-2.... -2

MINIMUM BENDING RADIUS:
Cable outer diameter x 6/8.

APPLICATIONS
Armoured control and instrumentation cables for fixed wiring on ships and in mobile offshore units (e.g. drilling rings, oil platforms, etc.). For use in regularly occupied areas such as accomodation facilities, control rooms and computer suites. Any application where life may be endangered by smoke and noxious fumes and where vital, sensitive equipment may be damaged by acid forming gases. According to BS 6883 or IEC 60092.376/375.

ON REQUEST
Fire resistant: IEC 60331.
Armour with steel wires and steel tape.
Overall screen.
Core colour on request.

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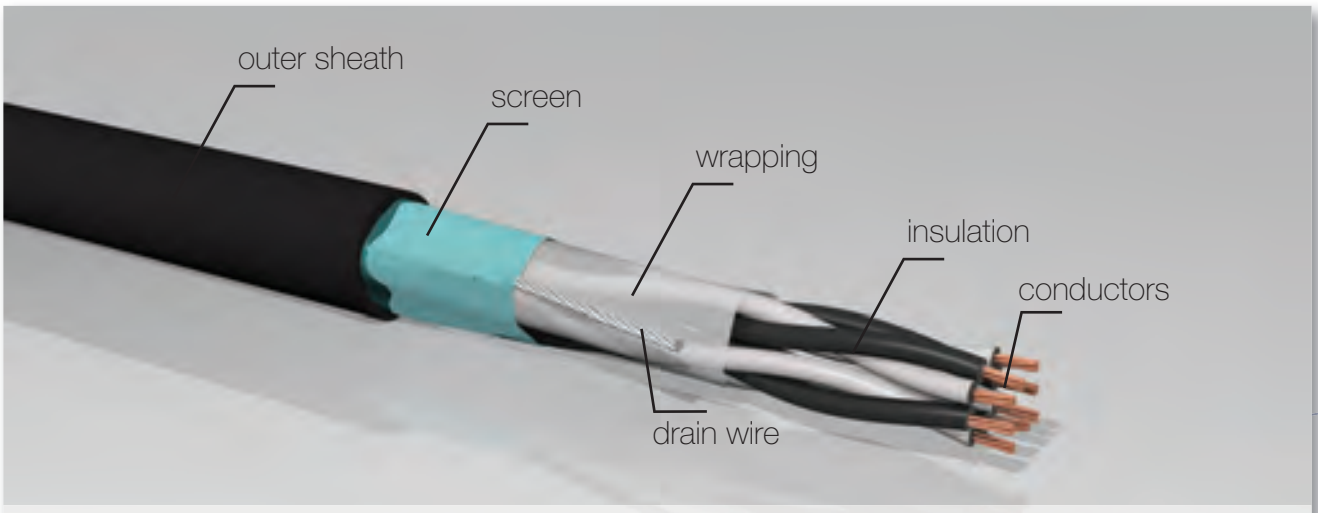

VDE: 2Y(St)Y - **BS**: CU/PE/OSCR/PVC - **UNEL**: REXOHR

SPECIFICATIONS: in accordance with **VDE 0815/0816**

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
Polyethylene insulation compound type 2YI1 acc.to VDE 0207.
PVC insulation compound type YI1 acc.to VDE 0207.

PAIRS IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Black RAL 9005, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1.

INSULATION RESISTANCE:
PE insulation: ≥5000MΩ × km.
PVC insulation: ≥100MΩ × km.

VOLTAGE RATING:
300/500V.

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These instrumentation cables are ideal for the transmission of analogue and digital signals.They are suitable for indoor and outdoor applications, in chases or in pipes. Cables with reinforced outer sheath or additional outer sheath for underground applications are available on request.

ON REQUEST
Cores laid up in triple or quads.
Other possibilities for collective screen:copper wire braid or copper tape.
Lead sheath or alternative solutions for re-finery applications.
Safety, halogen-free and fire resistant cables.
Core colours on request.

VDE STANDARD

MULTIPAIR CABLES WITH COLLECTIVE SCREEN

TYPE number of pairs x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	INSULATION THICKNESS mm	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P(Q) x 0,50	7 x 0.30	0.4	1.2	8.8	85
4P x 0,50	7 x 0.30	0.4	1.2	10.0	115
6P x 0,50	7 x 0.30	0.4	1.2	11.7	160
8P x 0,50	7 x 0.30	0.4	1.2	12.7	185
10P x 0,50	7 x 0.30	0.4	1.2	14.6	225
12P x 0,50	7 x 0.30	0.4	1.2	15.0	255
16P x 0,50	7 x 0.30	0.4	1.5	17.2	345
20P x 0,50	7 x 0.30	0.4	1.8	19.5	440
24P x 0,50	7 x 0.30	0.4	1.8	21.5	510
2P(Q) x 0,75	7 x 0.37	0.4	1.2	9.4	105
4P x 0,75	7 x 0.37	0.4	1.2	10.7	145
6P x 0,75	7 x 0.37	0.4	1.2	12.6	200
8P x 0,75	7 x 0.37	0.4	1.2	13.7	235
10P x 0,75	7 x 0.37	0.4	1.5	16.4	310
12P x 0,75	7 x 0.37	0.4	1.5	16.9	350
16P x 0,75	7 x 0.37	0.4	1.8	19.2	470
20P x 0,75	7 x 0.37	0.4	1.8	21.2	560
24P x 0,75	7 x 0.37	0.4	1.8	23.4	652
2P(Q) x 1	7 x 0.43	0.4	1.2	8.8	85
4P x 1	7 x 0.43	0.4	1.2	10.0	115
6P x 1	7 x 0.43	0.4	1.2	11.7	160
8P x 1	7 x 0.43	0.4	1.2	12.7	185
10P x 1	7 x 0.43	0.4	1.2	14.6	225
12P x 1	7 x 0.43	0.4	1.2	15.0	255
16P x 1	7 x 0.43	0.4	1.5	17.2	345
20P x 1	7 x 0.43	0.4	1.8	19.5	440
24P x 1	7 x 0.43	0.4	2.1	21.5	510
2P(Q) x 1,5	7 x 0.53	0.5	1.2	11.8	165
4P x 1,5	7 x 0.53	0.5	1.2	13.6	235
6P x 1,5	7 x 0.53	0.5	1.5	16.8	365
8P x 1,5	7 x 0.53	0.5	1.8	18.9	465
10P x 1,5	7 x 0.53	0.5	1.8	21.8	570
12P x 1,5	7 x 0.53	0.5	1.8	22.5	645
16P x 1,5	7 x 0.53	0.5	2.1	25.5	865
20P x 1,5	7 x 0.53	0.5	2.1	28.1	1030
24P x 1,5	7 x 0.53	0.5	2.4	31.8	1260

P is for: Pair/s. (Q) is for: Quad formation.

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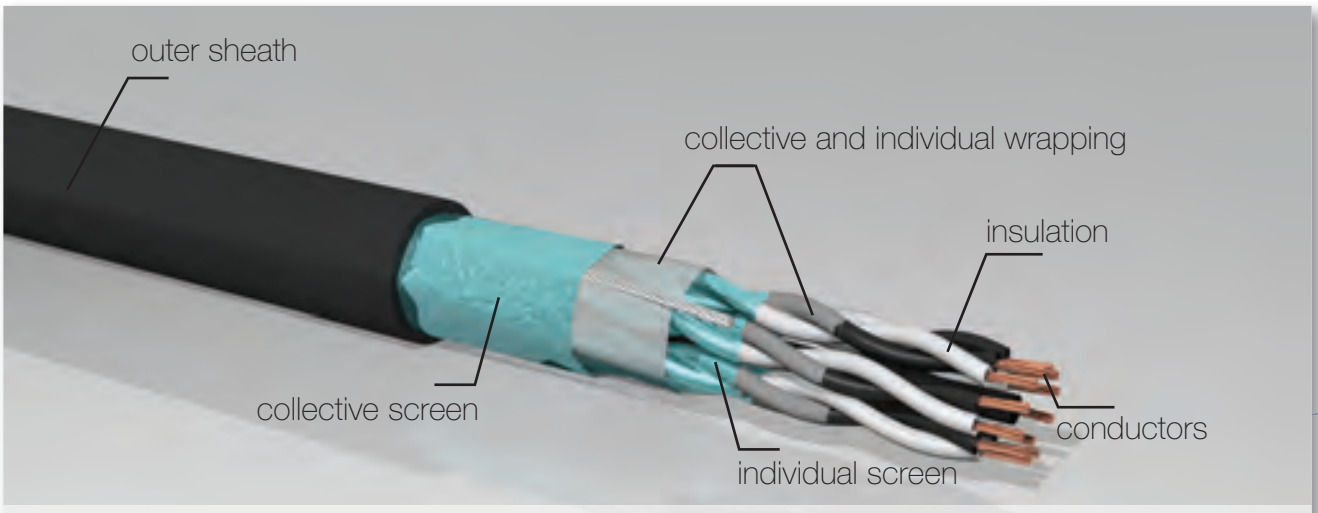

VDE: 2Y(St)Y PiMF - **BS**: CU/PE/ISCR/OSCR/PVC - **UNEL**: REXHOHR

BS STANDARD

SPECIFICATIONS: in accordance with VDE 0815/0816

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
Polyethylene insulation compound type 2YI1 acc.to VDE 0207.
PVC insulation compound type YI1 acc.to VDE 0207 part 4.

PAIRS IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with alluminium/PETP laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207 part 5).
Sheath colour: Black RAL 9005, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1.

INSULATION RESISTANCE:
PE insulation: ≥5000MΩ × km.
PVC insulation: ≥100MΩ × km.

VOLTAGE RATING:
300/500V

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These instrumentation cables are ideal for the transmission of analogue and digital signals.They are suitable for indoor and outdoor applications, in chases or in pipes.Cables with reinforced outer sheath or additional outer sheath for underground applications are available on request.

ON REQUEST
Cores laid up in triple or quads with individual screen.
Other possibilities for collective screen: copper wire braid or copper tape.
Lead sheath or alternative solutions for refinery applications
Safey cables, halogen-free and fire resistant cables.
Core colours on request.

MULTIPAIR CABLES WITH INDIVIDUAL AND COLLECTIVE SCREEN

TYPE number of pairs x cross section	CONDUCTOR CONSTRUCTION	INSULATION THICKNESS	OUTHER SHEATH THICKNESS	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	mm	Kg x Km
2Px 0,50	7x0.30	0.4	1.2	9.8	33
4P x 0,50	7x0.30	0.4	1.2	11.2	62
6P x 0,50	7x0.30	0.4	1.2	13.2	90
8P x 0,50	7x0.30	0.4	1.2	14.4	119
10P x 0,50	7x0.30	0.4	1.2	17.2	147
12P x 0,50	7x0.30	0.4	1.2	17.7	176
16P x 0,50	7x0.30	0.4	1.5	20.2	233
20P x 0,50	7x0.30	0.4	1.8	22.2	290
24P x 0,50	7x0.30	0.4	1.8	25.2	348
2Px 0,75	7x0.37	0.4	1.2	10.4	115
4P x 0,75	7x0.37	0.4	1.2	11.9	175
6P x 0,75	7x0.37	0.4	1.2	14.1	250
8P x 0,75	7x0.37	0.4	1.2	15.4	295
10P x 0,75	7x0.37	0.4	1.5	19.0	420
12P x 0,75	7x0.37	0.4	1.5	19.6	475
16P x 0,75	7x0.37	0.4	1.8	21.6	600
20P x 0,75	7x0.37	0.4	1.8	24.4	750
24P x 0,75	7x0.37	0.4	1.8	27.0	875
2P x 1	7x0.43	0.4	1.2	11.2	135
4P x 1	7x0.43	0.4	1.2	12.9	205
6P x 1	7x0.43	0.4	1.2	15.3	294
8P x 1	7x0.43	0.4	1.2	17.3	380
10P x 1	7x0.43	0.4	1.2	20.6	495
12P x 1	7x0.43	0.4	1.2	21.2	565
16P x 1	7x0.43	0.4	1.5	23.5	715
20P x 1	7x0.43	0.4	1.8	26.5	895
24P x 1	7x0.43	0.4	2.1	30.0	1095
2P x 1,5	7x0.53	0.5	1.2	13.0	170
4P x 1,5	7x0.53	0.5	1.2	15.1	275
6P x 1,5	7x0.53	0.5	1.5	19.2	455
8P x 1,5	7x0.53	0.5	1.8	21.0	540
10P x 1,5	7x0.53	0.5	1.8	24.8	700
12P x 1,5	7x0.53	0.5	1.8	25.6	795
16P x 1,5	7x0.53	0.5	2.1	28.3	1010
20P x 1,5	7x0.53	0.5	2.1	31.9	1255
24P x 1,5	7x0.53	0.5	2.4	36.0	1530

P is for: Pairs.

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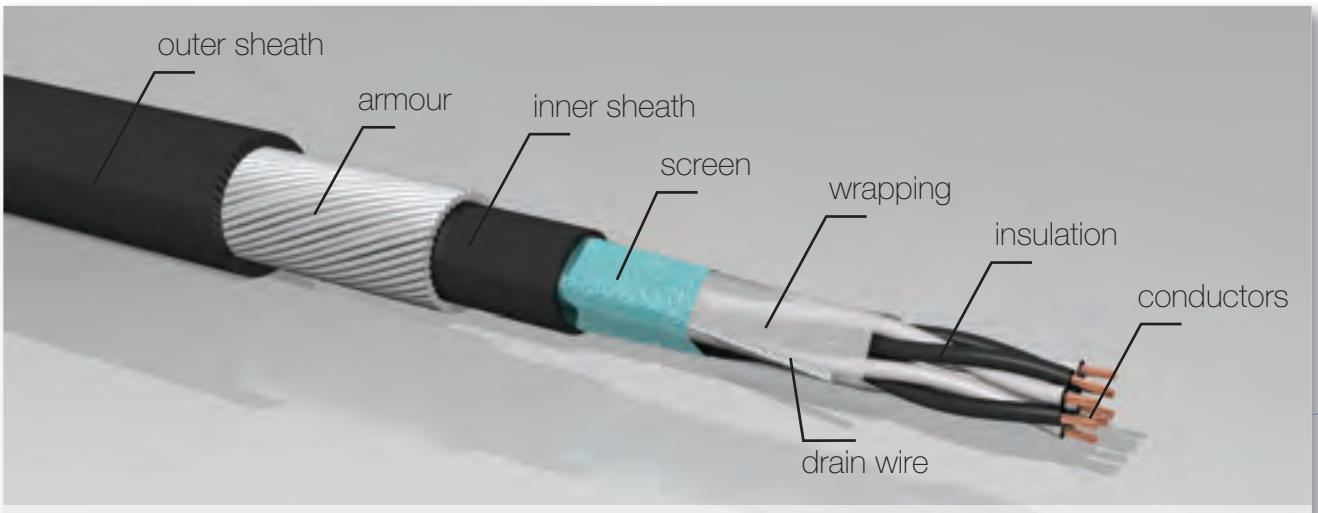

VDE: 2Y(St)YRY - **BS**: CU/PE/OSCR/PVC/SWA/PVC - **UNEL**: REXOHRFR

VDE STANDARD

SPECIFICATIONS: in accordance with VDE 0815/0816

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
Polyethylene insulation compound type 2YI1 acc.to VDE 0207.
PVC insulation compound type YI1 acc.to VDE 0207 part 4.

PAIRS IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath (compound type YM1 acc.to VDE 0207 part 4).
PE inner sheath (compound type 2YM1 acc.to VDE 0207).

ARMOUR:
Mild galvanized steel wires.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Black RAL 9005

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1.

INSULATION RESISTANCE:
PE insulation: ≥5000MΩ × km.
PVC insulation: ≥100MΩ × km.

VOLTAGE RATING:
300/500V

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 7,5.

APPLICATIONS
These armoured instrumentation cables are ideal for the transmission of analogue and digital signals.They are suitable for indoor and outdoor applications, in chases or in pipes.

ON REQUEST
Cores laid up in triple or quads with individual screen.
Other possibilities for collective screen: copper wire braid or copper tape.
Steel tape or steel wires braid armour.
Safety, halogen-free & fire resistant cables.
Core colours on request.

MULTIPAIR ARMOURED CABLES WITH COLLECTIVE SCREEN

TYPE number of pairsx cross section n x mm²	CONDUCTOR CONSTRUC-TION n x mm	INSULATION THICKNESS mm	INNER SHEATH THICKNESS mm	ARMOUR WIRE DIAMETER mm	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P(Q)x0,50	7 x 0.30	0.4	0.8	1.0	1.2	12.4	300
4P x 0,50	7 x 0.30	0.4	0.8	1.0	1.2	13.6	360
8P x 0,50	7 x 0.30	0.4	1.0	1.2	1.5	17.8	590
12P x 0,50	7 x 0.30	0.4	1.0	1.2	1.8	20.7	790
16P x 0,50	7 x 0.30	0.4	1.0	1.6	1.8	23.0	1030
24P x 0,50	7 x 0.30	0.4	1.2	1.6	2.1	27.7	1370
2P(Q)x0,75	7 x 0.37	0.4	0.8	1.0	1.2	13.0	330
4P x 0,75	7 x 0.37	0.4	1.0	1.0	1.2	14.3	400
8P x 0,75	7 x 0.37	0.4	1.0	1.2	1.8	19.5	700
12P x 0,75	7 x 0.37	0.4	1.0	1.6	1.8	23.0	1020
16P x 0,75	7 x 0.37	0.4	1.2	1.6	2.1	25.5	1240
24P x 0,75	7 x 0.37	0.4	1.2	1.6	2.4	30.5	1620
2P(Q) x 1	7 x 0.43	0.4	0.8	1.0	1.2	13.6	375
4P x 1	7 x 0.43	0.4	0.8	1.2	1.5	16.4	535
8P x 1	7 x 0.43	0.4	1.0	1.2	1.8	20.8	795
12P x 1	7 x 0.43	0.4	1.2	1.6	2.1	25.3	1230
16P x 1	7 x 0.43	0.4	1.2	1.6	2.1	27.3	1420
24P x 1	7 x 0.43	0.4	1.2	1.6	2.4	33.0	1900
2P(Q) x 1,5	7 x 0.53	0.5	0.8	1.2	1.5	16.5	525
4P x 1,5	7 x 0.53	0.5	1.0	1.6	1.8	19.3	960
8P x 1,5	7 x 0.53	0.5	1.2	1.6	2.1	21.5	1230
12P x 1,5	7 x 0.53	0.5	1.2	1.6	2.1	28.7	1530
16P x 1,5	7 x 0.53	0.5	1.4	1.6	2.4	32.1	1885
24P x 1,5	7 x 0.53	0.5	1.6	2.5	3.1	41.5	3270

P is for: Pairs. (Q) is for: Quad formation

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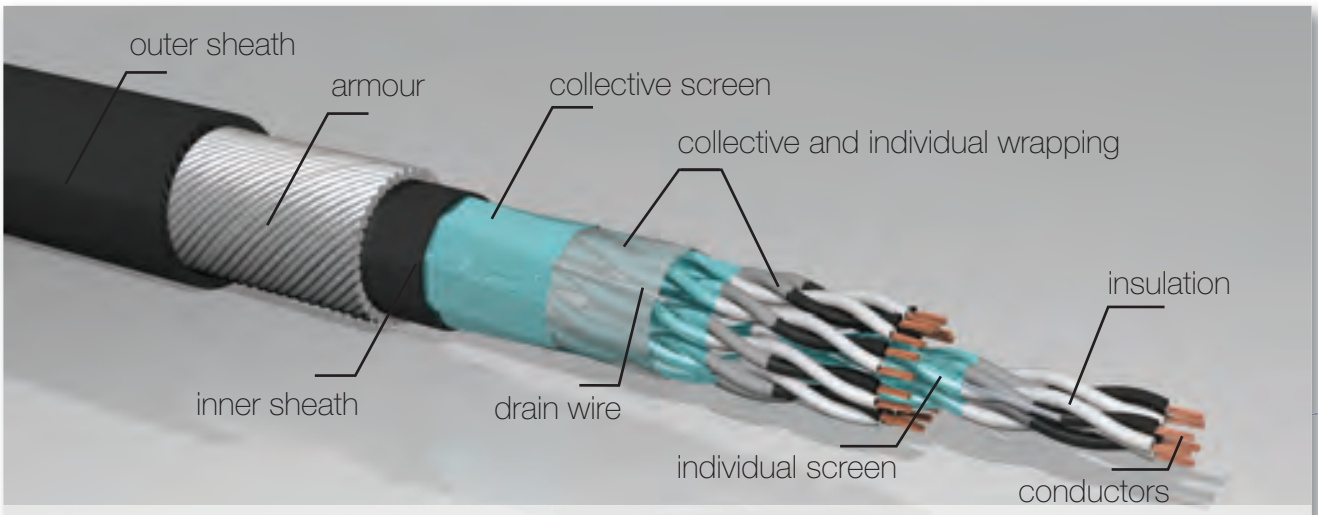

VDE: 2Y(St)YRY PiMF - **BS**: CU/PE/ISCR/OSCR/PVC/SWA/PVC - **UNEL**: REXHOHRFR

SPECIFICATIONS: in accordance with **VDE 0815/0816**

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
Polythene insulation compound type 2YI1 acc.to VDE 0207.
PVC insulation compound type YI3 acc.to VDE 0207 part 4.

PAIRS IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath compound

ARMOUR:
Mild galvanized steel wires.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Black RAL 9005, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1.

INSULATION RESISTANCE:
PE insulation: ≥5000MΩ × km.
PVC insulation: ≥100MΩ × km.

VOLTAGE RATING:
300/500V

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 7,5.

APPLICATIONS
These instrumentation cables are ideal for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases, in pipes or under the ground.

VDE STANDARD

MULTIPAIR ARMOURED CABLES WITH INDIVIDUAL AND COLLECTIVE SCREEN

TYPE number of pairsx cross section	CONDUCTOR CONSTRU-CTION	INSULATION THICKNESS	INNER SHEATH THICKNESS	ARMOUR WIRE DIAMETER	OUTHER SHEATH THICKNESS	OUTER DIAMETER Ø	AVERAGE WEIGHT
n x mm²	n x mm	mm	mm	mm	mm	mm	Kg x Km
2P x0,50	7 x 0.30	0.4	0.8	1.0	1.2	13.2	340
4P x 0,50	7 x 0.30	0.4	0.8	1.2	1.2	15.3	475
8P x 0,50	7 x 0.30	0.4	1.0	1.2	1.8	20.1	735
12P x 0,50	7 x 0.30	0.4	1.0	1.6	1.8	23.5	1075
16P x 0,50	7 x 0.30	0.4	1.3	1.6	2.1	26.4	1300
24P x 0,50	7 x 0.30	0.4	1.4	1.6	2.4	31.8	1730
2P x0,75	7 x 0.37	0.4	0.8	1.0	1.2	13.8	370
4P x 0,75	7 x 0.37	0.4	0.8	1.2	1.5	16.6	545
8P x 0,75	7 x 0.37	0.4	1.0	1.2	1.8	21.1	820
12P x 0,75	7 x 0.37	0.4	1.2	1.6	2.1	25.8	1260
16P x 0,75	7 x 0.37	0.4	1.2	1.6	2.1	27.8	1460
24P x 0,75	7 x 0.37	0.4	1.4	2.5	2.7	36.0	2600
2P x 1	7 x 0.43	0.4	0.8	1.0	1.2	15.3	455
4P x 1	7 x 0.43	0.4	0.8	1.2	1.5	18.0	630
8P x 1	7 x 0.43	0.4	1.0	1.2	1.8	23.1	1065
12P x 1	7 x 0.43	0.4	1.2	1.6	2.1	27.4	1405
16P x 1	7 x 0.43	0.4	1.2	1.6	2.1	30.3	1680
24P x 1	7 x 0.43	0.4	1.2	1.6	2.4	38.8	2950
2P x 1,5	7 x 0.53	0.5	0.8	1.2	1.5	18.0	525
4P x 1,5	7 x 0.53	0.5	1.0	1.6	1.8	20.8	780
8P x 1,5	7 x 0.53	0.5	1.2	1.6	2.1	27.2	1385
12P x 1,5	7 x 0.53	0.5	1.2	1.6	2.1	32.2	1815
16P x 1,5	7 x 0.53	0.5	1.4	1.6	2.4	37.3	2790
24P x 1,5	7 x 0.53	0.5	1.6	2.5	3.1	45.4	3270

P is for: Pairs.

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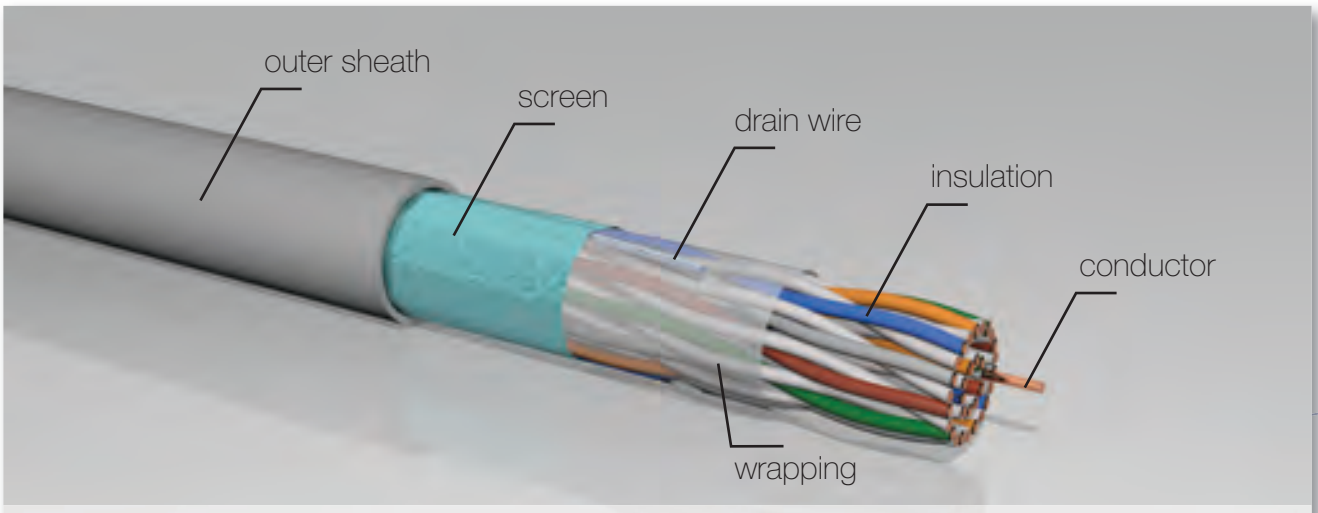

VDE: Y(St)Y - **BS**: CU/PVC/OSCR/PVC - **UNEL**: UR2XOHR

VDE STANDARD

SPECIFICATIONS: in accordance with VDE 0812/0815

CONDUCTOR:
Solid copper wires (class1) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

PAIRS IDENTIFICATION BY COLOURS:
Colours coded according to DIN 47100.(tab. 3) Available other colours on request.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Grey RAL 7001, Blue RAL 5015

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part1.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
300/500V

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath additional outer or sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour.
Safety, halogen-free and fire resistant cables.
Core colours on request.

PVC INSULATED MULTIPAIR CABLES WITH COLLECTIVE SCREEN

TYPE number of pairs x cross section n x mm²	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P(Q) x 0,8	1.0	6.5	55
4P x 0,8	1.0	8.5	95
8P x 0,8	1.0	10.5	150
12P x 0,8	1.0	12.0	210
16P x 0,8	1.2	14.0	285
20P x 0,8	1.2	15.0	340
24P x 0,8	1.2	16.0	400
32P x 0,8	1.4	19.0	530
40P x 0,8	1.4	20.5	645
48P x 0,8	1.4	23.0	750
80P x 0,8	2.0	29.0	1300
100P x 0,8	2.0	32.0	1550

P is for: Pairs. (Q) is for: Quad formation.

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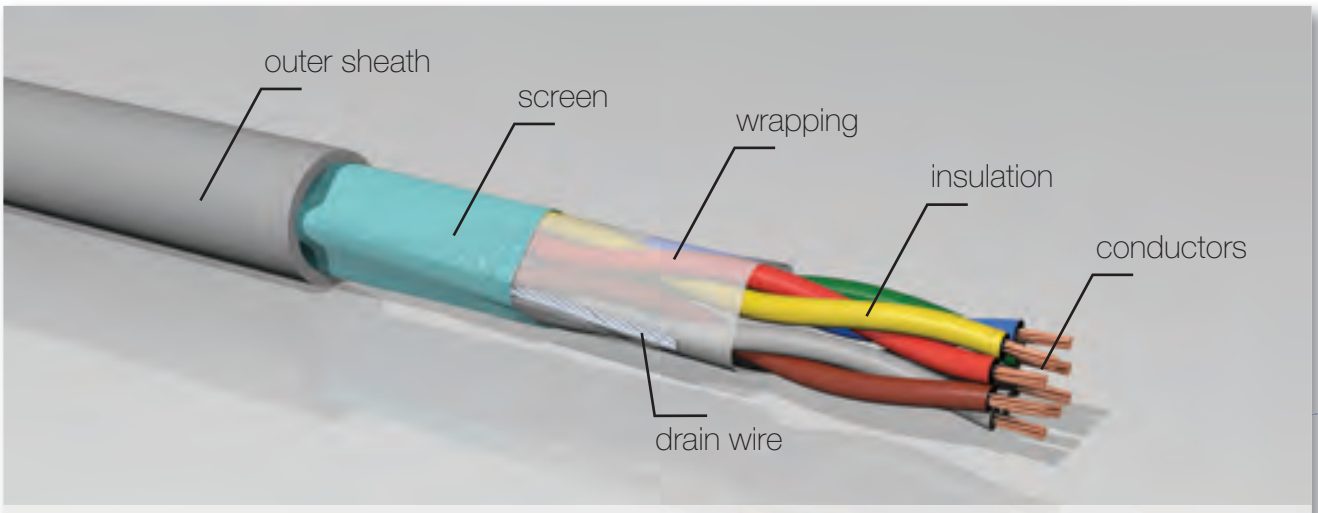

VDE: Y(St)Y - **BS**: CU/PVC/OSCR/PVC - **UNEL**: RR2XOHR

SPECIFICATIONS: in accordance with **VDE 0815/0816**

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

CORES IDENTIFICATION BY COLOURS:
According to manufactures specification.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Grey RAL 7001, Blue RAL 5015, Black RAL 9005.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
300/600V.

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These instrumentation cables are ideal for transmission of analogue and digital signals up to 10 kHz in power plants or other industrial applications. They are suitable for indoor and outdoor applications,in chases or in pipes. Cable with reinforced outer sheath or additional outer sheath for underground appilications are available on request.

ON REQUEST
Cables with heat resistant insulation and sheath.
Steel tape, steel wires or steel wires braid armour.
Safety, halogen-free and fire resistant cables.
Core colours on request.

VDE STANDARD

PVC INSULATED MULTIPAIR CABLES WITH COLLECTIVE SCREEN

TYPE number of pairs x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P(Q) x 0,50	7 x 0.30	1.0	6.5	65
4P x 0,50	7 x 0.30	1.0	9.0	105
8P x 0,50	7 x 0.30	1.0	11.5	180
12P x 0,50	7 x 0.30	1.0	13.5	250
16P x 0,50	7 x 0.30	1.2	15.5	310
20P x 0,50	7 x 0.30	1.2	16.1	385
24P x 0,50	7 x 0.30	1.2	19.0	450
32P x 0,50	7 x 0.30	1.4	21.0	560
48P x 0,50	7 x 0.30	1.4	25.5	810
96P x 0,50	7 x 0.30	1.4	34.0	1570

P is for: Pairs. (Q) is for: Quad formation.

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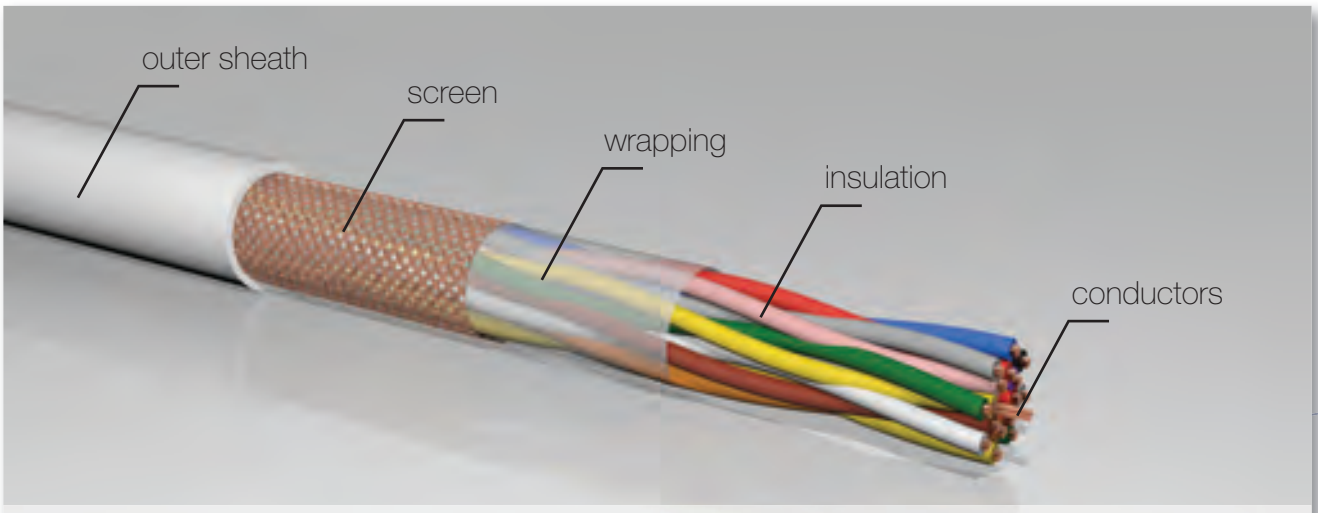

VDE: YCY - **BS**: CU/PVC/CWB/PVC - **UNEL**: RR2XOH2R

SPECIFICATIONS: in accordance with **VDE 0812/0815**

CONDUCTORS:
Stranded (class 2) or flexible (class 5) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

PAIRS IDENTIFICATION BY COLOURS:
Colours coded in accordance with DIN 47100 (tab 3).

WRAPPING:
PETP tape (23µm) 50% overlap.

SCREEN:
Bare copper wires braid.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).Sheath colour: Grey RAL 7001, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1/ part 3.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
300/500V

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour. Safety, halogen-free and fire resistant cables. Core colours on request.

VDE STANDARD

PVC INSULATED MULTIPAIR CABLES WITH COPPER BRAID SCREEN

TYPE number of pairs x cross section n x mm²	CONDUCTOR CONSTRUCTION n x mm	OUTHER SHEATH THICKNESS mm	OUTER DIAMETER Ø mm	AVERAGE WEIGHT Kg x Km
2P(Q) x 0,50	7 x 0.30	1.0	7.5	80
4P x 0,50	7 x 0.30	1.0	10.0	130
8P x 0,50	7 x 0.30	1.0	12.0	200
12P x 0,50	7 x 0.30	1.2	14.0	285
16P x 0,50	7 x 0.30	1.2	16,0	350
20P x 0,50	7 x 0.30	1.2	17.0	435
24P x 0,50	7 x 0.30	1.4	19.5	490
32P x 0,50	7 x 0.30	1.4	21.5	615
40P x 0,50	7 x 0.30	1.4	23.0	795

P is for: Pairs. (Q) is for: Quad formation.

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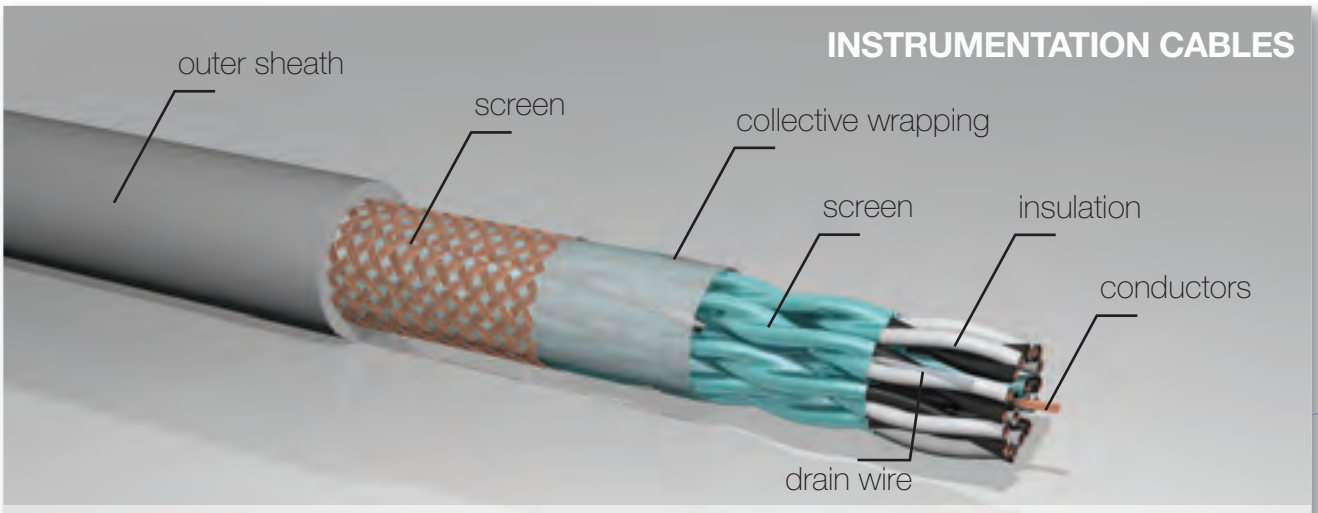


VDE: 2Y(C)Y PiMF - **BS**: CU/PE/ISCR/CWB/PVC - **UNEL**: REXHOH2R

VDE STANDARD

SPECIFICATIONS: in accordance with VDE 0815/0816

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
Polyethylene insulation compound type 2YI1 acc.to VDE 0207.

CORES IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

INDIVIDUAL SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

SCREEN:
Bare copper wire braid.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Grey RAL 7001, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1/ part 3.

INSULATION RESISTANCE:
≥5000MΩ × km.

VOLTAGE RATING:
300/500V

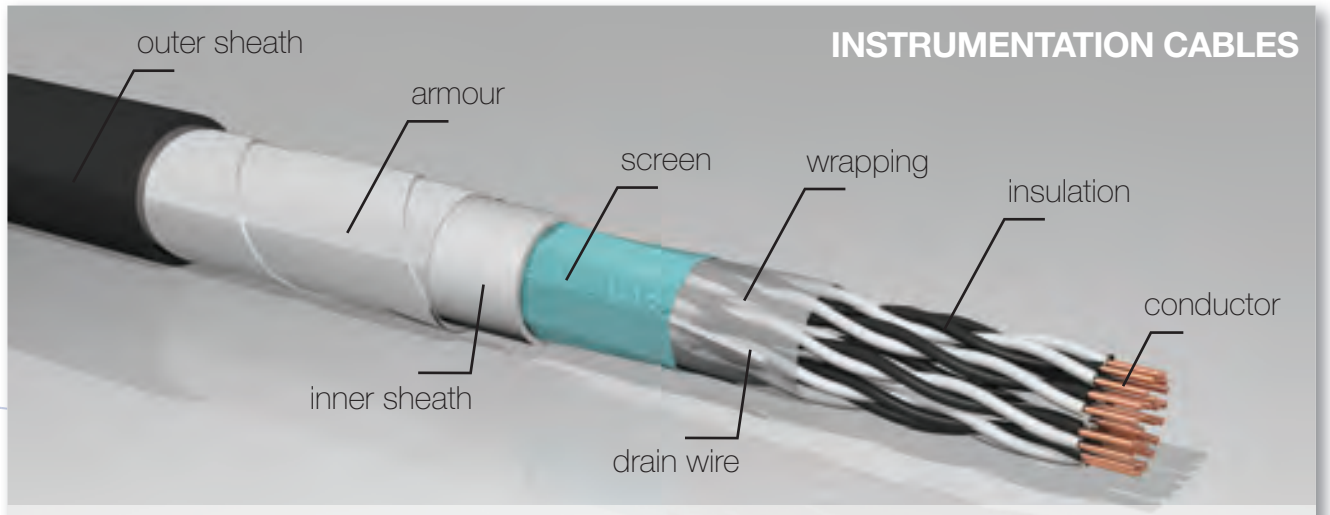
TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour. Safety, halogen-free and fire resistant cables. Several cross section dimensions. Core colours on request.



INSTRUMENTATION CABLES

VDE: Y(St)YBY - **BS**: CU/PVC/OSCR/PVC/DSTA/PVC - **UNEL**: UR2XOHRNR

SPECIFICATIONS: in accordance with VDE 0815/0816

CONDUCTOR:
Solid copper wires (class1) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

CORES IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath (compound type YM1 acc.to VDE 0207).

ARMOUR:
Mild galvanized double steel tape.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Black RAL 9005, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1/part 3.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
300/500V

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 7,5.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel wires or steel wires braid armour.
Safety, halogen-free and fire resistant cables.
Several cross section dimensions.
Core colours on request.

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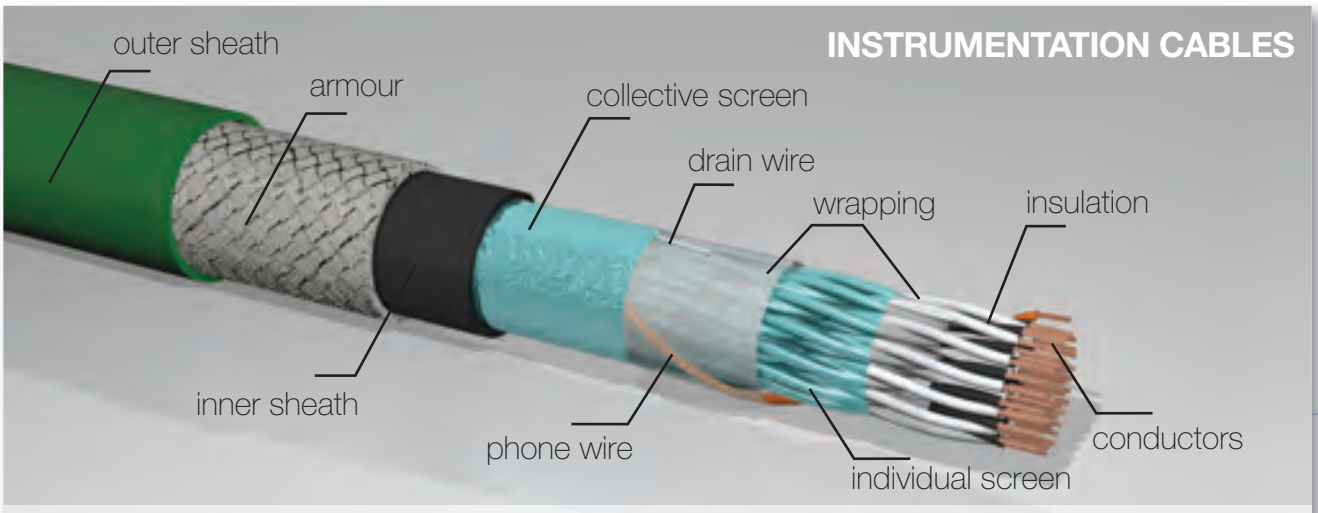


VDE: Y(St)YQY PiMF - **BS**: CU/PVC/ISCR/OSCR/GSWB/PVC - **UNEL**: FR2XHOHRAR

SPECIFICATIONS: in accordance with **VDE 0815/0816**

CONDUCTORS:
Flexible copper wires (class5) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

CORES IDENTIFICATION BY COLOURS:
Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath (compound type YM1 acc.to VDE 0207).

ARMOUR:
Mild galvanized steel wire braid, 80% covering.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207). Sheath colour: Green RAL 6018, Blue RAL 5015.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1/part 3.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
300/500V

TESTING VOLTAGE:
2000V a.c.

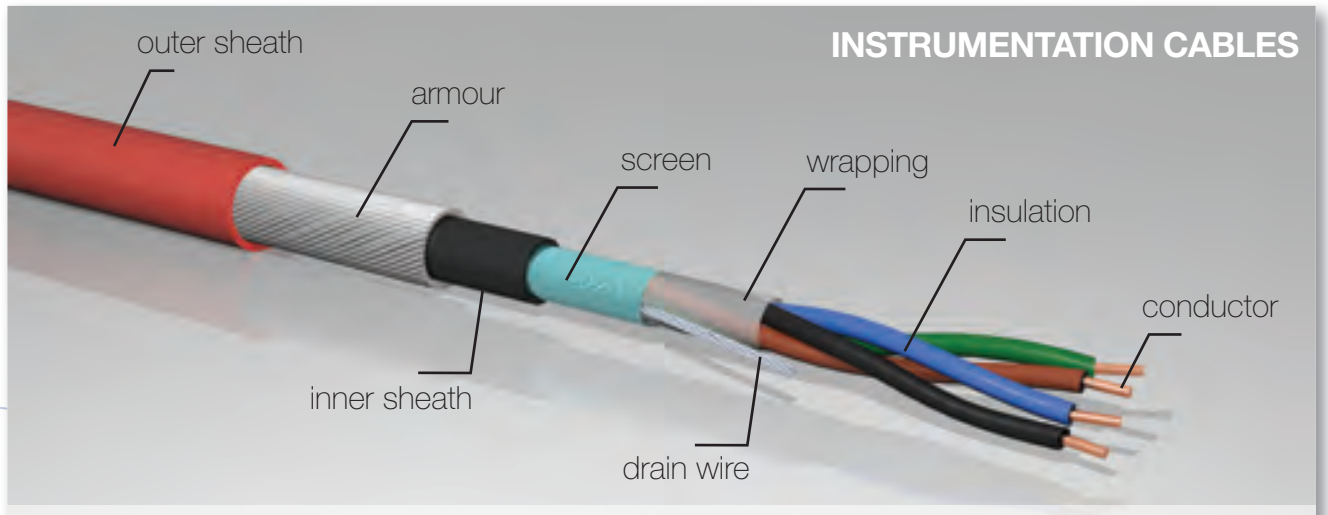
OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 7,5.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape or steel wires armour.
Safety, halogen-free and fire resistant cables. Several cross section dimensions.
Core colours on request.

VDE STANDARD



VDE: Y(St)YRY - **BS**: CU/PVC/OSCR/PVC/SWA/PVC - **UNEL**: UR2XOHRFR

SPECIFICATIONS: in accordance with VDE 0815/0816

CONDUCTOR:
Solid copper wires (class1) according to VDE 0295 / IEC 60228 ((Tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

PAIRS IDENTIFICATION BY COLOURS:
Colours coded in accordance with BS 5308 part 1(tab. 4)

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

INNER SHEATH:
PVC inner sheath (compound type YM1 acc.to VDE 0207).

ARMOUR:
Mild galvanized steel wire armour.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).

SHEATH COLOUR:
Red RAL 3000, Grey RAL 7001.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 1/part 3.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
300/500V

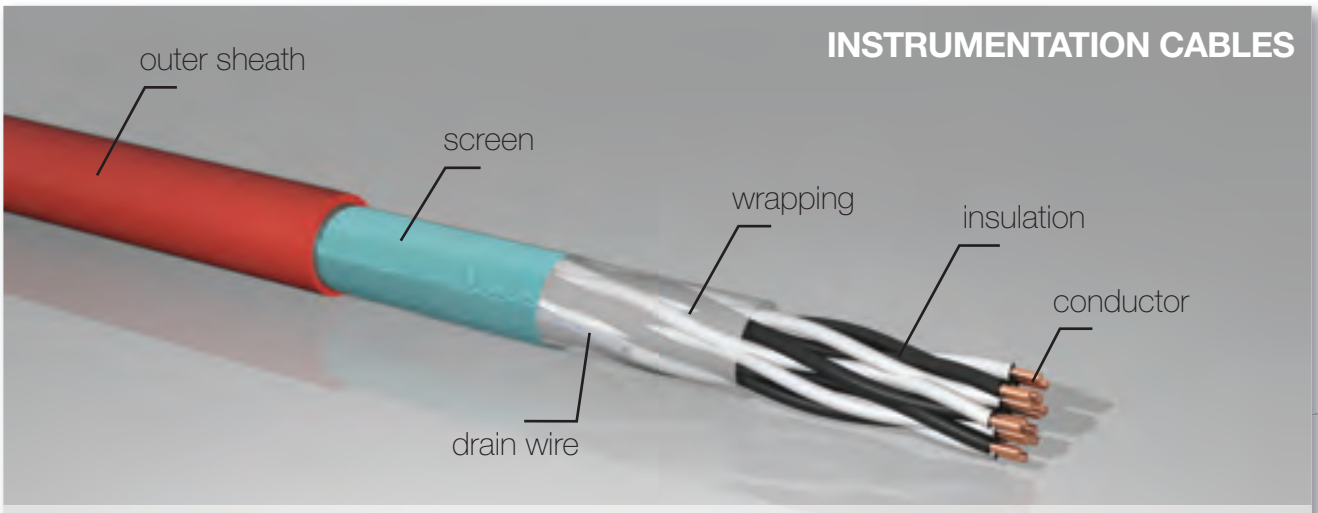
TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 7,5.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape or steel wires braid armour.
Safety, halogen-free and fire resistant cables. Several cross section dimensions.
Core colours on request.



VDE: 2X(St)H - **BS:** CU/XLPE/OSCR/LSZH - **UNEL:** UE4XOHM1

SPECIFICATIONS: IN ACCORDANCE WITH VDE 0815 AND VDE 0472 PART 815

CONDUCTOR:
Solid copper conductor (class1) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
XLPE, according to VDE 0262.
Cores identification by colours: Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
Halogen free fire retardant outer sheath.
Sheath colour: Green RAL 6018, Red RAL 3000.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 3.Halogen free acc. to VDE 0472 part 815 / IEC 60754 part 1 (Table 12).

INSULATION RESISTANCE:
≥3000MΩ × km.

VOLTAGE RATING:
600/1000V according to VDE 0262.

TESTING VOLTAGE:
2000V a.c.

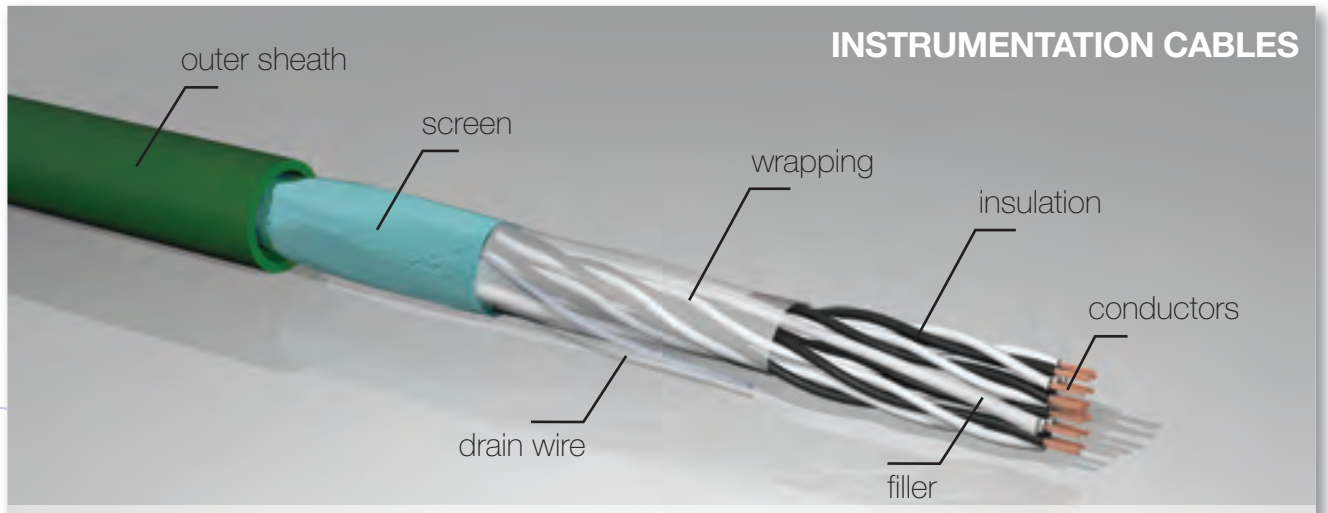
OPERATING TEMPERATURE:
-40°C up to +90°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour. Safety, halogen-free and fire resistant cables. Several cross section dimensions. Core colours on request.

VDE STANDARD



VDE: 2Y(St)H ...Bd - **BS:** CU/PE/OSCR/LSZH - **UNEL:** REXOHM1

SPECIFICATIONS: in accordance with VDE 0815 and VDE 0472 part 815

CONDUCTORS:
Sranded copper wires (class2) according to VDE 0295 / IEC 60228 (Tables 8 and 9).

INSULATION:
Polyethylene insulation compound type 2YI1 acc.to VDE 0207.
Cores identification by colours: Black, white, continuous numbering.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down.

OUTER SHEATH:
Halogen free fire retardant outer sheath
Sheath colour: Green RAL 6018, Red RAL 3000.

CABLE SHAPE:
Pairs forming a bundle and bundles assembled toghether.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part 3.
Halogen free acc. to VDE 0472 part 815 / IEC 60754 part 1 (Table 12).

INSULATION RESISTANCE:
≥5000MΩ × km.

VOLTAGE RATING:
300/500V.

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-40°C up to +70°C.

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour. Safety, halogen-free and fire resistant cables. Several cross section dimensions. Core colours on request.

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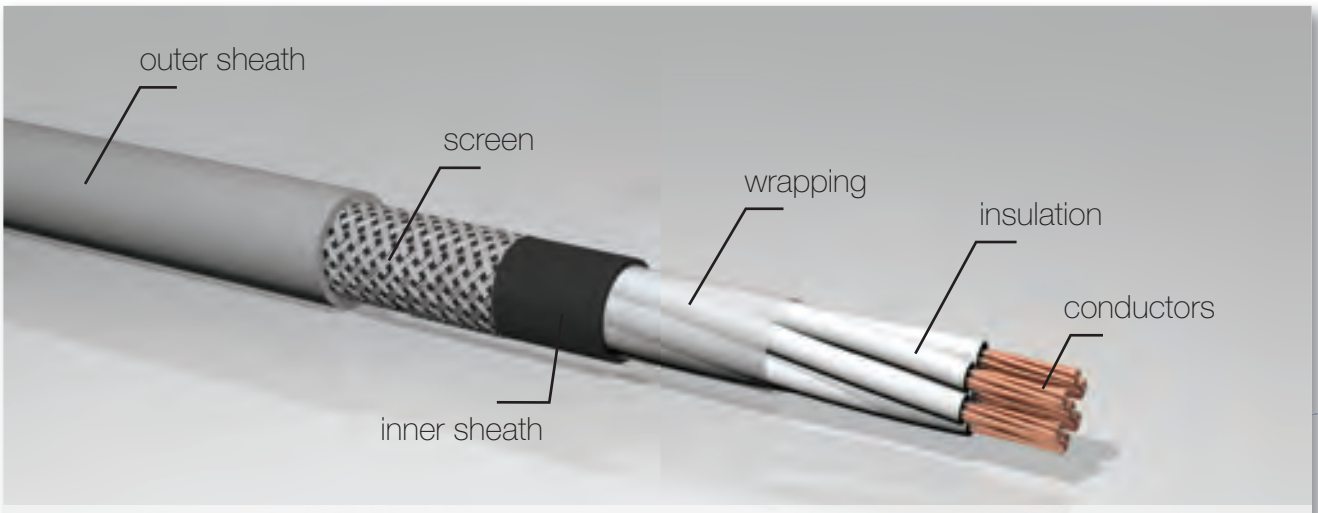


VDE: 2XY(C)Y - **BS:** CU/XLPE/PVC/SWB/PVC - **UNEL:** RE4ORAR

SPECIFICATIONS: in accordance with VDE 0815

CONDUCTORS:
Stranded copper wires (class2) according to VDE 0295 / IEC 60228 (tables 8 and 9).

INSULATION:
XLPE, according to VDE 0262.

CORES IDENTIFICATION:
White numbered cores.

WRAPPING:
PETP tape (23µm) 50% overlap.

INNER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).

SCREEN:
Tinned copper wires braid.

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Grey RAL 7001, Blue RAL 5015,Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part1/ IEC 60332 part 3.

INSULATION RESISTANCE:
≥3000MΩ × km.

VOLTAGE RATING:
600/1000V according to VDE 0262.

TESTING VOLTAGE:
4000V a.c.

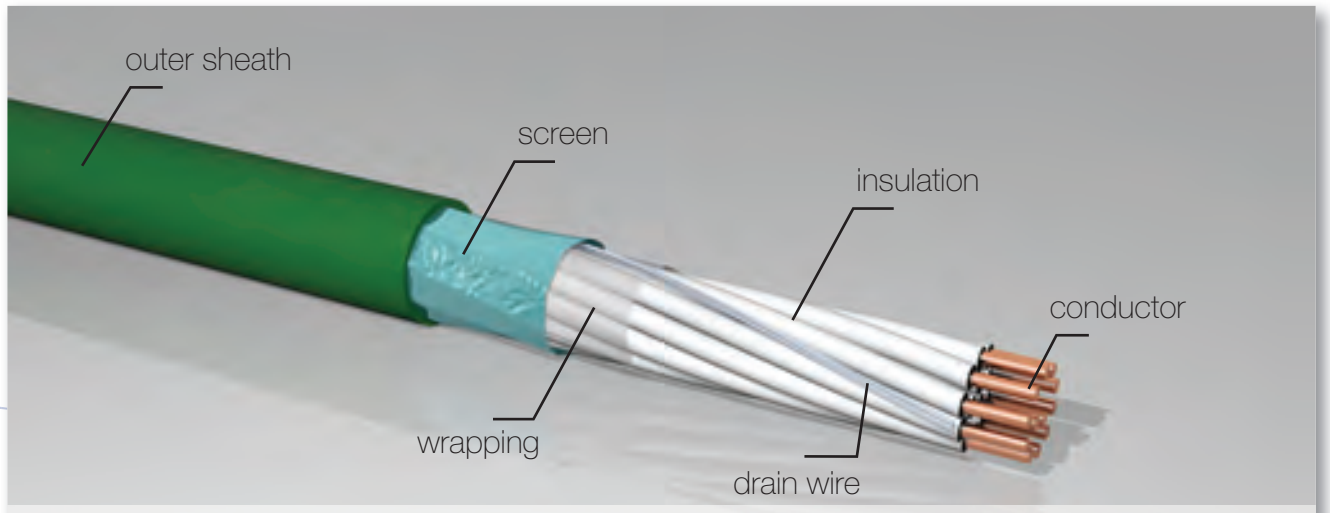
OPERATING TEMPERATURE:
-40°C up to +90°C.

MINIMUM BENDING RADIUS:
Outer diameter x 7,5.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour. Safety, halogen-free and fire resistant cables. Several cross section dimensions. Core colours on request.

VDE STANDARD



VDE: Y(St)Y - **BS:** CU/PVC/OSCR/PVC - **UNEL:** UR2OHR

SPECIFICATIONS: in accordance with VDE 0815

CONDUCTOR:
Solid copper conductor (class1) according to VDE 0295 / IEC 60228 (tables 8 and 9).

INSULATION:
PVC insulation compound type YI1 acc.to VDE 0207.

CORES IDENTIFICATION:
White numbered cores.

WRAPPING:
PETP tape (23µm) 50% overlap.

COLLECTIVE SCREEN:
Tinned copper drain wire under and in contact with AL/PETP (25µm/23µm) laminated tape applied metallic side down..

OUTER SHEATH:
PVC outer sheath (compound type YM1 acc.to VDE 0207).
Sheath colour: Grey RAL 7001, Blue RAL 5015,Green RAL 6018.

FIRE CHARACTERISTICS:
Flame retardant acc. to VDE 0472 part 804 / IEC 60332 part1/ IEC 60332 part 3.

INSULATION RESISTANCE:
≥100MΩ × km.

VOLTAGE RATING:
Max 300V.

TESTING VOLTAGE:
2000V a.c.

OPERATING TEMPERATURE:
-30°C up to +70°C..

MINIMUM BENDING RADIUS:
Outer diameter x 6.

APPLICATIONS
These cables are utilized for the transmission of analogue and digital signals in instrumentation system. The cables are suitable for indoor and outdoor applications, in chases or in pipes. Cable with reinforced outer sheath for underground appilications are available on request.

ON REQUEST
Steel tape, steel wires or steel wires braid armour. Safety, halogen-free and fire resistant cables. Several cross section dimensions. Core colours on request.

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TECHNICAL DATA

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TABLE 1
UNEL 00722
(VDE 0293 - flexible cables)

Cores number	cables with green / yellowconductor		cables without green / yellowconductor	
2			light blue	
			brown	
3	green / yellow		brown	
	light blue		black	
	brown		grey	
4	green / yellow		light blue	
	brown		brown	
	black		black	
	grey		grey	
5	green / yellow		light blue	
	light blue		brown	
	brown		black	
	black		grey	
	grey		black	
>5	green / yellow			
	black progressive numbered		black progressive numbered	

TABLE 2
DIN 47100

Cores no	Cores colours
1	white
2	brown
3	green
4	yellow
5	grey
6 pink	
7	blue
8	red
9	black
10	violet
11	grey / pink
12	red / blue
13	white / green
14	brown / green
15	white / yellow
16	yellow / brown
17	white / grey
18	grey / brown
19	white / pink
20	pink / brown
21	white / blue
22	brown / blue
23	white / red
24	brown / red
25	white / black
26	brown / black
27	grey / green
28	yellow / grey
29	pink / green
30	yellow / pink
31	green / blue
32	yellow / blue
33	green / red
34	yellow / red
35	green / black
36	yellow / black
37	grey / blue
38	pink / blue
39	grey / red
40	pink / red
41	grey / black
42	pink / black
43	blue / black
44	red / black

TABLE 2
DIN 47100

Pairs no.		A WIRE	B WIRE
1	23	white	brown
2	24	green	yellow
3	25	grey	pink
4	26	blue	red
5	27	black	violet
6	28	grey / pink	red / blue
7	29	white / green	brown / green
8	30	white / yellow	yellow / brown
9	31	white / grey	grey / brown
10	32	white / pink	pink / brown
11	33	white / blue	brown / blue
12	34	white / red	brown / red
13	35	white / black	brown / black
14	36	grey / green	yellow / grey
15	37	pink / green	yellow / pink
16	38	green / blue	yellow / blue
17	39	green / red	yellow / red
18	40	green / black	yellow / black
19	41	grey / blue	pink / blue
20	42	grey / red	pink / red
21	43	grey / black	pink / black
22	44	blue / black	red / black

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TABLE 4
IDENTIFICATION OF CABLE PAIRS OTHER
THAN TWO-PAIR UNSCREENED CABLES

BS 5308 PART 1

Two-pair unscreened cables shall be cabled in quad formation and coloured in clockwise order of rota-tion: black, blue, green, brown.Single triple cables will be identified by colours black, blue and green.All other cables up to 50 pairs shall conform to the coding in the following table.

Pairs no.	A-WIRE	B-WIRE	Pairs no.	A-WIRE	B-WIRE
1	black	blue	26	white	yellow
2	black	green	27	red	yellow
3	blue	green	28	orange	yellow
4	black	brown	29	black	grey
5	blue	brown	30	blue	grey
6	green	brown	31	green	grey
7	black	white	32	brown	grey
8	blue	white	33	white	grey
9	green	white	34	red	grey
10	brown	white	35	orange	grey
11	black	red	36	yellow	grey
12	blue	red	37	black	violet
13	green	red	38	blue	violet
14	brown	red	39	green	violet
15	white	red	40	brown	violet
16	black	orange	41	white	violet
17	blue	orange	42	red	violet
18	green	orange	43	orange	violet
19	brown	orange	44	yellow	violet
20	white	orange	45	grey	violet
21	red	orange	46	black	turquoise
22	black	yellow	47	blue	turquoise
23	blue	yellow	48	green	turquoise
24	green	yellow	49	brown	turquoise
25	brown	yellow	50	white	turquoise

TABLE 5
IDENTIFICATION OF CABLE PAIRS OTHER
THAN TWO-PAIR UNSCREENED CABLES

BS 5308 PART 2

A.1 IDENTIFICATION OF CORES

Cores shall be numbered for identification as follows:Up to 40 cores:All cores yellow and identified 1 to 40 with both printed numbers and written word, in black, e.g. Core 10 would be coloured yellow and identified by number 10 "TEN" in black.41 to 80 cores:All cores black and identified 1 to 40 with both printed numbers an written word,in yellow, e.g. Core 50 would be coloured black and identified by number 10 "TEN" in yellow.

A.2 IDENTIFICATION OF PAIRS

Two-pair unscreened or collectively screened cables shall be cabled in quad formation and colour coded in clockwise order of rotation: blue,green,orange,brown.All other cables up to 50 pairs shall conform to the coding in the following table.

Pairs no.	A-WIRE	B-WIRE	Pairs no.	A-WIRE	B-WIRE
1	white	blue	26	RED-blue	blue
2	white	orange	27	RED-blue	orange
3	white	green	28	RED-blue	green
4	white	brown	29	RED-blue	brown
5	white	grey	30	RED-blue	grey
6	red	blue	31	BLUE-black	blue
7	red	orange	32	BLUE-black	orange
8	red	green	33	BLUE-black	green
9	red	brown	34	BLUE-black	brown
10	red	grey	35	BLUE-black	grey
11	black	blue	36	YELLOW-blue	orange
12	black	orange	37	YELLOW-blue	orange
13	black	green	38	YELLOW-blue	green
14	black	brown	39	YELLOW-blue	brown
15	black	grey	40	YELLOW-blue	grey
16	yellow	blue	41	WHITE-orange	blue
17	yellow	orange	42	WHITE-orange	orange
18	yellow	green	43	WHITE-orange	green
19	yellow	brown	44	WHITE-orange	brown
20	yellow	grey	45	WHITE-orange	grey
21	WHITE-blue	blue	46	ORANGE-red	blue
22	WHITE-blue	orange	47	ORANGE-red	orange
23	WHITE-blue	green	48	ORANGE-red	green
24	WHITE-blue	brown	49	ORANGE-red	brown
25	WHITE-blue	grey	50	ORANGE-red	grey

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Standads	THERMO ELEMENT			CONDUCTOR			COLOUR CODE					
				Cu			INSULATION				SHEATH	
	TYPE	POLE+	POLE -	TYPE	POLE+	POLE -	POLE+		POLE -			
DIN 43713/ 43714/ 43715	**T**	Cu	CuNi	**TX**	Cu	CuNi	red		brown		brown	
	J	Fe	CuNi	**JX**	Fe	CuNi	red		blue		blue	
	K	Ni	CrNi	**KX**	Ni	CrNi	red		green		green	
	K	Ni	CrNi	**WC**	SoNICr	SoNi	red		green		green	
	R/S	PtRh	Pt	**RX/SX**	SoPtRh	SoPt	red		white		white	
ANSI MC 96.1	**T**	TP (Cu)	TN (CuNi)	**TX**	TPX (Cu)	TNX (CuNi)	blue		red		blue	
	J	JP (Fe)	JN (CuNi)	**JX**	JPX (Fe)	JNX (CuNi)	white		red		black	
	E	EP (NiCr)	EN (CuNi)	**EX**	EPX (NiCr)	ENX (CuNi)	porpour		red		porpour	
	K	KP (NiCr)	KN (Ni)	**KX**	KPX (NiCr)	KNX (Ni)	yellow		red		yellow	
	R/S	SP/R (PtRh)	SN/RN (Pt)	**SX**	SPX (Cu)	SNX(CuNi)	black		red		green	
	B	BP(Pt30%Rh)	BP(Pt6%Rh)	**BC**	BPX (Cu)	BNX(Cu)	grey		red		grey	
BS 4937	**T**	Cu	CuNi	**TX**	Cu	CuNi	white		blue		blue	
	J	Fe	CuNi	**JX**	Fe	CuNi	yellow		blue		black	
	E	NiCr	CuNi	**EX**	NiCr	CuNi	brown		blue		brown	
	K	NiCr	Ni	**KX**	NiCr	Ni	brown		blue		red	
	K	NiCr	Ni	**VC**	Cu	CuNi	white		blue		red	
	R/S	PtRh	Pt	**SX**	Cu	CuNi	white		blue		green	
NF C42-324	**T**	Cu	CuNi	**TX**	Cu	CuNi	yellow		blue		blue	
	J	Fe	CuNi	**JX**	Fe	CuNi	yellow		black		black	
	E	NiCr	CuNi	**EX**	NiCr	CuNi	yellow		light brown		light brown	
	N	NiCr	Ni	**NX**	NiCr	Ni	yellow		violet		violet	
	N	NiCr	Ni	**WX**	Fe	CuNi	yellow		white		white	
	N	NiCr	Ni	**VC**	Cu	CuNi	yellow		brown		brown	
	S	PtRh	Pt	**SC**	Cu	CuNi	yellow		green		green	
	B	Pt30%Rh	P16%Rh	**BC**	Cu	Cu	yellow		grey		grey	
IEC 60584	**T**	Cu	CuNi	**TX**	Cu	CuNi	brown		white		brown	
	J	Fe	CuNi	**JX**	Fe	CuNi	black		white		black	
	E	NiCr	CuNi	**EX**	NiCr	CuNi	violet		white		violet	
	K	NiCr	Ni	**KX**	NiCr	Ni	green		white		green	
	K	NiCr	Ni	**VC**	Cu	CuNi	green		white		green	
	K	NiCr	Ni	**WC**	Cu	Cuni	green		white		green	
	N	NiCrSi	NiSi	**NX**	NiCrSi	NiSi	pink		white		pink	
	R/S	PtRh	Pt	**RC/SC**	Cu	CuNi	light brown		white		light brown	

TABLE 6
THERMOCOUPLE MATERIALS AND COLOURS

TABLE 7
AWG/mm² CONVERSION TABLE

SOLID BARE COPPER WIRE				STRANDED TINNED COPPER WIRE		
GAGE (AWG or B&S)	WIRE Ø mm	CROSS SECTION mm²	WEIGHT Kg/Km	AWG SIZE	CONDUCTOR CONSTRUCTION n. wire x Ø mm	CROSS SECTION mm²
40	0,079	0,005	0.046	36	7 x 44	0,0142
38	0,102	0,008	0.074	34	7 x 42	0,0222
36	0,1270	0,013	0.116	32	7 x 40	0,0341
34	0,1600	0,020	0.184	32	19 x 44	0,0385
32	0,2007	0,032	0.294	30	7 x 38	0,0568
30	0,2540	0,051	0.462	30	19 x 42	0,0602
28	0,3200	0,080	0.734	28	7 x 36	0,0887
26	0,4039	0,128	1.164	28	19 x 40	0,0925
24	0,5105	0,205	1.854	26	7 x 34	0,1408
22	0,6426	0,324	2.953	26	10 x 36	0,1267
20	0,8103	0,519	4.610	26	19 x 38	0,1540
18	1,0211	0,823	7.315	24	7 x 32	0,2214
16	1,2878	1,303	11.630	24	10 x 34	0,2011
14	1,6231	2,082	18.529	24	19 x 36	0,2407
12	2,0472	3,308	29.441	24	41 x 40	0,1996
10	2,5806	5,262	48.822	22	7 x 30	0,3547
8	3.268	8.387	74.644	22	19 x 34	0,3821
6	4.115	13.289	118.352	22	26 x 36	0,3294
4	5.189	21.149	188.226	20	7 x 28	0,5631
1	7.348	42.409	377.431	20	10 x 30	0,5067
				20	19 x 32	0,6009
				20	26 x 34	0,5229
				20	41 x 36	0,5194
				18	7 x 26	0,8967
				18	16 x 30	0,8107
				18	19 x 30	0,9627
				18	41 x 34	0,8246
				18	65 x 36	0,8234
				16	7 x 24	1,4330
				16	19 x 29	1,2077
				16	26 x 30	1,3174
				16	65 x 34	1,3072
				16	105 x 36	1,3301
				14	7 x 22	2,2704
				14	19 x 27	1,9413
				14	41 x 30	2,0775
				14	105 x 34	2,1117
				12	7 x 20	3,6094
				12	19 x 25	3,0847
				12	65 x 30	3,2936
				12	165 x34	3,3184
				10	37 x 26	4,7397
				10	49 x 27	5,0065
				10	105 x 30	5,3204

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TABLE 8
TYPICAL CONTRUCTIONS
according to CEI 20-29, VDE 0295 and IEC 60228

	Nominal conductor area mm²	CONSTRUCTION N.WIRES x Ø mm			
		SOLID Class 1	**STRANDED** Class 2	**FLEXIBLE** Class 5	**FLEXIBLE** Class 6
	0.15				18 X 0.10
	0.20				26 X 0.10
	0.25			14 x 0.15	32 X 0.10
	0.38			12 x 0.20	21 X 0.15
TYPICAL CONSTRUCTIONS	0.50	1 x 0.80	7 x 0.30 (round)	16 x 0.20	28 x 0.15
	0.75	1 x 0.98	7 x 0.37 (round)	24 x 0.20	42 x 0.15
	1.00	1 x 1.13	7 x 0.43 (round)	32 x 0.20	56 x 0.15
	1.50	1 x 1.39	7 x 0.52 (round)	29 x 0.25	84 x 0.15
	2.5	1 x 1.76	7 x 0.67 (round)	50 x 0.25	140 x 0,15
	4	1 x 2,24	7 x 0.85 (round)	56 x 0.30	224 x 0.15
	6	1 x 2,80	7 x 1.05 (round)	84 x 0.30	192 x 0.20
	10	1 x 3.60	7 x 1.35 (round)	80 x 0.40	320 x 0.20
	16		7 x 1.70 (round)	128 x 0.40	512 x 0.20
	25		7 x 2.25 (compact)	200 x 0.40	800 x 0.20
	35		7 x 2.64 (compact)	280 x 0.40	1120 x 0.20
	50		14 x 2.21 (compact)	400 x 0.40	705 x 0.30
	70		14 x 2.64 (compact)	356 x 0.50	990 x 0.30
	95		19 x 2.67 (compact)	485 x 0.50	1340 x 0.30
	120		19 x 3.00 (compact)	614 x 0.50	1690 x 0.30
	150		30 x 2.64 (compact)	765 x 0.50	2123 x 0.30
	185		37 x 2.67 (compact)	944 x 0.50	1470 x 0.40
	240		37 x 3.00 (compact)	1225 x 0.50	1905 x 0.40
	300		37 x 3.35 (compact)	1530 x 0.50	2385 x 0.40
	400		61 x 2.85 (round)	2034 x 0.50	
	500		61 x 3.20 (round)	1768 x 0.60	

TABLE 9
ELECTRIC RESISTANCE
according to CEI 20-29, VDE 0295 and IEC 60228

Conductor resistance at 20°C, maximum value Ω / km				
Nominal cross section mm²	Class 5-6 Ω / km		Class 1-2 Ω / km	
	plain Cu	Tinned Cu	plain Cu	tinned Cu
0,15	132	145	122	123
0,20	100	102	92	93
0,22	91	93	83	84
0,35	57	59	52,5	53.3
0,50	39	40,1	36	36,7
0,75	26	26,7	24,5	24,8
1,00	19,5	20	18,1	18,1
1,50	13,3	13,7	12,1	12,2
2,50	7,98	8,21	7,41	7,56
4,00	4,95	5,09	4,61	4,70
6,00	3,30	3,39	3,08	3,11
10,00	1,91	1,95	1,83	1,84
16,00	1,21	1,24	1,15	1,16
25,00	0,780	0,795	0,727	0,734
35.00	0.554	0.565	0.524	0.529
50.00	0.386	0.393	0.387	0.391
70.00	0.272	0.277	0.268	0.270
95.00	0.206	0.210	0.193	0.195
120.00	0.161	0.164	0.153	0.154
150.00	0.129	0.132	0.124	0.126
185.00	0.106	0.108	0.0991	0.100
240.0	0.0801	0.0817	0.0754	0.0762
300.0	0.0641	0.0654	0.0601	0.0607
400.0	0.0486	0.0495	0.0470	0.0475
500.0	0.0384	0.0391	0.0366	0.0369

TABLE 9.1
TEMPERATURE COEFFICIENT Kt
for the measurement of the ELECTRIC RESISTANCE

Electric resistance at 20C° = Rta x Temperature coefficient (Kt)
Rta =electric resistance at environment temperature

C°	Kt	C°	Kt	C°	Kt
10	1,042	17	1,012	24	0,984
11	1,037	18	1,008	25	0,980
12	1,033	19	1,004	26	0,977
13	1,029	20	1,000	27	0,973
14	1,025	21	0,996	28	0,969
15	1,020	22	0,992	29	0,965
16	1,016	23	0,988	30	0,962

TABLE 10 FIRE RESISTANCE TEST	
CEI 20-36/ IEC 60331/VDE 0472 part 814	3 h at 750° C
BS 6387 category C	3 h at 950 °C
FIRE RESISTANCE TEST IN PRESENCE OF WATER	
BS 6387 category W	15 min at 750 °C
FIRE RESISTANCE TEST WITH MECHANICAL SHOCK	
BS 6387 category Z	15 min at 950 °C

TABLE 11 SMOKE DENSITY TEST (27 cubic metres)	
CEI 20-37/ IEC 61034/BS 7622	Light trnsmittance 50% to 70%
BS 6724	Absorbance 0,7 to 1,5 (based on cable diameter)

TABLE 12 TEST ON GAS DEVELOPPED DURING COMBUSTION	
CEI 20-37 part 1 / IEC 60754 part 1BS 6425 part 1	halogen acid gases ≤0,5%
CEI 20-37 part 2 / IEC 60754 part 2	PH ≥4,3Conductivity ≤ 100 nS cm-1
FLAME RETARDANT	
CEI 20-35 part 1 / IEC 60332 part 1BS 4066 part 1	

TABLE 13

Total core number	K coefficient	Central	First	Second	Thlrd
002	2,00	2			
003	2,15	3			
004	2,41	4			
005	2,70	5 + f			
006	3,00	6 + f			
007	3,00	1	6		
008	3,31	1 + f	7		
009	3,62	1 + f	8		
010	4,00	2	8		
011	4,00	2 + f	9		
012	4,15	3 9			
013	4,41	3 + f	10		
014	4,41	4	10		
015	4,70	4 + f	11		
016	4,70	5	11		
017	5,00	5 + f	12		
018	5,00	6	12		
019	5,00	1	6	12	
020	5,31	f	7	13	
021	5,31	1 + f	7	13	
022	5,62	f	8	14	
023	5,62	1 + f	8	14	
024	6,00	2	8	14	
025	6,00	2	8	15	
026	6,00	2 + f	9	15	
027	6,15	3	9	15	
028	6,41	3	9	16	
029	6,41	3 + r	10	16	
030	6,41	4	10	16	
031	6,70	4 + f	10	17	
032	6,70	4 + f	11	17	
033	6,70	5	11	17	
034	7,00	f	5	11	18
035	7,00	f	5	12	18
036	7,00	f	6	12	18
037	7,00	1	6	12	18
038	7,31	f	6	13	19
039	7,31	f	7	13	19
040	7,31	f	7	14	19
041	7,62	f	7	14	20
042	7,62	f	8	14	20
043	7,62	1 + f	8	14	20
044	8,00	1 + f	8	14	21
045	8,00	1 + f	8	15	21
046	8,00	1 + f	9	15	21
047	8,00	2	9	15	21
048	8,15	3	9	15	21
049	8,15	3	9	15	22
050	8,41	3 + f	9	16	22

TABLE 14
PROPERTIES OF MATERIALS FOR SPECIAL CABLES (part 1)

					MECHANICAL				
ABBREVIATION	CHEMICAL DESIGNATION	WORKING TEMPERATURE C°	CONTINUOUS OPERATION LIMITING TEMPERATURE C°	SPECIFIC WEIGHT g/cm³	TENSILE STRENGTH N/mm²	SHORE HARDNESS	ELONGATION AT BREAK %	ABRASION	WATER ABSORPTION %
PVC	Polyvinylcloride	-40 up to +105	+ 70 + 80 +105	1.25 / 1.60 1.27 / 1.41	12.5 - 25	70 - 95 (A)	125-350	MEDIUM GOOD	0.4
LDPE	Polyethylene low-density PE	-40 up to +80	+ 80	0.92 / 0.93	10 -20	43 50 (D)	400-600	MEDIUM GOOD	0.1
HDPE	High-density PE	-55 up to +90	+ 90	0.94 / 0.96	25 40	60 - 63 (D)	500-1000	GOOD	0.1
XLPE	Cross linked PE	-60 up to +90	+ 115	0.93	12.5 - 20	300 -450		MEDIUM GOOD	0.1
EPR	Ethylen-proylene compounds polymeride compounds	-50 up to +90	+ 110	-	5 - 10	65-85 (A)	300-500	AVERAGE	1.0
PUR	Polyurethane	-40 up to +90	+ 110	1.20	35 - 50	70 -100 (A)	500 -700	VERY GOOD	1.5
EVA	Ethylene- vinyl acetate compounds Levapren	-40 up to +90	+ 125	-	8 - 12	70 - 80 (A)	250 350	MODERATE	1.0
SIR	Silicone rubber	-60 up to +200	+ 200	1.30	5 - 10	40 -80 (A)	300 -600	MODERATE	1.0

PROPERTIES OF MATERIALS FOR SPECIAL CABLES (part 2)

		THERMAL						
ABBREVIATION	CHEMICAL DESIGNATION	RADIATION RESISTANCEMRAD	BURNING CHARACTERISTICS	MELTING TEMPERATURE+ °C	OXYGEN INDEX LOI% 0²	FLAME RETARDACE	CORROSIVE GASES IN THE EVENT OF FIRE	LOW TEMPERATURE CHARACTERISTICS
PVC	Polyvinylcloride	80	SELF EXTINGUISHING	>140	23 - 42	MEDIUM GOOD	HYDROGEN CHLORIDE	MODERATE GOOD
LDPE	Polyethylene low-densityPE	100	FLAMMABLE	105 -110	≤ 22	POOR	NO	GOOD
HDPE	High-densityPE	100	FLAMMABLE	130	≤ 22	POOR	NO	GOOD
XLPE	Cross linked PE	100	FLAMMABLE	110	18 - 30	POOR	NO	GOOD
EPR	Ethylen-proylenecompounds polymeride com-pounds	200	FLAMMABLE	-	≤ 22	MODERATE POOR	NO	GOOD
PUR	Polyurethane	50	FLAMMABLE	150	20 - 26	AVERAGE MODERATE	NO	VERY GOOD
EVA	Ethylene-vinyl acetate compounds Levapren	100	FLAMMABLE	-	≤ 22	MODERATE	NO	GOOD
SIR	Silicone rubber	50	LOW FLAMMABLE	-	25 - 35	MODERATE GOOD	NO	VERY GOOD

PROPERTIES OF MATERIALS FOR SPECIAL CABLES (part 3)

		ELECTRICAL				
ABBREVIATION	CHEMICAL DESIGNATION	SPECIFIC VOLUME RESISTANCE Ω X cm / 20°c	DIELECTRIC CONSTANT 50 Hz/20°C	DIELECTRIC STRENGTH kV / mm 20°C	LOSS FACTOR TAN δ	DENSITY g/cm³
PVC	Polyvinylcloride	10^{12}–10^{15}	4.0 - 6.5	25	10^{-2} - 10^{-3}	1.35-1.5
LDPE	Polyethylene low-density PE	~10^{16}	2.25 - 2.6	70	~10^{-4}	0.92 - 0.94
HDPE	High-density PE	~10^{16}	2.4 - 2.5	85	~10^{-4}	0.94 - 0.98
XLPE	Cross linked PE	~10^{14}	2.3 - 2.6	50	~10^{-4}	0.92
EPR	Ethylen-proylene compounds polymeride compounds	10^{17}	3.0 -3.8	20	10^{-2} - 10^{-3}	1.3 - 1.55
PUR	Polyurethane	~10^{12}	~6.0	20	~10^{-2}	1.15 - 1.2
EVA	Ethylene- vinyl acetate compounds Levapren	10^{12}	5 - 6.5	30	2 x 10^{-2}	1.3 - 1.5
SIR	Siliconerubber	10^{15}	~3.0	20	~10^{-3}	1.2 -1.3

CABLE VOLTAGE REFERENCES

TABLE 15
NOMINAL VOLTAGE FOR CABLE IDENTIFICATION
AND DESIGNATION SYMBOLS IN SUBSTITUTION OF INSULATION LEVELS

Insulation rating		Cables voltage references		
(a)	(b)	Max. voltage kV	Nominale voltage Uo/U	Designation symbol
1.5		-	300/300 V	03
2		-	300/300 V	05
3		-	300/300 V	07
4		(1.2)	0.6/1 kV	1
	5	(1.2)	0.6/1 kV	1
-	-	3.6	1.8/3 kV	3
8		3.6	2.3/3 kV	2.3/3
	9	3.6	2.3/3 kV	2.3/3
-	-	3.6	3.3 kV	3/3
11		7.2	3.6/6 KV	6
	14	7.2	3.6/6 KV	6
	17	7.2	3.6/6 KV	6/6
17		12	6/10 KV	10
	22	12	6/10 KV	10
24		17.5	8.7/15 KV	15
	26	12	8.7/15 KV	8.7/10
	32	17.5	8.7/15 KV	15
	36	17.5	12/15 KV	12/15
32		24	12/20 KV	20
40		24	15/20 KV 1	15/20
47		36	8/30 KV	30
67		52	26/45 KV	45
92		72.5	36/60 KV	60

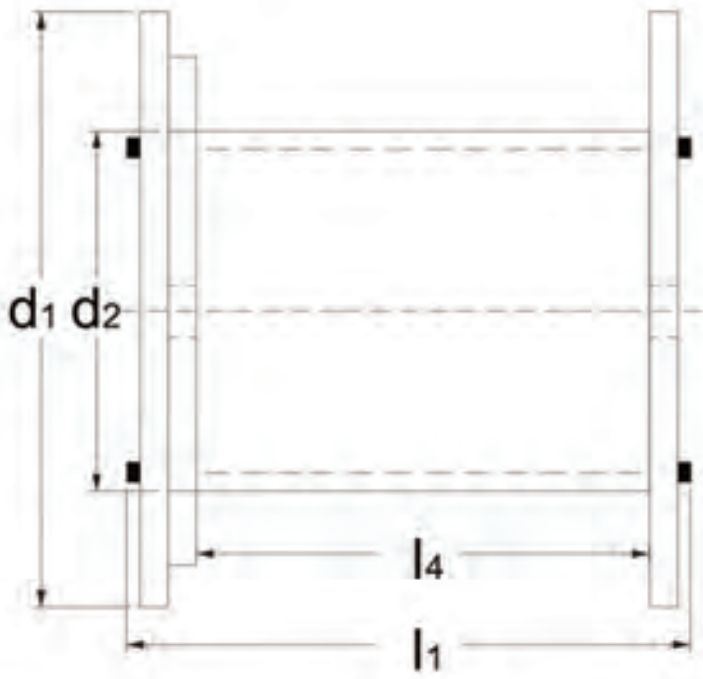

TABLE 16
STANDARDIZED DRUM SIZES

DRUM SIZE	FLANGE DIAMETER d1	MINOR DIAMETER d2	TOTAL WIDTH l1	SPOOL WIDTH l4	DRUM WEIGHT
	mm	mm	mm	mm	kg
051	500	150	470	410	8
061	630	150	390	315	13
071	710	355	520	400	25
081	800	400	520	400	31
091	900	450	690	560	47
101	1000	500	710	560	71
121	1250	630	890	670	144
141	1400	710	890	670	175
161	1600	800	1100	850	280
181	1800	1000	1100	840	380
201	2000	1250	1350	1045	550
221	2240	1400	1450	1140	710
250	2500	1600	1500	1140	875
251	2500	1600	1450	1130	900
260	2600	1520	1460	1200	1000
281	2800	1800	1635	1280	1175

TABLE 17
mm

CABLE DIAMETER mm.	600	800	1000	1200	1400	1600	1800
3,0	6000	11000	22000				
4,0	3600	8500	16000				
5,0	2300	5500	10000	18000	25000		
6,0	1600	3700	7300	12500	17500		
7,0	1200	2800	5500	9500	13000		
8,0	930	2100	4300	7000	10000	12000	
9,0	700	1600	3200	5700	7800	9600	
10,0	560	1400	2600	4600	6400	7800	
11,0	470	1100	2200	3700	5100	6500	
12,0	400	930	1900	3100	4400	5400	
13,0	340	810	1600	2750	3700	4700	
14,0	280	700	1450	2300	3200	4300	
15,0	230	590	1230	2100	2800	4000	
16,0		550	1100	1900	2600	3800	
17,0		470	950	1600	2300	3400	
18,0		430	850	1450	2000	3000	
19,0		370	780	1300	1750	2700	
20,0		330	720	1200	1600	2500	
21,0			650	1100	1500	2200	3500
22,0			570	1000	1400	2000	2850
23,0			530	930	1300	1900	2460
24,0			480	790	1200	1700	2400
25,0			440	750	1080	1600	2200
26,0				700	950	1500	2060
27,0				650	870	1400	1700
28,0				600	820	1300	1750
29,0				580	780	1200	1750
30,0				540	730	1100	1550
31,0				500	670	1030	1450
32,0				470	620	980	1350
33,0				440	570	950	1250
34,0				420	540	900	1200
35,0				400	500	840	1140
36,0					470	780	1080
37,0					440	740	1000
38,0					400	700	950
39,0					380	660	900
40,0					350	630	860
41,0						600	820
42,0						580	790
43,0						560	750
44,0						540	720
45,0						510	680
46,0						490	650
47,0						470	610
48,0						450	570
49,0						420	540
50,0						390	500

ITALIAN DESIGNATION SYSTEM according to UNEL 35011 - 72

F FF FR U	**Conductor flexibility:** Flexible Extra fine strands Multi-wire. round (hard) Single-wire, round (hard)
E E4 G4 G5 G6 G7 G8 G9 G10 R R2 R3	**Insulation type:** PE, Polyethylene XLPE, Cross linked polyethylene SiR, Silicone rubber (car. temp. 180°C) EPR, Ethylene propylene rubber (car. temp. 90°C) CSM, Chlorosulphonated PE (car. temp 85°C) Hight module EPR (car. temp 90°C) EPR for insuleted outer sheath (car. temp 85°C) Cross linked non toxic rubber max.750 V (car. temp 90°C) Cross linked non toxic rubber max.1000 V (car. temp 90°C) Soft PVC, polyvinylchloride (car. temp 70°C) Soft PVC, polyvinylchloride (car. temp. 70°C) Soft PVC, polyvinylchloride, heat resistant up to 90°C (car. temp. 105°C)
C H H1 H2	**Screen and conductor:** Copper conductor Alluminium or metallic foil screen Copper tape, copper wires screen or copper flat wires screen Copper wires braid screen
A F N Z	**Armour:** Steel wires braid Steel wires Steel tape Flat steel wires
E M1 M2 R G K T T2	**Sheath:** Ex, Ey Polyethylene Nontoxic thermoplastic compound Cross linked atossic rubber Rx, Ry Rz Polyvinylchloride Natural Rubber Polychloroprene Textil braid Glass Textil braid
O D X W	**Cable shape:** Round shape Flat shape >2 cables twisted togheter Separable flat configuration cable

EUROPEAN DESIGNATION according to CENELEC-HAR HD 361 (CEI 20-27 - VDE 0292)

H A N S	**Standards references:** Acc. to harmonised regulations National cable acc. to IEC National cable not acc. to IEC According to a special regulation
F H K R U	**Conductor flexibility:** Finely stranded for a flexible cable Extra fine stranded for a flexible cable Finely stranded for fixed installations Multi-wire, round (hard) Single-wire, round (hard)
03 05 07 1	**Voltage rating:** 300/300V 300/500V 450/750V 600/1000V
B E E4 E7 G N N2 N4 Q Q2 Q4 R S T V V2 X	**Insulation and sheath materials:** EPR, Ethylene propylene rubber PE, Polyethylene PTFE, Polytetrafluoroethylene PP, Polypropylene EVA, Ethylene vinyl acetate CR, Polychloroprene rubber Special Polychloroprene rubber CSM, Chlorosulphonated PE PUR, Polyurethane PETP, Polyethylene terephthalate PA, Polyamide Natural rubber or synthetic SiR, Silicone rubber Textil braid over twisted cores Soft PVC, polyvinylchloride Soft PVC, polyvinylchloride, heat resistant (up to 90°C) XLPE, Cross linked polyethylene
A C A7 C4 C5 C7	**Screen and conductor:** Alluminium conductor, concentric Copper conductor, concentric Aluminium screen Copper braid over twisted cores Copper braid over each core Copper tape, copper wires screen
Z2 Z3 Z4 Z5 Y2	**Armour:** Round steel wires Flat steel wires Steel tape Steel wires braid Round aluminium wires
H H2 H3 H5	**Cable shape:** Flat configuration of separable cables Flat configuration of not separable Flat webbed building cable >2 laid up, single core not sheathed cable

GERMAN DESIGNATION SYSTEM according to DIN VDE

H N (N)	**Standards references:** Acc.to harmonised regulations National, VDE standard On the base of VDE standards
Li F FF E Re Rm	**Conductor flexibility:** Stranded Flexible, finely stranded Extra fine strands Single wire, solid Round, single-wire Round, multi-wire
G 2G 3G 4G 5G 6G H HX X Y Yu Yw 2Y 02Y 2X 3Y 4Y 5Y 9Y 11Y 12Y 14Y	**Insulation and sheath materials:** Rubber SiR, Silicone rubber EPR, Ethylene propylene rubber EVA, Ethylene vinyl acetate CR, Polychloroprene rubber CSM, Chlorosulphonated PE Halogen free, flire retardant Cross linked, halogen free Cross linked PVC PVC, polyvinylchloride Flame retardant PVC PVC, heat resistant up to 90°C PE, Polyethylene PE Foam, cellular PE XLPE, Cross linked polyethylene PS, polystyrene PA, Polyamide PTFE, Polytetrafluoroethylene PP, Polypropylene PUR, Polyurethane PETP, Polyethylene terephthalate PFA, perfluoralkoxy
PiMF TiMF (C) (L) (St) (CuB)	**Screen:** Pair in metal foil Triple in metal foil Copper wires braid Plastic coated aluminium tape Aluminium foil (static screen) Copper tape
B Q Z R	**Armour:** Double steel tape Steel wires braid Flat steel wires braid Round steel wires
Bd -Z	**Cabling:** Cabling elements forming a bundle Cores imprinted with numbers
MSR J- JE- RD-	**Cable type:** Instrumentation cables Installation cables Industrial electronics cables Control systems cables

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