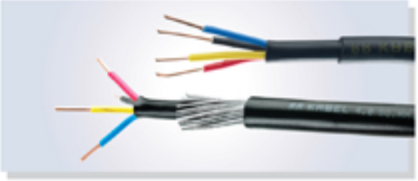
Armoured Unarmoured Cables

PVC Insulated Heavy Duty Power + Control Cable as per IS 1554 (P-1)

- Heavy Duty performance.
- Offers the best combination of safety, efficiency and economy.



Specifications: IS 1554 (P-1)

Construction		IS Specification
Conductor	: ETP Grade Copper	8130
Insulation	: PVC type A or C	5831
Inner Sheath	: PVC type ST1 or ST2	5831
Armour	: Galvanized steel wire strip	3975
Outer Sheath	: PVC type ST1 or ST2	5831

Core Identification:

For power cable and control cable upto 4 cores, the cores are identified by different colours as per IS 1554: (Part 1)

Single Core	: Red, Yellow, Blue, Black etc.(only unarmoured)
2 Core	: Red and Black
3 Core	: Red, Yellow and Blue
4 Core	: Red, Yellow, Blue and Black.
5Core	: Red, Yellow, Blue, Black and Grey.

When the number of core exceed 5, numbering is provided on core.

Applications: Heavy Duty Power and Control Cables are used for Underground power supply by Utility provider for Street Lights, Industrial Automation with mechanical strength for protection on insulated cores and other industrial applications.

Duration of short ckt. in sec.	1 cycle = 0.02 s	2 Cycles	5 Cycles	10 cycles	25 Cycles	50 Cycles	2 sec.	3 sec.	4 sec.	5 sec.
Short ckt. Constant per unit area	536	378	239	169	107	75.5	53	43.6	37.8	34.0

Current Rating of RR KABEL Copper Armoured / Unarmoured Cables 650 / 1100 V Grade in Air

Area, sq.mm	Twin core, Amp.	3, 3½, 4 core, Amp.
25	105	90
35	125	110
50	155	135

Note: The entire range of Power and control cables can be supplied with Flame Retardant Low Smoke (FRLS) or Halogen Free Flame Retardant (HFFR) sheathing on request.

Charging Lives Globally.

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BRAIDED CABLES

Multicore Flexible Braided Cables

- Braiding Min. 65% Coverage.

Conductor: Annealed Bare Copper as per IS 8130.

Insulation PVC: Type A conforming to IS 5831.

Core Colours: upto 4 cores, Black with white numbering +Green/ Yellow.

Sheath Colour: Grey, Black and white.

Test Voltage: 2000 V A.C.

Braiding: Annealed tinned copper wire braiding.

Rated Voltage: 300/500 V

PVC Sheath: Type ST-1 conforming to IS 5831.HR, FR and FRLS sheathing can be provided as per requirement.

Min. Bending Radius: 6 times the overall diameter of cable.

Max Working Temperature: 70°C, also available for 85ºC and 105ºC as per requirement.

Max Short Circuit Temperature: 160°C

Minimum Laying Temperature: upto -15°C

Applications: Is suitable for interconnection of electrical measuring devices to Instrument panel or instrument. Measuring, monitoring and control in machine tool manufacturing, in plant engineering, in all places where electrical interference fields can distort a signal transmission or where Interference pulses arising in the mains must be confined.

No. Of cores per conductor	No. Of sq.mm^2 per conductor	Approx cable diameter in mm	Copper weight kg/km	Approx weight kg/km
2	0.5	5.3	21	57
3	0.5	5.6	25	64
4	0.5	6.2	35	84
5	0.5	6.7	33	89
6	0.5	7.4	39	107
7	0.5	7.9	43	121
8	0.5	8.5	49	138
10	0.5	9.3	60	167
12	0.5	9.6	67	180
14	0.5	10	78	201
16	0.5	10.7	88	228
18	0.5	11.2	96	249
2	0.75	5.7	25	66
3	0.75	6.2	31	79
4	0.75	6.7	38	93
5	0.75	7.2	45	109
6	0.75	8	53	132
7	0.75	8.6	59	150
8	0.75	9.4	68	177
10	0.75	10.2	83	211
12	0.75	10.4	93	224
14	0.75	11.1	106	255
16	0.75	11.6	121	284
18	0.75	12.4	134	319

No. Of cores per conductor	No. Of sq.mm^2 per conductor	Approx cable diameter in mm	Copper weight kg/km	Approx weight kg/km
2	1.0	6	29	74
3	1.0	6.5	37	90
4	1.0	7.1	46	108
5	1.0	7.6	56	127
6	1.0	8.5	66	154
7	1.0	9.1	74	175
8	1.0	9.9	84	203
10	1.0	10.8	104	246
12	1.0	11.2	119	270
14	1.0	11.8	137	305
16	1.0	12.3	154	335
18	1.0	13.2	172	380
2	1.5	8.5	37	128
3	1.5	7.6	50	121
4	1.5	8.2	62	145
5	1.5	9.1	76	177
7	1.5	10.8	100	242
8	1.5	11.6	115	279
2	2.5	8.6	55	146
3	2.5	9.4	76	183
4	2.5	10.2	96	221
5	2.5	11.3	117	270
7	2.5	13.5	157	375
12	2.5	16.7	261	591

NOTE : Mylar Tape provided over the cores.

* The above data is indicative and may be revised without prior intimation.

RATNA LAN CAT 5e

Tech details

ELECTRICAL & TRANSMISSION PROPERTIES

	Frequency MHz	Cat 5e
Attenuation at (dB/100 m at 20° C), max.	1.00 MHz	2.0
	4.00 MHz	4.1
	10.00 MHz	6.5
	20.00 MHz	9.3
	31.25 MHz	11.7
	62.50 MHz	17.0
	100.00 MHz	22.0
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...
Propagation Delay (ns/100 m at 20° C) max.	1.00 MHz	570
	10.00 MHz	545
	20.00 MHz	542
	100.00 MHz	538
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...
Next dB	1.00 MHz	65.3
	4.00 MHz	56.3
	10.00 MHz	50.3
	20.00 MHz	45.8
	31.25 MHz	42.9
	62.50 MHz	38.4
	100.00 MHz	35.3
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...
PSNEXT dB	1.00 MHz	62.3
	4.00 MHz	53.3
	10.00 MHz	47.3
	20.00 MHz	42.8
	31.25 MHz	39.9
	62.50 MHz	35.4
	100.00 MHz	32.3
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...

	Frequency MHz	Cat 5e
ELFEXT dB/100m	1.00 MHz	63.8
	4.00 MHz	51.7
	10.00 MHz	43.8
	20.00 MHz	37.7
	31.25 MHz	33.9
	62.50 MHz	27.8
	100.00 MHz	23.8
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...
PSELFEXT dB/100m	1.00 MHz	60.8
	4.00 MHz	48.7
	10.00 MHz	40.8
	20.00 MHz	34.7
	31.25 MHz	30.9
	62.50 MHz	24.8
	100.00 MHz	20.8
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...
RL dB	1.00 MHz	19.0
	4.00 MHz	20.8
	10.00 MHz	22.0
	20.00 MHz	22.0
	25.00 MHz	21.3
	31.25 MHz	20.6
	62.50 MHz	18.5
	100.00 MHz	17.1
	150.00 MHz	...
	200.00 MHz	...
	250.00 MHz	...

RATNA LAN CAT 5e

UTP 4 pair Data Cables

Applications: CAT 5e UTP cables are high performance Cables used increasingly for modern Computer network systems. These cables form the back bone of modern data transmission in industries and high-rise "intelligent buildings".

Performance: RATNALAN enhanced CAT 5e UTP cables are capable of handling 100+ Mbps data rates.

RATNALAN CAT 5e UTP is independently verified to exceed the requirements of the EN50173,ISO/IEC 11801 and TIA/EIA 568-B-1/B-2 Category 5e proposals.

Construction:	
Conductor	24 AWG Solid bare copper
Insulation	High Density Polyethylene
Pairs	2 Insulated conductors twisted, Twisted together

Colour Code:	
1Pair	White-Orange Stripe and Orange
2Pair	White-Green Stripe and Green
3Pair	White-Blue Stripe and Blue
4Pair	White-Brown and Brown

Outer Jacket: FR PVC

Printing: 'RR KABEL 4PAIR 24 AWG UTP TIA/EIA-568-B.2.1 CATEGORY 5e' and sequential length counter.

Packing: Available in easy pull box of 100 and 305m. Longer lengths also available on request in non returnable reels.

Physical Properties:

Max Short Circuit Temperature:	
Conductor	**0.5mm (24AWG) Nominal, Solid annealed copper**
Cable Diameter	**6.0mm**
Cable Weight	**Nom. 9.95 kg/305m**
Bend Radius	**Min. 20mm**
Pulling Tension	**Max. 110N (11.3 Kgf)**
Temp Rating	**-20°C to +75°C**
Flame Test	**IEC 60332-1 / UL 1581 VW-1**

CONTROL CABLES

PVC Insulated and Sheathed Flexible Control Cables

Applications: These cables are used for flexible use for medium mechanical stresses with Free Movement without tensile stress in dry & moist condition for measuring and control cables in tool machines, conveyor belts, production lines in machinery production and in steel production.

Conductor: Annealed Bare Copper as per IS 8130.

Insulation PVC: Type ST-1 conforming to IS 5831.

Insulation PVC Sheath: HR, FR and FRLS sheathing can be provided as per requirement.

Core Colours: Black with white numbering + Green / Yellow.

Sheath Colour: Black.

Rated Voltage: 300/500 V

PVC Sheath: Type ST-1 conforming to IS 5831.HR, FR and FRLS sheathing can be provided as per requirement.

Min. Bending Radius: 4 times the overall diameter of cable

Test Voltage: 2000 V A.C.

Max Working Temperature: 70°C, also available for 85ºC and 105ºC as per requirement.

Max Short Circuit Temperature: 160°C

Minimum Laying Temperature: upto -15°C

No. Of Cores and mm^2 per conductor	Finished Cable Dia in mm	Approx Wt of cable Kg/Km
0.50x2C	4.8	34
0.50x3C	5.1	41
0.50x4C	5.7	52
0.50x5C	6.2	62
0.50x7C	7.9	88
0.50x12C	9.1	138
0.50x18C	10.7	196
0.50x19C	10.6	198
0.50x25C	13.0	284
0.75x2C	5.2	42
0.75x3C	5.5	51
0.75x4C	6.2	66
0.75x5C	6.8	80
0.75x7C	8.1	113
0.75x10C	9.6	160
0.75x12C	9.9	177
0.75x18C	11.9	260
0.75x19C	12.3	276
0.75x25C	14.5	377
1.0x2C	5.5	49
1.0x3C	6.0	63
1.0x4C	6.6	79
1.0x5C	7.2	96
1.0x7C	8.6	135
1.0x8C	9.4	159
1.0x12C	10.0	218
1.0x14C	11.3	247
1.0x16C	12.0	280
1.0x18C	12.7	315
1.0x19C	13.0	331
1.0x25C	15.6	459

No. Of Cores and mm^2 per conductor	Finished Cable Dia in mm	Approx Wt of cable Kg/Km
1.5x2C	6.3	66
1.5x3C	6.7	83
1.5x4C	7.3	102
1.5x5C	8.2	129
1.5x7C	9.8	183
1.5x8C	10.6	212
1.5x12C	12.1	292
1.5x18C	14.5	427
1.5x19C	15.2	461
1.5x25C	17.8	622
2.5x2C	7.6	101
2.5x3C	8.3	131
2.5x4C	9.10	164
2.5x5C	10.2	205
2.5x7C	12.1	288
2.5x12C	15.2	471
2.5x18C	18.1	685
2.5x19C	18.2	711
2.5x21C	20.7	839
2.5x25C	22.2	1011

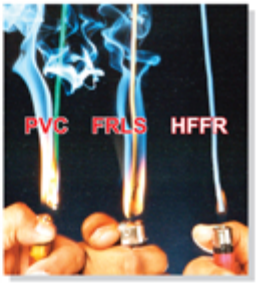
Conductor config. No. Of wires/max.dia	Conductor Resist ohm/km at 20°C max
0.5MM^2 (16/0.20mm)	39.0
0.75MM^2 (24/0.20mm)	26.0
1.0MM^2 (32/0.20mm)	19.5
1.5MM^2 (30/0.25mm)	13.3
2.5MM^2 (50/0.25mm)	7.98

* The above data is indicative and may be revised without prior intimation.

FIREX-*HFFR*

Halogen Free Flame Retardant Cable - upto 1100V

- India's 1st Fire-safe Cable with HFFR insulation and UNILAY conductor.
- Zero Halogen.
- Does not catch flame, does not propagate fire.
- Non-Toxic, Non-Corrosive.



Applications: Wiring in all installations where fire safety is more important. Schools, theaters, commercial complexes, air conditioned apartments, high rise buildings, fire alarm and emergency lighting circuits.

Specifications: Generally conforms to, IEC 60332-1 & 3, IEEE 383, IEC 60754-1 & 2, BS 4066-1 & 3, BS 7211, IS 8130.

Conductor: Thin strands of Electrolytic Copper are multi - drawn simultaneously for uniformity of Resistance, Dimension, and Flexibility. The drawn strands are uni-laid in high precision machines and compacted. A perfectly circular conductor is thus formed. This enables reduction in overall diameter for space saving in high density wiring. The strands do not get cut when stripping the Insulation. The conductor offers perfect contact at pins, terminals and sockets. This eliminates spot heating and sparking.

Insulation: Specially formulated grade of Halogen Free Flame Retardant (HFFR) compound is used. The performance of the cable in a fire situation is exceptionally good. The insulation does not burn readily. It does not melt and drip. The smoke is negligible, transparent, non toxic. The victims trapped in fire do not suffocate and this facilitates fire fighting operations. Unlike PVC, the smoke emitted is non-corrosive. Thus, the electronic printed circuit boards, hard disks and other sensitive electronic equipments are unaffected.

Marking: The cables are marked "FIREX-*HFFR*".

Colours: Red, Yellow, Blue, Black, Green.

Packing: 90 mtrs. (Approx. 100 yards) coils packed in protective cartons.

Sizes, Dimensions and Ratings

Conductor Area Sq. mm	Insulation Thickness mm	Number * Nominal Dia. of Strands	Max. Overall Diameter mm	Conductor Resistance ohm/km at 20°c (Max)	Current Rating Amps.	
					Casing	Concealed
1.00	0.6	19/0.26	3.2	18.1	14	13
1.50	0.7	19/0.32	3.4	12.1	18	16
2.50	0.8	37/0.29	4.2	7.41	24	20
4.00	0.8	37/0.37	4.8	4.61	32	26

* Conductor as per IS-8130 : 1984

FR Properties

Properties	Test Method	Value
Limited Oxygen Index	ASTM - D 2863	35%
Limited Temp. Index	ASTM - D 2863	> 250°c
Smoke Density (Light absorption)	ASTM - D 2843	< 10%
Acid Gas Generation	IEC - 60754- 1	< 5%

FLAMEX-*FRLS*

FRLS + HR 105° C Cable - upto 1100V

- Special Heat Resistant and Flame Retardant Low Smoke (FRLS) insulation.
- Higher Current Rating.
- Higher Temperature Rating.

Applications: Suitable for use in conduit and for fixed protected insulation particularly suitable for wiring in fire and explosion prone areas, chemical factories, densely wired areas, public buildings, schools, hospitals, commercial complexes, theatres etc.

Specifications: Generally conforms to, IS 694, BS 6004, DIN VDE 0281-3, IEC 60332-1, IEEE 383, IEC 60754-1, BS 4066-1, IS8130 & IS 5831.

Conductor: Many thin strands of Electrolytic Copper are fine - drawn simultaneously for uniformity of Resistance, Dimension and Flexibility. The drawn strands are twisted in high precision machines and compacted. This not only imparts circularity to the bunched conductor but also prevents the tendency of the strands to separate and exert internal pressure on the insulation when the cable is bent during installation and usage.

Insulation: Specially formulated high temperature grade of Flame Retardant Low Smoke compound to restrict the spread of flames in fire situation. The smoke emitted by the burning cable is less compared to traditional cables. This ensures improved visibility for evacuation of trapped victims and facilitates fire fighting operation.

Marking: The cables are printed with generic marking 'FLAMEX'.

Colours: Entire cable has White base and a double strip of Red, Yellow, Blue, Black, Green running along the length of the cable.

Packing: 90 mtrs. (Approx. 100 yards) coils packed in protective cartons. Project coils of 180 mtrs also available.

Sizes, Dimensions and Ratings

Conductor Area Sq. mm	Insulation Thickness mm	Number * Nominal Dia. of Strands	Max. Overall Diameter mm	Conductor Resistance ohm/km at 20°c (Max)	Current Rating Amps.	
					Casing	Concealed
1.00	0.6	14/0.3	3.2	18.1	14	13
1.50	0.7	22/0.3	3.4	12.1	18	16
2.50	0.8	36/0.3	4.2	7.41	24	20
4.00	0.8	56/0.3	4.8	4.95	32	26

* Conductor as per IS-8130 :1984

FR Properties

Properties	Test Method	Value
Limited Oxygen Index	ASTM - D 2863	31%
Temperature Index	ASTM - D 2863	> 250°c
Smoke Density (Light absorption)	ASTM - D 2843	≤ 60%

RATNAFLEX-*M*

Multicore Flexible Cables for Appliances & Machine Tools

- Compact construction.
- Rugged yet flexible for industrial use.
- High temperature insulation.

Conductor: Compactly bunched, electrolytic grade, annealed copper with high flexibility according to class 5 conductor as per IS 8130 sizes from 0.5 sq. mm to 35.0 sq. mm.

Type of Insulation	Type of Sheathing	Typical Applications	Specifications
Standard PVC	Standard PVC, HR PVC	Power cords for Appliances, Temporary Power supplies, 3 core flat cables are suitable for submersible pump applications.	IS 694, BS 6500, IEC 60227, DIN VDE-0281-5.
Heat Resistant PVC Up to 105ºC	Standard PVC, HR PVC	Hi-power Appliances, Ovens, Temporary Power Supply in higher temp. areas.	IS 694, BS 6500, IEC 60227, DIN VDE-0281-5
Standard PVC or FRLS	FRLS Flame Retardant Low Smoke & HFFR	Power cords for appliances used in fire prone areas, flame proof equipments, machine tools used in critical locations and heat zones.	IS 694, BS-6500, IEC 60227, DIN VDE-0281-5, IEC 60754-1, IEC 60332-1, BS-4066-1, ASTMD2843, ASTMD2863

Colours: Black Grey, & white (available on request).

Packing: 100 mtrs. Coils. Longer lengths of 300 / 500 and 1000 mtrs can be made available.

Physical andElectrical Properties

No. Of cores	Properties	0.5	0.75	1.0	1.5	2.5	4.0
CIRCULARLY LAID UP CORES	Conductor	16/0.2	24/0.2	32/0.2	30/0.25	50/0.25	56/0.3
	Ins. thickness, (nom), mm	0.6	0.6	0.6	0.6	0.7	0.8
	Single core OD (max.), mm	2.60	2.80	3.0	3.8	4.0	4.8
	Cond. resist. (max.), Ohm/km	39.0	26.0	19.5	13.3	7.98	4.95
2 CORES RED, BLACK	Sheath thickness, (nom), mm	0.9	0.9	0.9	0.9	1.0	1.0
	Overall dia. (max.), mm	7.20	7.80	8.0	8.60	10.50	12.0
	Current rating DC or single phase AC, amp.	6	9	14	18	24	32
	Voltage drop DC or single phase AC, mV/A/m	93	62	46	32	19	12
3 CORES RED, BLACK and GREEN	Sheath thickness, (nom), mm	0.9	0.9	0.9	0.9	1.0	1.0
	Overall dia. (max.), mm	7.60	8.20	8.60	9.20	11.0	12.50
	Current rating DC or single phase AC, amp.	6	9	14	18	24	32
	Voltage drop DC or single phase AC, mV/A/m	102	62	46	32	19	12
4 CORES RED, YELLOW, BLUE and GREEN	Sheath thickness, (nom), mm	0.9	0.9	0.9	1.0	1.0	1.0
	Overall dia. (max.), mm	8.20	8.80	9.40	10.50	12.0	14.0
	Current rating, three phase AC	6	9	14	18	20	25
	Voltage drop, three phase AC	88	54	40	27	16	10

* The above data is indicative and may be revised without prior intimation.

RATNAFLEX-*S*

Single-core flexible cables for Electrical Panel Switch Boards

- High Flexibility.
- Compact construction.

Conductor: Compactly bunched, electrolytic grade, annealed copper with high flexibility according to class 5 conductor as per IS 8130. Available in various sizes from 0.5 sq. mm to 300 sq. mm. Unilay conductor will be provided on special order from 1 to 4 sq. mm.

Insulation	Applications	Specifications
70°C/105°C Heat Resistant PVC	Wiring of panels for use in high ambient temperatures	IS-694, BS 6004, IEC 60227, DIN VDE-0281-3.
Flame Retardant Low Smoke (FRLS)	Wiring in high density critical installations in public places and fire prone areas	IS 694, IS 8130, IS 5831, IEC 60332-1, BS 4066-1, IEC 60754-1, ASTMD-2843, ASTMD-2863.
Halogen Free Flame Retardant (HFFR) From 1.0 to 4.0 sq.mm.	Wiring in critical installations in public places and in vicinity of electronic systems	IS 8130 & IS 5831, IEC 60332-1, BS 4066-1, IEC60754-1&2, ASTMD-2843, BS 7211, ASTMD-2863, DIN VDE-0282-9.

Colours: Red, Yellow, Blue, Green, Green/Yellow, Grey & Black.

Packing: 100 mtrs. Coils. Longer lengths of 300 / 500 and 1000 mtrs can be made available.

Physical and Electrical Properties

Cross section Area Sq. mm	Approx. AWG	Overall Dia., mm., Max.	Insulation Thickness, mm, Nom	Conductor Config. No. of wires/ max. Dia	Conductor Resist. Ohm/km at 20ºC Max	Max. current rating, Amp	Approx. voltage drop per amp per meter, mV
0.5	-	2.6	0.6	16/0.2	39	6	46.0
0.75	19	2.8	0.6	24/0.2	26	9	31.0
1.0	18	3.0	0.6	32/0.2	19.5	14	22.0
1.5	16	3.80	0.6	30/0.25	13.3	18	15.0
2.5	14	4.0	0.7	50/0.25	7.98	24	9.1
4.0	12	4.8	0.8	56/0.3	4.95	32	5.7
6.0	10	6.4	0.8	84/0.3	3.30	42	3.8
10.0	8	8.0	1.0	140/0.3	1.91	55	2.2
16.0	6	9.6	1.0	126/0.4 or 226/0.3	1.21	75	1.4
25.0	4	11.5	1.2	196/0.4	0.780	100	0.89
35.0	3	13.0	1.2	276/0.4	0.554	125	0.64
50.0	1	15.0	1.4	396/0.4	0.386	165	0.45
70.0	-	15.0	1.4	360/0.5	0.272	240	0.32
95.0	3/0	17.5	1.6	480/0.5	0.206	300	0.24
120	4/0	19.0	1.6	608/0.5	0.161	325	0.19
150	-	21.0	1.80	750/0.5	0.129	352	0.15
185	-	23.5	2.0	931/0.5	0.106	400	0.12
240	400	26.5	2.20	1200/0.5	0.0801	475	0.10
300	500	29.5	2.40	1500/0.5	0.0641	500	0.08

* The above data is indicative and may be revised without prior intimation.

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RR✓KĀBEL
wires without worries

BUILDING WIRE

RR✓eubiq
Convenience Empowered

Revolutionary Power Outlet System

Yet another first in the remarkable product lineage of Ram Ratna Group, RR✓ Eubiq is the result of a joint venture between the Group and Eubiq Pte. Ltd., Singapore. It is the world's first-of-its-kind electrical power outlet system with applications in domestic and commercial spaces. The system brings whole new level of 'functional convenience' with the sleekness of an object d'art. Moreover, it is ultra-safe, architecturally versatile, sleek and easy to install. Truly, a rare combination of beauty and convenience.

RR✓ CONNECT

Switch on the future

Ultra-modern aesthetic designs, multiple choices in configurations and co-ordinations, future-ready levels of safety are the hallmarks of these switches under brand "RR✓ Connect".

RR✓MICRO

High Tech Industrial Switches

Ram Ratna Group has decided to respond to the vital need for quality industrial switches. Propelled by the experience, and its own innovative pursuits, the Group has introduced RR✓ Micro Switches

RR✓PCE
Redefining safety

Industrial Plugs & Sockets

RR✓ PCE is the fruit of the alliance between the Group and PC Electric of Austria, a global leader. This high performance range is extensively used in industrial plants, exhibition centers, outdoor events and construction sites to name a few. In addition to industrial applications, the RR✓ PCE range also includes premium-quality plugs & sockets and metal distribution boxes designed exclusively for use in residences and offices. The entire range conforms to IEC standards and to IP67 and IP44 norms.

RR✓SHRAMIK
Winding Wire

Super Enamelled Copper Wires & Strips

Trusted by MNCs and India's top Electrical industries for decades, Ram Ratna Wires Ltd. is India's leading maker of Winding wires (Magnet wires). It is UL-certified ISO 9001:2000 company and its RR✓SHRAMIK brand is a name to reckon with. Enamelled winding wires find use primarily in rotary electrical machines, as original equipment as well as in replacement markets

RR✓COPPER

Oxygen Free Bus Bar & Tapes

With a strong presence in the Electrical Switchboard industry, Ram Ratna Group has diversified into manufacturing of Bus Bars. Also operational is a plant to manufacture Oxygen Free Copper tapes for earthing.

RR✓PARKON
Automated Multi-level Car Parking Systems

Automated Multi-Level Car Parking Systems

In anticipation of the galloping need for car parking space in busy urban India, Ram Ratna Group collaborated with the best available technology from Korea, to usher in the great new concept of vertical car parking. Technically sound and reliable, and operationally quick and smooth, the variety of custom made multi-level parking solutions offered by RR✓ PARKON has already begun to change the urban landscape. In fact more than 100 projects have just been completed.

RAM RATNA
GROUP

ENRICHING LIVES THROUGH INNOVATION

Innovation, Trust and Transparency are the key drivers to growth and excellence in RAM RATNA GROUP. In fact it is a way of life.

Brilliant, simple ideas for better living have been the hallmark of Ram Ratna Group. Present in over 73 countries across the globe, the group endeavors to set standards that redefine quality, delivery and customer care. The Group's success is attributed to promptness in identifying and responding to emerging market needs. Top-of-the-line technologies driven by skilled team of technocrats give the group a cutting edge in both domestic and global markets. The Group is engaged in diverse range of activities spanning from electricals, magnet wires, infrastructure, dyes & chemicals, to exports.

RR Kabel presents the latest and the widest range of electrical wires for a diverse spectrum of applications from control switchboards to building and construction industries and even telecommunication industry.

From FIREX-HFFR, the only cable to have HFFR insulation with UNILAY conductor, to FLAMEX-FRLS, low smoke and flame retardant cables to the premium RR Unilay, RR Kabel range of wires are high on current rating, temperature rating, current carrying capacity and low on broken ends, loose contacts, sparking, over-heating and conductive losses.
Quality is an unwavering passion at Ram Ratna Group. RR Kabel has ensured that the world's best quality electrical wires and cables are available here in India.

RR Kabel Ltd is an ISO 9001:2000 company which has earned multiple international accreditations like BASEC (U.K.), UL (U.S.A.), VDE (Germany), CE and many more, for its wide range of cables.

RR Kabel is the first wire and cable manufacturing company in India to be accredited with ISO 14001:2004 and 18001:2001 (OHSAS).

RoHS

International Accreditions

U.K. U.S. Germany Saudi Arabia Singapore South Africa

Other Accreditions

RATNA*COM*

Telephone and Switchboard Cables

- Low attenuation.
- Minimized cross talk.
- Flame retardant jacket.

Applications: Recommended for switchboard and internal telephone wiring in high rise building, offices, factories, hotels, residential complexes, transmission of analog and digital signals, internal wiring in faxes, modems, computers, alarm enunciators, data recording / acquisition systems and various communication devices.

Specifications: ITD-S/WS 113C & 114C, DOT G / WIR 06/02 MAY 94, ITI D 3005 & D2712.

Conductor: The central conductor is made of 99.97% pure solid electrolytic grade copper.

Insulation: Premium quality PERATT grade polyethylene used on a special extruder, with several online testing equipments.

Twisted Pairs: The cores are carefully twisted with suitable lays and bunched together so that the cross talk is reduced.

RipCord: A nylon rip cord is provided in order to safely peel off the jacket without damage to the cores.

Sheath: The laid up pairs are jacketed with special Flame Retardant (FR) compound to resist flame.

Packing: Normally available 100m coils in shrink-wrapped. Higher lengths available on special order.

Sizes, Dimensions and Ratings:

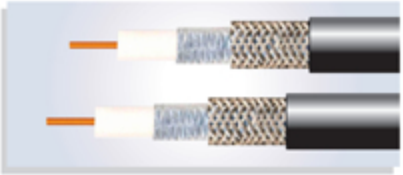
Construction Parameters:

	Cable Type				
	2 Pair	3 Pair	4Pair	5 Pair	10 Pair
Approx. Overall Diameter	3.50 mm	4.20 mm	5.30 mm	6.00 mm	8.50 mm
Conductor Diameter	Solid Annealed Bare Copper, 24AWG (0.5mm) (approx 0.5mm)				
Insulation Material	High Density Polyethylene				
Insulation Thickness	Avg. 0.2 mm				
Rip Cord	Nylon				
PVC Jacket	Flame Retardant PVC				

Electrical Parameters	
Conductor Resistance	92.20 ohm / km at 20° C max.
Mutual Capacitance	50 nF / km max.
Insulation Resistance in Air	10000 M-ohm / km
Capacitance Unbalance - pair to pair	250 pF / 100m max.
Capacitance Unbalance - pair to ground	330 pF / 100m max.
Resistance Unbalance	5% max.

RATNA*CO-X*

Co-Axial Cables for CATV Networks



- High quality Co-axial cable for Cable TV network.
- Notch free attenuation values over wide band of frequencies.
- The special jacketing offers increased life even in rugged conditions.

Conductor: The central conductor is made of 99.97% pure solid electrolytic grade copper conductor, which has distinct advantages over traditional copper conductor.

Insulation: The insulation provided over the conductor is of foam PE which acts as a dielectric.

Screen: Aluminium Mylar tape is provided over the insulated conductor to shield the conductor and ensure disturbance free transmission of signals.

Braiding: The braiding provided is of 60% coverage of ATC (Annealed tinned copper).

Construction Parameters:

		Cable Type		
		RG 11 F	RG 6 F	RG 59 F
Inner Conductor		ABC	ABC	ABC
Nom. Dia. (mm)		1.63	1.02	0.8
Dielectric		Foam PE	Foam PE	Foam PE
Nom. Dia. (mm)		7.00	4.50	3.50
Outer Conductor	First	Bonded Al Tape	Bonded Al Tape	Bonded Al Tape
	Second	Tinned Cu/Al Braid	Tinned Cu/Al Braid	Tinned Cu/Al Braid
Nom. Coverage (%)		60	60	60
Jacket		PVC (Black)	PVC (Black)	PVC (Black)
Nom. Dia. (mm)		10.00	7.00	6.20

Electrical Parameters:

	Cable Type		
	RG 11 F	RG 6 F	RG 59 F
Inner Conductor-Max.Resistance (ohm/100m) @ 20°C	0.80	2.10	3.43
Nom. Capacitance (pF/mtr.)	53	53	53
Characteristic Impedance (Ohms)	75	75	75
Velocity of Propagation (%)	85	85	85
Dielectric Strength (kV)	>1	>1	>1
Minimum Bending Radius (mm)	75	65	60
Maximum Attenuation at 20°C (db/100m) At	Max.	Max.	Max.
5 MHz	1.25	1.95	2.81
50 MHz	3.10	5.30	6.71
100 MHz	4.20	7.00	8.80
200 Mhz	6.00	9.90	12.40
250 MHz	6.72	10.50	13.45
300 MHz	7.38	11.50	14.60
350 MHz	7.94	12.45	15.75
400 MHz	8.53	13.30	16.73
450 MHz	9.02	14.35	17.72
500 MHz	9.51	14.95	18.70
550 MHz	9.97	15.70	19.52
600 MHz	10.43	16.45	20.34
750 MHz	11.97	18.35	22.87
800 MHz	12.40	19.50	24.52
900 Mhz	13.00	20.10	24.70
1000 Mhz	14.27	21.48	26.63

SHIELDED CABLES

Multicore Flexible Shielded Cables

Conductor: Annealed Bare Copper as per IS 8130.

Insulation PVC: Conforming to IS 5831.

Shield: Aluminium Mylar taped wrapped, over all laid up cores along with annealed tinned copper drain wire. In case of multipairs / multitriads individual pair/triad is wrapped with Aluminium Mylar tape along with drain wire and identification of pair/triad is done by numbered black core / numbered shielded tape.

Sheath Colour: Grey, Black and White (available on request).

PVC Sheath: Type ST-1 conforming to IS 5831. HR, FR and FRLS sheathing can be provided as per requirement.

Rated Voltage: 300/500 V. **Test Voltage:** 1000 V A.C. for 1 minute.

Min. Bending Radius: 6 times the overall diameter of cable.

Max Working Temperature: 70°C, also available for 85°C and 105°C as per requirement.

Max Short Circuit Temperature: 160°C **Minimum Laying Temp.:** Upto-15°C

Application: Is suitable for interconnection of electrical measuring devices to instrument panel or instrument. Measuring, monitoring and control in machine tool manufacturing, in plant engineering, in all places where electrical interference fields can distort a signal transmission or where Interference pulses arising in the mains must be confined.

No. Of Pairs x Cross sec. Sq.mm	Max. Dia Of Conductor Strands mm	Finished Cable Dia mm(nom)	Approx Weight Kg/Km
1 x 2 x 0.5	0.2	7.5	80
2 x 2 x 0.5	0.2	10.2	142
4 x 2 x 0.5	0.2	11.0	175
6 x 2 x 0.5	0.2	12.6	232
8 x 2 x 0.5	0.2	13.8	283
10 x 2 x 0.5	0.2	14.6	323
12 x 2 x 0.5	0.2	15.7	374
16 x 2 x 0.5	0.2	17.5	470
20 x 2 x 0.5	0.2	18.5	538
1 x 2 x 0.75	0.2	7.9	91
2 x 2 x 0.75	0.2	10.6	158
4 x 2 x 0.75	0.2	11.7	206
8 x 2 x 0.75	0.2	14.6	334
10 x 2 x 0.75	0.2	15.8	396
12 x 2 x 0.75	0.2	17.0	462
16 x 2 x 0.75	0.2	19.0	585
20 x 2 x 0.75	0.2	21.5	741
1 x 2 x 1.5	0.25	8.8	127
2 x 2 x 1.5	0.25	11.7	223
4 x 2 x 1.5	0.25	13.5	333
6 x 2 x 1.5	0.25	16.0	475
8 x 2 x 1.5	0.25	16.8	563
12 x 2 x 1.5	0.25	19.3	782
16 x 2 x 1.5	0.25	22.0	1025
24 x 2 x 1.5	0.25	26.5	1506

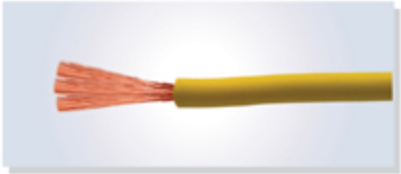
* These cables are also available with armouring on request.

* The above data is indicative and may be revised without prior intimation.

SUPEREX

FR+HR 105° C Cables - upto 1100V

- India's 1st Flame Retardant and Heat Resistant PVC cables.
- Greater current-carrying capacity offers economy of wire-gauge.
- Higher Short-Term and Long-term temperature rating.
- No overheating or melting.
- Steam and boiling water resistant.



Applications: Suitable for use in conduit and for fixed, protected installation.

Specifications: Generally conforms to IS 694,BS 6004,IEC 60227, DIN VDE 0281-3, SS-358, IS 8130 & IS 5831, BS 6231.

Conductor: Many thin strands of Electrolytic Copper are fine - drawn simultaneously for uniformity of Resistance, Dimension, and Flexibility. The drawn strands are twisted in high precision machines and compacted. This not only imparts circularity to the bunched conductor but also prevents the tendency of the strands to separate and exert internal pressure on the insulation when the cable is bent during installation and usage.

Insulation: Specially formulated Heat Resistant of PVC compound is used. A rating of 105°C enables the cable to withstand overloads without compromising safety. "FR" property ensures the flame is not propogated. The insulation is resistant to boiling water, steam and vapors. This prevents ageing and cracking during usage in kitchens, bathrooms, damp walls, chemical industries etc.

Marking: The cables are printed with generic marking 'SUPEREX - FR'.

Colours: Red, Yellow, Blue, Black, Green.

Packing: 90 mtrs. (approx. 100 yards) coils packed in protective cartons. Project coils of 180 also mtrs available.

Sizes, Dimensions and Ratings

Conductor Area Sq. mm	Insulation Thickness mm	Number * Nominal Dia. of Strands	Max. Overall Diameter mm	Conductor Resistance ohm/km at 20°c (Max)	Current Rating Amps.	
					Casing	Concealed
1.00	0.6	14/0.3	3.2	18.1	14	13
1.50	0.7	22/0.3	3.4	12.1	18	16
2.50	0.8	36/0.3	4.2	7.41	24	20
4.00	0.8	56/0.3	4.8	4.95	32	26
6.00	0.8	84/0.3	5.6	3.30	42	35

* Conductor as per IS-8130 : 1984

RR✓ UNILAY

FR + HR 105°C Cables with 'UNILAY' conductor – upto 1100V

Traditional
Bunch Conductor

UNILAY
Conductor

- India's first Flame Retardant and Heat Resistant P.V.C. cable with Unilay conductor.
- No loose contacts, No broken ends.
- No sparking or overheating.
- Facilitates perfect contacts.
- Minimizes conductive losses.

Applications: Suitable for use in conduit and for fixed, protected installation. Ideal for high density wiring.

Specifications : Generally conforms to IS 694, BS 6004, IEC 60227, DIN VDE 0281-3, IS 8130 & IS 5831.

Conductor: Thin strands of Electrolytic Copper are multi - drawn simultaneously for uniformity of Resistance, Dimension and Flexibility. The drawn strands are uni-laid in high precision machines and further compacted. A perfectly circular conductor is thus formed. This enables reduction in overall diameter for space saving in high density wiring. The strands do not get cut when stripping the Insulation. The conductor offers perfect contact at pins, terminals and sockets. This eliminates spot heating and sparking.

Insulation: Specially formulated Heat Resistant PVC compound is used. A rating of 105°C enables the cable to withstand overloads without compromising safety. Flame Retardant (FR) property retards the propagation of flame. The insulation is resistant to boiling water, steam and vapors.

Marking: The cables are printed with generic marking of " RR UNILAY ".

Colours: Skin colours in Red, Yellow, Blue, Black, Green.

Packing: 90 mtrs. (Approx. 100 yards) coils packed in protective cartons.

Sizes, Dimensions and Ratings

Conductor Area Sq. mm	Insulation Thickness mm	Number * Nominal Dia. of Strands	Max. Overall Diameter mm	Conductor Resistance ohm/km at 20°c (Max)	Current Rating Amps.	
					Casing	Concealed
1.00	0.6	19/0.26	3.2	18.1	14	13
1.50	0.7	19/0.32	3.4	12.1	18	16
2.50	0.8	37/0.29	4.2	7.41	24	20
4.00	0.8	37/0.37	4.8	4.61	32	26

* Conductor as per IS-8130 :1984

Table III: 2.5 sqmm., Solid Copper Conductor, PVC insulated, PVC Sheathed, Unarmoured (YY) / Armoured (YWY & YFY) Multicore Control Cables - 650/1100 Volts

			Unarmoured		Armoured			Max.DC	In Air		In Ground	
Size	Nom. Thickness Of PVC Insulation mm.	Cores	Approx Overall cable Dia mm.	Approx Weight Kg. / km.	Nom. Steel Armour Size mm.	Approx. Overall cable Dia. mm.	Approx Weight Kg. / km.	Conductor Resistance At 20° C Ohm / km	PVC insulation Amps.	HRPVC Insulation Amps.	PVC insulation Amps.	HRPVC Insulation Amps.
2.5	0.9	2	11.8	197	1.4	14.6	519	7.41	27	32	32	37
	0.9	3	12.4	233	1.4	15.2	575	7.41	24	29	27	31
	0.9	4	13.3	278	1.4	16.1	652	7.41	24	29	27	31
	0.9	5	14.3	328	1.4	17.1	737	7.41	19	23	23	27
	0.9	6	15.4	384	1.4	18.2	832	7.41	18	21	21	25
	0.9	7	15.6	410	1.4	18.4	864	7.41	17	20	20	23
	0.9	8	17.2	489	4 x 0.8	19.1	783	7.41	17	20	20	23
	0.9	9	18.5	560	4 x 0.8	20.4	880	7.41	16	19	19	22
	0.9	10	19.6	627	4 x 0.8	21.1	942	7.41	15	18	18	20
	0.9	12	20.2	692	4 x 0.8	21.7	1016	7.41	14	17	17	19
	0.9	14	21.1	771	4 x 0.8	22.6	1111	7.41	13	16	16	18
	0.9	16	22.1	858	4 x 0.8	23.6	1215	7.41	12	15	15	17
	0.9	18	23.2	952	4 x 0.8	24.7	1328	7.41	12	15	15	17
	0.9	20	24.4	1055	4 x 0.8	25.9	1452	7.41	11	13	13	15
	0.9	24	26.8	1270	4 x 0.8	28.3	1708	7.41	11	13	13	15
	0.9	27	27.3	1357	4 x 0.8	28.8	1801	7.41	10	12	12	14
	0.9	30	28.4	1483	4 x 0.8	30.0	1952	7.41	10	12	12	13
	0.9	37	31.0	1792	4 x 0.8	32.0	2250	7.41	9	11	11	12
	0.9	44	34.6	2194	4 x 0.8	36.0	2736	7.41	9	10	10	11
	0.9	52	36.1	2461	4 x 0.8	37.0	2983	7.41	8	9	10	11
	0.9	61	38.2	2810	4 x 0.8	39.0	3346	7.41	8	9	9	10

Cables with stranded conductors also made on request. * The above data is indicative and may be revised without prior intimation.

*The size up to 50.0 sqmm core available on request.

Table - B

Current ratings

The current rating given in tables are based on normal conditions of installation described below:

1. Maximum Conductor temperature 70°C for PVC insulation & 80°C for HRPVC insulation.
2. Thermal Resistivity of soil 150°C cm/w
3. Thermal Resistivity of PVC 650°C cm/w
4. Ground temperature 40°C
5. Depth of laying 75cms

(To the highest point of cable laid direct in the ground)

Formula for calculating the Short Circuit for other durations

$$I_t = \frac{I_1}{\sqrt{t}}$$

Where.....

I_1= Short Circuit Current for one second.

I_t= Short Circuit Current for t second.

t= Duration in seconds.

Note : For cables in air , no reduction in current rating is necessary provided that

1. The horizontal clearance between circuits is: (a) not less than six times the overall diameter of an individual cable, and (b) not less than the overall width of an individual circuit, except that the horizontal clearance need not in any case exceed 150mm.
2. If the number of circuits exceeds 4, they are installed in a horizontal plane.

However, for installation conditions other than above, current rating factors incorporated in IS 3961 Part II may please be applied.

The following points should be taken in to consideration before selecting any particular size and type of cable:

1. The system of power & voltage source where the cables are being used.
2. Conditions of installation at site.
3. Current carrying capacity of cable.
4. Voltage drop of cable.
5. Short circuit capacity of cable.
6. Availability of the selected size of cable.

Tables I to III: Copper Conductor, PVC Insulated, PVC Sheathed Cables.

Table I : 2 core, 3 core & 4 core copper conductor, PVC Sheathed, Unarmoured (YY) / Armoured (YWY & YFY)* cables - 650 / 1100 Volts.

			Unarmoured			Armoured				In Air		In Ground	
No. Of Cores	Nom. Cross Sectional Area Sq. mm.	Class of conductor	Nom. Thickness Of PVC Insulation mm.	Approx Overall Db. mm.	Approx Overall Weight Kg. / km.	Nom. Steel Armour Size mm.	Approx. Overall Dia. mm.	Approx Weight Kg. / km.	Conductor Resistance At 20° C Ohm / km	PVC insulation Amps.	HRPVC Insulation Amps.	PVC insulation Amps.	HRPVC Insulation Amps.
2	4	1	1.0	13.2	264	1.4	16	585	4.61	35	43	41	48
2	4	2	1.0	13.8	292	1.4	16.6	632	4.61	35	43	41	48
2	6	1	1.0	14.2	327	1.4	17	682	3.08	45	55	50	58
2	6	2	1.0	15.0	368	1.4	17.8	751	3.08	45	55	50	58
2	10	2	1.0	17.2	524	4 x 0.8	19.1	867	1.83	60	73	70	81
2	16	2	1.0	19.9	747	4 x 0.8	21.4	1102	1.15	78	95	90	105
2	25	2	1.2	23.4	1092	4 x 0.8	24.9	1874	0.727	105	123	115	122
2	35	2	1.2	25.6	1394	4 x 0.8	27.1	1891	0.524	125	147	140	145
3	4	1	1.0	13.9	317	1.4	16.7	659	4.61	30	37	36	42
3	4	2	1.0	14.5	351	1.4	17.3	713	4.61	30	37	36	42
3	6	1	1.0	15.0	401	1.4	17.8	770	3.08	39	48	45	53
3	6	2	1.0	15.8	151	1.4	18.9	860	3.08	39	48	45	53
3	10	2	1.0	18.2	657	4 x 0.8	20.1	1000	1.83	52	63	60	69
3	16	2	1.0	20.9	939	4 x 0.8	22.4	1323	1.15	66	81	77	90
3	25	2	1.2	24.9	1405	4 x 0.8	26.4	1874	0.727	90	106	99	105
3	35	2	1.2	27.2	1810	4 x 0.8	28.7	2336	0.524	110	129	120	125
4	4	1	1.0	15.0	385	1.4	17.8	762	4.61	30	37	39	42
4	4	2	1.0	15.7	430	1.4	18.5	828	4.61	30	37	39	42
4	6	1	1.0	16.6	506	1.4	18.2	878	3.08	39	48	45	53
4	6	2	1.0	17.2	559	4 x 0.8	19.1	901	3.08	39	48	45	53
4	10	2	1.0	20.2	837	4 x 0.8	21.7	1220	1.83	52	63	60	69
4	16	2	1.0	22.8	1180	4 x 0.8	24.3	1621	1.15	66	81	77	90
4	25	2	1.2	27.1	1767	4 x 0.8	28.6	2293	0.727	90	106	99	105
4	35	2	1.2	30.2	2328	4 x 0.8	31.7	2912	0.524	110	129	120	125

* Y = PVC Insulation, W = Steel round wire armour, F = Steel strip armour

Table II: 1.5 sqmm., Solid Copper Conductor, PVC insulated, PVC Sheathed, Unarmoured (YY) / Armoured (YWY & YFY) Multicore Control Cables - 650/1100 Volts

			Unarmoured		Armoured			Max.DC	In Air		In Ground	
Size	Nom. Thickness Of PVC Insulation mm.	Cores	Approx Overall cable Dia mm.	Approx Weight Kg. / km.	Nom. Steel Armour Size mm.	Approx. Overall cable Dia. mm.	Approx Weight Kg. / km.	Conductor Resistance At 20° C Ohm / km	PVC insulation Amps.	HRPVC Insulation Amps.	PVC insulation Amps.	HRPVC Insulation Amps.
1.5	0.8	2	10.6	152	1.4	13.4	374	12.1	20	24	23	27
	0.8	3	11.1	176	1.4	13.9	411	12.1	17	21	21	24
	0.8	4	11.9	209	1.4	14.7	466	12.1	17	21	21	24
	0.8	5	12.7	243	1.4	15.5	522	12.1	14	17	17	19
	0.8	6	13.6	281	1.4	16.4	585	12.1	13	16	15	18
	0.8	7	13.7	296	1.4	16.5	602	12.1	12	15	14	17
	0.8	8	15.2	357	1.4	18.0	703	12.1	12	15	14	16
	0.8	9	16.2	405	1.4	19.3	792	12.1	12	14	14	16
	0.8	10	16.8	439	4 x 0.8	18.4	714	12.1	11	13	13	15
	0.8	12	17.3	481	4 x 0.8	19.2	778	12.1	10	12	12	14
	0.8	14	18.0	532	4 x 0.8	19.9	842	12.1	10	12	11	13
	0.8	16	19.3	611	4 x 0.8	20.8	920	12.1	9	11	11	12
	0.8	18	20.2	475	4 x 0.8	21.7	1000	12.1	9	11	11	12
	0.8	19	20.4	495	4 x 0.8	22.0	1029	12.1	9	11	11	12
	0.8	20	21.2	745	4 x 0.8	22.7	1088	12.1	8	8	9	11
	0.8	24	23.2	893	4 x 0.8	24.7	1272	12.1	8	10	9	11
	0.8	27	23.7	954	4 x 0.8	25.2	1340	12.1	8	9	9	10
	0.8	30	24.6	1040	4 x 0.8	26.0	1434	12.1	7	9	9	10
	0.8	37	26.4	1225	4 x 0.8	28.0	1661	12.1	7	8	8	9
	0.8	44	29.8	1525	4 x 0.8	31.0	1985	12.1	6	7	7	8
	0.8	52	31.1	1702	4 x 0.8	32.0	2163	12.1	6	7	7	8
	0.8	61	32.8	1935	4 x 0.8	34.0	2436	12.1	6	7	6	7