



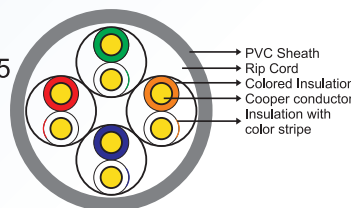
Networking Data Cables

Enhanced performance cables for transmission of high speed data, digital and analogue voice and video (RGB) signals of LAN's. Supports Gigabit Ethernet standards (1000 base T). Operates at bandwidth up to 100 MHz for CAT-5e and 250 MHz for CAT-6e. The cable meets the requirements of EIA/TIA 568 B.2 and ISO-11801

Conductor	Annealed Bare Electrolytic Grade Copper / CCA (Copper Clad Aluminum). Cables made in both solid and stranded conductors. 24 AWG size for CAT-5e and 23 AWG size for CAT-6e is used.
Insulation	High Density Polyethylene
Pairs	Two Cores are twisted to form a pair. The lay of the pairs are chosen to minimize the cross talk, and structural return loss (SRL). The four pairs are further laid up. A separator between pairs is inserted in CAT-6e cable to minimize crosstalk between pairs at high frequencies.
Colour coding of Pairs :	Pair 1 - WHITE - BLUE / BLUE • Pair 2 - WHITE - ORANGE / ORANGE • Pair 3 - WHITE - GREEN / GREEN • Pair 4 - WHITE - BROWN / BROWN
Sheath	FR / FRLS / ZHFR PVC Printing : At every meter with sequential marking Rip Cord : PP / Polyester
Shielding	FTP Aluminium mylar and polyester tape with ATC drain wire in contact with aluminium tape.
STP	Aluminium mylar tape with copper / alloy braiding upto 96%+ coverage.

Applications :

- Horizontal Distribution & Backbone Cabling
- 100 Base TX / 1000 Base TX / 100 Base VG Anylan
- 155 ATM / 622 ATM
- IEEE 802.3 / IEEE 802.5
- 16 Mbps Token Ring
- Gigabit Ethernet
- Impedance (OHMS)
- DC Resistance (OHMS/100 meters at 20°C) for a single copper conductor
- DC Resistance Unbalanced (percent), max.
- Pair-to-Ground Capacitance Unbalanced (pF/100 meters), Max



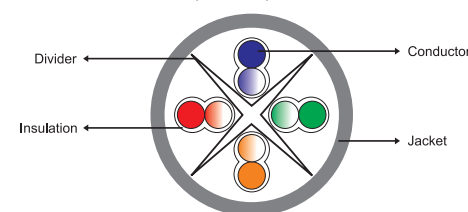
Frequency (MHz)	Worst Pair Near-End Cross talk (db), min	Attenuation (db/100 Meters at 20°C), Max	Structural Return Loss (db) Min.
0.772	64	1.8	-
1	62	2	23
4	53	4.1	23
8	49	5.8	23
10	47	6.5	23
16	44	8.2	23
20	42	9.3	23
25	41	10.4	22
31.25	39	11.7	21
62.5	35	17	18
100	32	22	16

CAT-6e

Frequency (MHz)	ATT (db/ 100m) max.	Ps. Next (db) min.	PS. ACR (db @100m) min.	PS. Elftxt (db @100m) min.	R.L. (Db @ 100m) min.
1	2	72.3	70.3	64.8	20
4	3.8	63.3	59.5	52.7	23
8	5.4	58.8	53.4	46.7	24.5
10	6	57.3	51.3	44.8	25
16	7.6	54.3	46.7	40.7	25
20	8.5	52.8	44.3	38.7	25
25	9.6	51.3	41.7	36.8	24.3
31.25	10.7	49.9	39.2	34.9	23.6
62.5	15.5	45.1	29.9	28.8	21.5
100	19.9	42.3	22.4	24.8	20.1
155	25.3	39.5	14.2	20.9	18.8
200	29.2	37.8	8.6	18.7	18
250	33	36.3	3.3	16.8	17.3

Applications :

- Gigabit Ethernet
- ATM 622 or higher
- Broadband video (77 channels, 550MHz)
- DC Resistance Unbalanced (percent), max.
- Pair-to-Ground Capacitance Unbalanced (pF/100 meters), Max
- Impedance (ohms)



Packing : 100 mtr coils / 305 mtr tangle free cartons.

www.hplindia.com



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PVC Insulated Cable

Control & Instrumentation



Range

- Control Cable
- Instrumentation Cable
- Submersible Winding Wire
- Data Cable (CAT - 5e & 6e)





Instrumentation, Signal Cables

Applications Used in Data Acquisition systems, computer networking, PA systems, Digital control / Measuring & communication systems. Specially designed to transmit signals without any external interference

Type & Size Manufactured with conductor sizes 0.5/0.75/1.0/1.5 sq. mm. conforming to BS:5308-I&II IEC-189,IS:1554-I:88, VDE 0815, IEC: 60227

Conductor Solid / stranded / Flexible copper (Annealed Bare Copper / Annealed Tinned Copper)

Insulation PVC - GP / HR; PE, ZHFR

Shielding core /Pair/Triad/Quads, Individual & overall or overall screen by Al-mylar tape / copper tape / or ABC / ATC Wire braiding

Inner Sheath PVC - GP / HR / FR / FRLS; PE, ZHFR

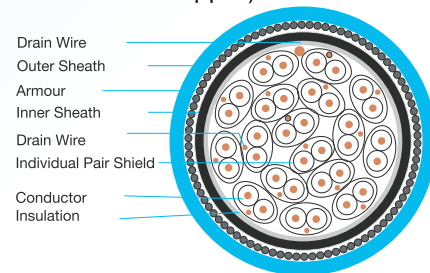
Armouring Galvanised steel round wire / steel strip

Rip Cord High tensile strength Nylon rip cord for Jacket removal

Outer sheath PVC - GP / HR / FR / FRLS; PE, ZHFR

We can supply PVC/PE insulated instrumentation cables as per customer's requirements or as per various National / International standards such as IEC, BS, VDE, IS, BHEL, NTPC etc.

Electrical and physical parameters of cables are maintained as per applicable standards / customer's requirements as agreed between customer and HPL



300/500 Volts Grade PVC insulated and PVC sheathed, unscreened / individual pair screened / overall armoured / unarmoured instrumentation cable conforming to BS : 5308-II/86

0.5 sq. mm Multipair PVC insulated and PVC sheathed cables

No. of Pair	2		5		10		15	
Cable Type	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd
Conductor formation	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2
Insulation thickness (mm) (Nominal)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Max. core diameter (mm)	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
Thickness of inner sheath (mm) (Nominal)	1.1	1.1	1.2	1.2	1.3	1.3	1.5	1.5
Diameter over inner sheath (mm)	11.0	11.0	14.2	14.2	20.1	20.1	23.5	23.5
Size of armour wire (mm)	NA	0.9	NA	1.25	NA	1.6	NA	1.6
Diameter over armour (mm)	NA	12.8	NA	16.7	NA	23.3	NA	26.7
Thickness of outer sheath (mm) (Nominal)		1.5		1.6		1.8		1.8
Nominal overall Diameter (mm) (for information only)	11.0	15.8	14.2	19.9	20.1	26.9	23.5	30.3

HPL Cables

HPL Cables

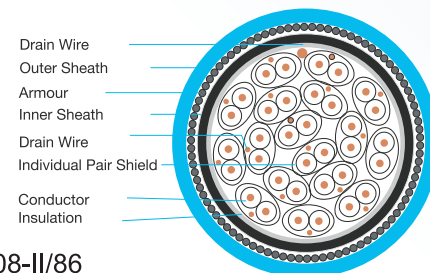
**0.75 sq.mm multipair PVC insulated and PVC sheathed cables**

No. of Pair	2		5		10		15	
Cable Type	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd
Conductor formation	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2
Insulation thickness (mm) (Nominal)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Max. core diameter (mm)	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
Thickness of inner sheath (mm) (Nominal)	1.1	1.1	1.2	1.2	1.3	1.3	1.5	1.5
Diameter over inner sheath (mm)	11.8	11.8	15.3	15.3	21.7	21.7	25.4	25.4
Size of armour wire (mm)	NA	0.9	NA	1.25	NA	1.6	NA	1.6
Diameter over armour (mm)	NA	13.6	NA	17.8	NA	24.9	NA	28.6
Thickness of outer sheath (mm) (Nominal)		1.5		1.6		1.8		1.9
Nominal overall Diameter (mm) (for information only)	11.8	16.6	15.3	21	21.7	28.5	25.4	32.4

1.5 sq.mm multipair PVC insulated and PVC sheathed cables

No. of Pair	2		5		10		15	
Cable Type	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd
Conductor formation	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53
Insulation thickness (mm) (Nominal)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Max. core diameter (mm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Thickness of inner sheath (mm) (Nominal)	1.2	1.2	1.3	1.3	1.5	1.5	1.7	1.7
Diameter over inner sheath (mm)	13.7	13.7	17.8	17.8	25.5	25.5	29.8	29.8
Size of armour wire (mm)	NA	1.25	NA	1.6	NA	1.6	NA	2.0
Diameter over armour (mm)	NA	16.2	NA	21.0	NA	28.7	NA	33.8
Thickness of outer sheath (mm) (Nominal)	1.6		1.7		1.9		2.0	
Nominal overall Diameter (mm) (for information only)	13.7	19.4	17.8	24.4	25.5	32.5	29.8	37.8

* To obtain the diameter of these cables with a collective screen, add 1.0 mm to the diameter given above. *Note* : Cable with number of pairs upto 50 can be supplied.



300/500 Volts Grade PVC insulated and PVC sheathed, unscreened / overall screened, armoured / unarmoured instrumentation cable conforming to BS : 5308-II/86

0.5 sq.mm Single multipair PVC insulated and PVC sheathed cables

No. of Pair	1		2 (Quad Formation)		5		10	
Cable Type	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd
Conductor formation	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2	16/0.2
Insulation thickness (mm) (Nominal)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Max. core diameter (mm)	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
Thickness of inner sheath (mm) (Nominal)	0.8	0.8	0.8	0.8	1.1	1.1	1.2	1.2
Diameter over inner sheath (mm)	6.0	6.0	6.9	6.9	12.1	12.1	16.2	16.2
Size of armour wire (mm)	NA	0.9	NA	0.9	NA	0.9	NA	1.25
Diameter over armour (mm)	NA	7.8	NA	8.7	NA	13.9	NA	18.7
Thickness of outer sheath (mm) (Nominal)		1.3		1.3		1.5		1.6
Nominal overall Diameter (mm) (for information only)	6.0	10.4	6.9	11.3	12.1	16.9	16.2	21.9



0.75 sq.mm Single / multipair PVC insulated and PVC sheathed cables								
No. of Pair	1		2 (Quad Formation)		5		10	
Cable Type	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd
Conductor formation	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2	24/0.2
Insulation thickness (mm) (Nominal)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Max. core diameter (mm)	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
Thickness of inner sheath (mm) (Nominal)	0.8	0.8	0.8	0.8	1.2	1.2	1.3	1.3
Diameter over inner sheath (mm)	6.3	6.3	7.3	7.3	13.3	13.3	17.7	17.7
Size of armour wire (mm)	NA	0.9	NA	0.9	NA	1.25	NA	1.6
Diameter over armour (mm)	NA	8.1	NA	9.1	NA	15.8	NA	20.9
Thickness of outer sheath (mm) (Nominal)		1.3		1.4		1.5		1.7
Nominal overall Diameter (mm) (for information only)	6.3	10.7	7.3	11.9	13.3	18.8	17.7	24.3

1.5 sq.mm Single / multipair PVC insulated and PVC sheathed cables								
No. of Pair	1		2 (Quad Formation)		5		10	
Cable Type	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd	Unarmd	Armd
Conductor formation	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53	7/0.53
Insulation thickness (mm) (Nominal)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Max. core diameter (mm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Thickness of inner sheath (mm) (Nominal)	0.8	0.8	0.9	0.9	1.2	1.2	1.3	1.3
Diameter over inner sheath (mm)	7.3	7.3	8.7	8.7	15.4	15.4	20.6	20.6
Size of armour wire (mm)	NA	0.9	NA	0.9	NA	1.25	NA	1.6
Diameter over armour (mm)	NA	9.1	NA	10.5	NA	17.9	NA	23.8
Thickness of outer sheath (mm) (Nominal)		1.4		1.4		1.6		1.8
Nominal overall Diameter (mm) (for information only)	7.3	11.9	8.7	13.3	15.4	21.1	20.6	27.4

* To obtain the diameter of these cables with a collective screen, add 1.0 mm to the diameter given above.
Note : Cable with number of pairs upto 50 can be supplied.



65 / 40mm High Speed
PVC Extruder

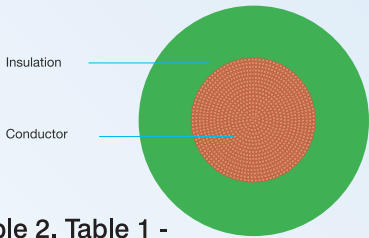


16 Wire High Speed Wire Drawing
Machine NEIHOFF - Germany



Winding Wires PVC Insulated for Submersible Pump Motors

HPL has also developed a special range of winding wires with stranded copper conductor insulated with HR PVC compound for higher current carrying capacity for submersible pump motors. HPL winding wires are insulated with a very superior grade of HR PVC and with a modern, well equipped plant, to give it the necessary electrical strength and resistance to abrasion.



The solid / stranded copper conductor range of these winding wires is given in table 2. Table 1 - HR PVC Insulated winding wires as per IS : 8783 (Part 4/Sec 1) : 1995 (Solid copper conductor)

Nom. Conductor Diameter (mm.)	Nom. Cross -sectional Area (sq. mm.)	Min. Insulation Thickness (mm.)	Approx. overall Diameter (mm.)	Max. Conductor Resistance at 20° C (Ohms/km)
0.60	0.283	0.25	1.25	62.20
0.70	0.385	0.30	1.45	45.70
0.80	0.502	0.30	1.55	35.00
0.90	0.638	0.30	1.65	27.60
1.00	0.785	0.30	1.75	22.40
1.10	0.950	0.30	1.85	18.50
1.20	1.13	0.30	1.95	15.50
1.30	1.33	0.30	2.05	13.20
1.40	1.54	0.35	2.25	11.40
1.50	1.77	0.35	2.35	9.95
1.60	2.01	0.35	2.45	8.75
1.70	2.27	0.35	2.55	7.75
1.80	2.54	0.35	2.70	6.91
1.90	2.84	0.35	2.80	6.20
2.00	3.14	0.45	3.10	5.60
2.10	3.46	0.45	3.20	5.08
2.20	3.80	0.45	3.30	4.63
2.30	4.15	0.45	3.40	4.23
2.40	4.52	0.50	3.60	3.89
2.50	4.91	0.50	3.70	3.58
2.60	5.31	0.50	3.80	3.31
2.70	5.73	0.50	3.90	3.07
2.80	6.19	0.55	4.10	2.86
2.90	6.60	0.55	4.20	2.66
3.00	7.07	0.55	4.30	2.49

No. of strands/ Nom. Strand dia. (mm.)	Nom. Conductor Diameter (mm.)	Min. Insulation thicknes (mm.)	Max. Overall Diameter (mm.)	Max. conductor resistance at 20°C (Ohms/km)
19/0.68	3.40	0.50	4.60	2.60
19/0.78	3.90	0.60	5.20	1.98
19/0.82	4.10	0.60	5.40	1.79
19/0.90	4.50	0.60	5.90	1.48
19/0.97	4.85	0.70	6.40	1.28
19/1.04	5.20	0.80	6.90	1.11

Physical Properties : The limiting values of solid copper conductor diameter, Elongation at break and other technical details are as given in IS 8783 (Part 1) : 1995. The properties of PVC compound are as given in IS 8783 (Part 2) : 1995. The winding wires are tested as per IS 8783 (Part 3) : 1995



Control Cable

Technical detail for HPL 1100 V 1.5 sq mm solid copper cond. Multicore XLPE / PVC insulated, Galvanized steel wire/Strip Armoured / Unarmoured Control cable conforming to IS : 1554 (Part 1) / 1988 & IS : 7098 / (Part 1) / 1988

Conductor Material Annealed bare copper/option:tinned Construction : SOLID/STRANDED

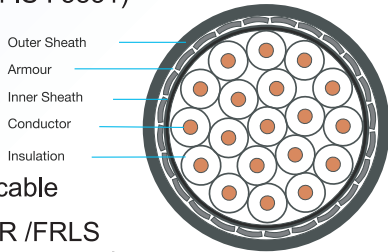
Insulation Material XLPE / PVC Type A of IS :5831/OPTION : HR PVC(Type -C of IS : 5831)
Nominal insulation thickness 0.80 mm,

Cores identification Up to 5 core by color coding & more than 5 core by color coding /Nos printing on core

Inner Sheath Extruded PVC

Armouring Single layer of Galvanized steel round wire /Flat strip as applicable

Outer Sheath PVC TYPE ST-1 of IS : 5831, PVC TYPE -ST-2 of IS:5831/ FR /FRLS
Type COLOUR of outer sheath BLACK and any other color as per requirement



Physical Parameters - conforming to IS : 1554 (Part - 1)/1988

Cable Code : (YY/YWY/YFY)		Unarmoured (YY)		Armoured with Flat Strips / Round Wires (YFY/YWY)				Approx. Net Wt of Cable (Kg/KM)		Normal current Rating in Amps.			
No. of Cores	Min. thick of inner sheath	Nom thick of outer sheath	Approx. overall Diameter	Diameter of round wire (Nom.)	Diameter of Flat strip (Nom.)	Min. thick of outer sheath	Approx. overall Diameter	Unarm- oured (YY)	Weight of Cable Armoured (Approx)	with general Insulation		with H.R. Insulation	
(Nos.)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg / km)	(kg / km)	Ground	Air	Ground	Air
2	0.30	1.8	11.5	1.40	-	1.24	13.0	170	385	23	20	26	24
3	0.30	1.8	12	1.40	-	1.24	13.5	195	420	21	17	24	21
4	0.30	1.8	12.5	1.40	-	1.24	14.0	225	460	21	17	24	21
5	0.30	1.8	13.5	1.40	-	1.24	15.0	240	500	21	17	24	21
6	0.30	1.8	14.5	1.40	-	1.24	16.0	280	565	15	13	17	16
7	0.30	1.8	15	1.40	-	1.24	16.0	300	580	14	13	16	15
8	0.30	1.8	16	1.40	-	1.24	17.0	330	630	14	12	16	14
10	0.30	1.8	17	1.40	-	1.24	18.5	365	695	13	11	15	13
12	0.30	1.8	17.5	-	4.0x0.8	1.24	19.0	395	765	12	10	14	12
14	0.30	1.8	18	-	4.0x0.8	1.40	18.0	445	665	11	10	13	12
16	0.30	1.8	18.5	-	4.0x0.8	1.40	19.0	495	750	11	9	13	11
19	0.30	2.0	19.5	-	4.0x0.8	1.40	20.0	520	825	10	9	11	11
24	0.30	2.0	21	-	4.0x0.8	1.40	21.0	590	905	9	8	10	10
27	0.30	2.0	24	-	4.0x0.8	1.40	24.0	740	1005	9	8	10	10
30	0.30	2.0	24.5	-	4.0x0.8	1.40	24.5	800	1195	9	7	10	8
37	0.30	2.0	25	-	4.0x0.8	1.40	25.0	870	1260	8	7	9	8
40	0.30	2.0	27	-	4.0x0.8	1.40	27.0	1040	1460	8	7	9	8
44	0.30	2.0	30	-	4.0x0.8	1.56	31.0	1240	1750	7	7	8	7
52	0.40	2.2	33	-	4.0x0.8	1.56	32.0	1450	1975	6	6	7	7
61	0.40	2.2	31.5	-	4.0x0.8	1.56	34.0	1680	2215	6	6	7	7



Technical detail for HPL 1100 V 2.5 sq mm solid copper cond. Multicore XLPE / PVC insulated, Galvanized steel wire/Strip Armoured / Unarmoured Control cable conforming to IS : 1554 (Part 1) / 1988 & IS : 7098 (Part 1) /1988

Conductor Material Annealed bare copper/option:tinned Construction : SOLID/STRANDED (As per requirement)

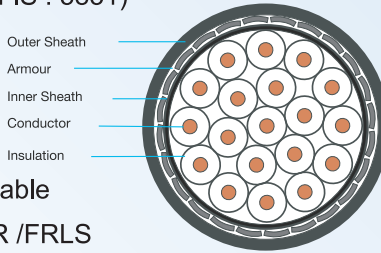
Insulation Material XLPE / PVC Type A of IS :5831/OPTION : HR PVC (Type -C of IS : 5831)
Nominal insulation thickness 0.90 mm,

Cores identification Up to 5 core by color coding & more than 5 core by color coding /Nos printing on core

Inner Sheath Extruded PVC

Armouring Single layer of Galvanized steel round wire /Flat strip as applicable

Outer Sheath PVC TYPE ST-1 of IS : 5831, PVC TYPE -ST-2 of IS:5831/ FR /FRLS
Type COLOUR of outer sheath BLACK and any other color as per requirement



Physical Parameters : conforming to IS : 1554 (Part - 1)/1988

Cable Code : (YY/YWY/YFY)		Unarmoured (YY)		Armoured with Flat Strips / Round Wires (YFY/YWY)				Approx. Net Wt of Cable (Kg/KM)		Normal current Rating in Amps.			
No. of Cores	Min. thick of inner sheath	Nom thick of outer sheath	Approx. overall Diameter	Diameter of round wire (Nom.)	Diameter of Flat strip (Nom.)	Min. thick of outer sheath	Approx. overall Diameter	Unarm- oured (YY)	Weight of Cable Armoured (Approx)	with general Insulation		with H.R. Insulation	
(Nos.)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg / km)	(kg / km)	Ground	Air	Ground	Air
2	0.30	1.8	12.5	1.40	-	1.24	15.0	215	455	32	27	38	32
3	0.30	1.8	13	1.40	-	1.24	15.5	250	500	27	24	30	28
4	0.30	1.8	14	1.40	-	1.24	16.0	290	575	27	24	30	28
5	0.30	1.8	15	1.40	-	1.24	16.5	320	620	27	24	30	28
6	0.30	1.8	16	1.40	-	1.24	17.5	375	705	21	17	24	21
7	0.30	1.8	16.5	1.40	-	1.24	18.0	400	720	20	17	22	20
8	0.30	1.8	17	1.40	-	1.24	19.5	450	840	19	16	21	18
9	0.30	1.8	19	1.40	-	1.40	19.5	505	800	18	15	20	16
10	0.30	1.8	20	-	4.0x0.8	1.40	20.0	510	825	17	14	19	16
12	0.30	1.8	21	-	4.0x0.8	1.40	21.0	585	900	16	13	18	15
14	0.30	1.8	21.5	-	4.0x0.8	1.40	21.5	660	1010	15	13	17	15
16	0.30	2.0	22.5	-	4.0x0.8	1.40	23.0	750	1075	14	12	16	14
19	0.30	2.0	24	-	4.0x0.8	1.40	24.0	850	1220	13	11	14	13
24	0.30	2.0	27.5	-	4.0x0.8	1.40	27.5	1060	1480	12	10	13	12
27	0.30	2.0	28	-	4.0x0.8	1.40	28.0	1160	1610	12	10	13	12
30	0.30	2.0	29	-	4.0x0.8	1.56	29.0	1260	1740	11	9	12	10
37	0.40	2.0	31.5	-	4.0x0.8	1.56	32.0	1560	2030	11	9	12	10
44	0.40	2.0	35	-	4.0x0.8	1.56	36.0	1860	2425	10	9	11	10
52	0.40	2.2	36.5	-	4.0x0.8	1.56	37.0	2150	2740	9	8	10	10
61	0.40	2.2	38.5	-	4.0x0.8	1.56	40.0	2470	3100	8	8	9	9

