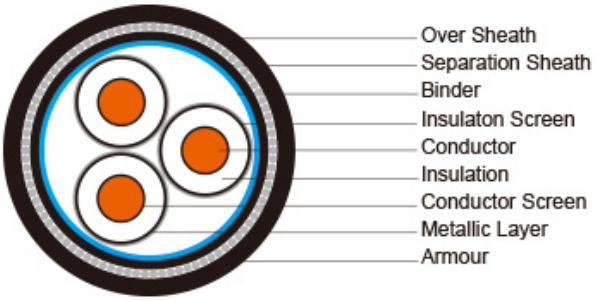
Three Core Cables to BS 6622



Application:	The three core cables are designed for distribution of electrical power with nominal voltage Uo/U ranging from 3.6/6.6KV to 19/33KV and frequency 50Hz. They are suitable for installation mostly in power supply stations, indoors and in cable ducts, outdoors, underground and in water as well as for installation on cable trays for industries, switchboards and power stations.
Standards:	BS 6622
Conductor:	Plain annealed copper or aluminium complying with IEC 60228/BS 6360. Copper conductors shall be stranded (class 2) and aluminium conductors shall be either solid or stranded (class 2).
Conductor Screen:	Extruded layer of semi-conducting cross-linkable compound is applied over the conductor and shall cover the surface completely. The minimum thickness is 0.3mm and the maximum resistivity shall not exceed 500 Ohm-m at 90°C.
Insulation:	Insulation is of cross-linked polyethylene compound XLPE (GP8) conforming to BS 7655-1.3 or EPR (GP7), conforming to BS 7655-1.2.

Table 1. Insulation Thickness

Nom. Cross Section Area	Insulation Thickness at Nom. Voltage				
	3.8/6.6KV(Um=7.2 KV)	6.35/11KV(Um=12 KV)	8.7/15KV(Um=17.5 KV)	12.7/22KV(Um=24 KV)	19/33KV(Um=36K V)
mm²	mm	mm	mm	mm	mm
70 – 185	2.5	3.4	4.5	5.5	8.0
240	2.6	3.4	4.5	5.5	8.0
300	2.8	3.4	4.5	5.5	8.0
400	3.0	3.4	4.5	5.5	8.0
Above 500	3.2	3.4	4.5	5.5	8.0

Insulaton Screen: Extruded layer of semi-conducting cross-linkable compound is applied over the insulation. The extruded semi-conducting layer shall consist of bonded or cold strippable semi-conducting compound capable of removal for jointing or terminating. As an option, a semi -conducting tape may be applied over the extruded semi-conducting layer as a bedding for the metallic layer. The minimum thickness is 0.3 mm and the maximum resistivity is 500 Ohm-m at 90°C. The screen is tightly fitted to the insulation to exclude all air voids and can be easily hand stripped on site. **Inner Covering & Fillers:** For cables with a collective metallic layer or cables with a metallic layer over each individual cores

with additional collective metallic layers, semi-conducting inner covering and fillers shall be applied over the laid up cores. The inner covering is made of non hygroscopic material, except if the cable is to be made longitudinally watertight. The inner covering shall be extruded or lapped. The approximate thickness of extruded inner coverings is given in Table 2:

Table 2. *Approximate Thickness Of Extruded Inner Coverings*

Ficititous Diameter Over Laid Up Cores		Approx. Thickress of Extruded Inner Covering
mm		mm
>	<	
35	45	1.0
25	35	1.2
35	45	1.4
45	60	1.6
60	80	1.8
80	-	2.0

*The approximate thickness of lapped inner coverings shall be 0.6mm.

Metallic Layer: The metallic layer shall be applied over each core or applied as a collective screen. The metallic screen shall consist of either copper tapes or a concentric layer of copper wires or a combination of tapes and wires. The metallic layer provides an earth fault current path, capable of withstanding fault current to earth of 1000A for one second at maximum temperature 160°C. Copper wires are applied over the conducting water blocking layer with a minimum diameter of 0.5mm. And over the copper wires, copper tape with minimum thickness of 0.1mm can be applied helically with overlap. Total cross section of copper wire screen is shown in table 3.

Table 3. Minimum Total Cross Section Of Copper Wire Screen & DC Resistance Of The Screen

Nominal Cross-Section Area of Cable	Minimum Cross-Section of Copper Wire Screen Area	DC Resistance of the Copper Wire Screen
mm²	mm²	mm
up to 120	16	1.06
150-300	25	0.72
400-630	35	0.51

Separation Sheath (for armoured cable): The separation sheath comprises a layer of extruded PVC, PE or LSZH. The nominal thickness is calculated by 0.02Du + 0.6mm where

Du is the fictitious diameter under the sheath in mm. The nominal separation sheath thickness shall not be less than 1.2mm. **Armour (for armoured cable):** The armour consists of galvanized steel wire applied over the inner covering with diameter specified as in Table 4.

Table 4. Armour Wire Diameter

Fictitiious Diameter Under the Armour		Armour Wire Diameter
mm		mm
>	<	
	25	1.6

25	35	2.0
35	60	2.5
60	-	3.15

Over Sheath: Overall sheath comprises a layer of extruded either PVC type 9 conforming to BS 7665-4.2 or MDPE type TS2 conforming to BS 7655-10.1; LSZH can be offered as an option. The oversheath is normally black in colour. When a DC voltage test is to be performed on the oversheath, a semi-conducting layer such as graphite coating shall be applied over the surface of the extruded oversheath. The nominal oversheath thickness is calculated by 0.035+D where D is the diameter immediately under the oversheath in mm. For cables with the oversheath not applied over the armour, the nominal oversheath thickness shall not be less than 1.4mm. And for cables with oversheath applied over the armour, the nominal oversheath thickness shall not be less than 1.8mm.

PHYSICAL PROPERTIES:

Operating Temperature: up to 90°C **Temperature Range:** -5°C (PVC sheath); -20°C (PE sheath) **Short Circuit Temperature:** 250°C (short circuit duration up to 5 seconds) **Bending Radius:** 15 x OD

Table 5. Nominal /Operating /Test Voltages

Rated Voltage Uo/U	Operating Voltage (Um)	Testing Voltage (rms)
3.8/6.6KV	7.2KV	15KV
6.35/11KV	12KV	25.5KV
8.7/15KV	17.5KV	35KV
12.7/22KV	24KV	51KV
19/33KV	36KV	76KV

Three Core 3.8/6.6KV (Um=7.2KV) Dimensional Data

Nom. Cross-Section Area		Unarmoured Cables					Steel Wire Armoured Cables						
	Nom.Insulation Thickness	Copper Tape Screen Area	Nom.Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Copper Tape Screen Area	Nom.Bedding Thickness	Nom. Armour Wire Diameter	Nom.Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL						CU	AL
mm2	mm	mm2	mm	mm	kg/km		mm2	mm	mm	mm	mm	kg / km	
25	2.5	16	2.1	37.7	2205	1740	3.4	1.2	2.0	2.2	44.5	3890	3465
35	2.5	16	2.3	41.2	2690	2010	3.6	1.2	2.5	2.3	46.8	4420	3730
50	2.5	16	2.5	44.9	3340	2350	3.8	1.3	2.5	2.5	51.5	5640	4690
70	2.5	16	2.6	48.0	4050	2730	4.3	1.3	2.5	2.6	55.0	6570	5240

95	2.5	16	2.7	51.7	5000	3180	4.7	1.4	2.5	2.7	58.9	7760	5890
120	2.5	16	2.8	54.7	5890	3590	5.0	1.5	2.5	2.8	62.1	8810	6510
150	2.5	25	2.9	58.4	6960	4160	5.3	1.5	2.5	2.9	65.8	10110	7310
185	2.5	25	3.0	61.9	8160	4650	5.8	1.6	2.5	3.0	69.5	11520	7960
240	2.6	25	3.2	68.1	10210	5530	6.3	1.7	2.5	3.2	75.9	13920	9140
300	2.8	25	3.5	73.6	12380	6670	7.0	1.8	3.15	3.5	83.1	17400	11620
400	3.0	35	3.7	83.8	16190	8430	7.7	2.0	3.15	3.7	93.0	21900	13980

Electrical Data

Nom. Cross-Section Area						Unarmoured Cables	Steel Wire Armoured Cables			Current Ratings					
	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reac-tance	Induc-tance	Ground		Duct		Air	
										CU	AL	CU	AL	CU	AL
mm2	μΩ/m	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m	A		A		A	
25	727/1200	927/1538	3.6/2.3	272	0.33	2.6	0.4	113	370	140	115	125	95	145	115
35	524/868	668/1113	5.0/3.2	301	0.36	2.6	0.5	108	350	170	135	150	115	175	140
50	387/641	494/822	6.8/4.4	332	0.40	2.6	0.5	102	330	210	160	180	135	220	170
70	268/443	343/568	9.8/6.3	383	0.46	2.6	0.6	97	310	255	195	215	165	270	210

95	193/320	248/410	13.3/8.5	432	0.52	2.6	0.6	92	290	300	230	255	200	330	250
120	153/253	196/325	17.2/11.0	474	0.57	2.6	0.7	89	280	340	265	290	225	375	295
150	124/206	159/265	21.2/13.5	511	0.61	4.3	0.7	87	280	380	295	330	255	430	330
185	99.1/164	128/211	26.6/17.0	562	0.67	4.3	0.8	86	270	430	335	370	290	490	385
240	75.4/125	98/161	34.9/22.3	602	0.72	4.3	0.9	83	260	490	380	425	335	570	450
300	60.1/100	80/130	43.8/28.0	622	0.75	4.3	1.0	82	260	540	435	470	375	650	510
400	47.0/77.8	64/102	57.3/36.6	648	0.78	5.8	1.1	80	250	590	480	520	420	700	570

Three Core 6.35/11KV (Um=12KV) Dimensional Data

Nom. Cross-Section Area		Unarmoured Cables					Steel Wire Armoured Cables						
	Nom. Insulation Thickness	Copper Wire Screen Area	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Copper Tape Screen Area	Nom. Bedding Thickness	Nom. Armour Wire Diameter	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL						CU	AL
mm2	mm	mm2	mm	mm	kg/km		mm2	mm	mm	mm	mm	kg / km	
25	3.4	16	2.3	42.8	2600	2120	3.8	1.3	2.5	2.4	50.0	4930	4400
35	3.4	16	2.3	45.3	3000	2320	4.1	1.3	2.5	2.5	52.3	5380	4700
50	3.4	16	2.4	48.5	3630	2690	4.4	1.4	2.5	2.6	55.7	6210	5260
70	3.4	16	2.5	52.0	4440	3110	4.7	1.4	2.5	2.7	59.2	7200	5870
95	3.4	16	2.7	56.0	5440	3620	5.2	1.5	2.5	2.8	63.2	8420	6550
120	3.4	16	2.8	59.4	6370	4020	5.5	1.6	2.5	3.0	67.0	9580	7190
150	3.4	25	2.9	62.7	7430	4630	5.8	1.6	2.5	3.1	70.3	10830	8030
185	3.4	25	3.0	66.1	8680	5150	6.2	1.7	2.5	3.2	73.9	12290	8720

240	3.4	25	3.1	71.7	10690	5990	6.8	1.8	3.15	3.4	81.2	15620	10790
300	3.4	25	3.3	76.4	12770	7050	7.3	1.9	3.15	3.6	86.1	18030	12240
400	3.4	35	3.5	85.1	16460	8680	8.0	2.0	3.15	3.8	95.0	22350	14350

Electrical Data

Nom. Cross-Section Area						Unarmoured Cables	Steel Wire Armoured Cables			Current Ratings					
	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reac-tance	Induc-tance	Ground		Duct		Air	
										CU	AL	CU	AL	CU	AL
mm2	μ Ω/m	μ Ω/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m	A		A		A	
25	727/1200	927/1538	3.6/2.3	216	0.43	2.6	0.5	123	390	140	115	125	95	145	115
35	524/868	668/1113	5.0/3.2	237	0.47	2.6	0.6	115	370	170	135	150	115	175	140
50	387/641	494/822	6.8/4.4	260	0.52	2.6	0.6	109	350	210	160	180	135	220	170
70	268/443	343/568	9.8/6.3	298	0.60	2.6	0.7	103	330	255	195	215	165	270	210
95	193/320	248/410	13.3/8.5	334	0.67	2.6	0.7	99	310	300	230	255	200	330	250
120	153/253	196/325	17.2/11.0	365	0.73	2.6	0.8	96	310	340	265	290	225	375	295
150	124/206	159/265	21.2/13.5	392	0.78	4.3	0.8	93	300	380	295	330	255	430	330
185	99.1/164	128/211	26.6/17.0	430	0.86	4.3	0.9	90	290	430	335	370	290	490	385

240	75.4/125	98/161	34.9/22.3	476	0.95	4.3	0.9	87	280	490	380	425	335	570	450
300	60.1/100	80/130	43.8/28.0	524	1.05	4.3	1.0	85	270	540	435	470	375	650	510
400	47.0/77.8	64/102	57.3/36.6	580	1.16	5.8	1.1	81	260	590	480	520	420	700	570

Three Core 8.7/15KV (Um=17.5KV) Dimensional Data

Nom. Cross-Section Area		Unarmoured Cables					Steel Wire Armoured Cables						
	Nom. Insulation Thickness	Copper Wire Screen Area	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Copper Tape Screen Area	Nom. Bedding Thickness	Nom. Armour Wire Diameter	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL						CU	AL
mm2	mm	mm2	mm	mm	kg/km		mm2	mm	mm	mm	mm	kg / km	
25	4.5	16	2.4	48.4	3000	2420	4.4	1.4	2.5	2.6	55.2	5600	5100
35	4.5	16	2.5	50.4	3450	2670	4.7	1.4	2.5	2.7	57.6	6130	5440
50	4.5	16	2.6	53.7	4140	3190	4.9	1.5	2.5	2.8	61.1	7010	6060
70	4.5	16	2.7	57.2	4980	3640	5.3	1.5	2.5	2.9	64.6	8030	6700
95	4.5	16	2.8	60.6	5900	4050	5.7	1.6	2.5	3.0	68.2	9160	7330
120	4.5	16	2.9	63.9	6870	4560	6.1	1.7	2.5	3.1	71.7	10340	8030
150	4.5	25	3.0	67.9	8030	5230	6.4	1.7	2.5	3.2	75.4	11730	8930
185	4.5	25	3.1	71.1	9310	5770	6.8	1.8	3.15	3.4	80.6	14170	10570
240	4.5	25	3.3	76.9	11390	6680	7.4	1.9	3.15	3.6	86.6	16670	11810
300	4.5	25	3.5	81.6	13510	7790	7.9	2.0	3.15	3.7	91.3	19140	13340
400	4.5	35	3.7	89.9	17130	9340	8.5	2.1	3.15	4.0	100.0	23360	15410

Electrical Data

Nom. Cross-Section Area						Unarmoured Cables	Steel Wire Armoured Cables			Current Ratings					
	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reac-tance	Induc-tance	Ground		Duct		Air	
										CU	AL	Cu	Al	Cu	Al
mm2	μΩ/m	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m	A		A		A	
25	727/1200	927/1538	3.6/2.3	176	0.48	2.6	0.6	138	410	140	115	125	95	145	115
35	524/868	668/1113	5.0/3.2	193	0.53	2.6	0.6	123	390	170	135	150	115	175	140
50	387/641	494/822	6.8/4.4	211	0.58	2.6	0.7	116	370	210	160	180	135	220	170
70	268/443	343/568	9.8/6.3	240	0.65	2.6	0.7	110	350	255	195	215	165	270	210
95	193/320	248/410	13.3/8.5	267	0.73	2.6	0.8	105	330	300	230	255	200	330	250
120	153/253	196//325	17.2/11.0	291	0.79	2.6	0.8	102	320	340	265	290	225	375	295
150	124/206	159/265	21.2/13.5	312	0.85	4.3	0.9	98	310	380	300	330	255	430	330
185	99.1/164	128/211	26.6/17.0	340	0.93	4.3	0.9	95	300	430	335	370	290	490	385
240	75.4/125	98/161	34.9/22.3	375	1.02	4.3	1.0	91	290	490	380	425	335	570	450
300	60.1/100	80/130	43.8/28.0	411	1.12	4.3	1.1	89	280	540	435	470	375	650	510
400	47.0/77.8	64/102	57.3/36.6	454	1.24	5.8	1.2	84	270	590	480	520	420	700	570

Three Core 12.7/22KV (Um=24KV) Dimensional Data

		Unarmoured Cables	Steel Wire Armoured Cables

Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Wire Screen Area	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Copper Tape Screen Area	Nom. Bedding Thickness	Nom. Armour Wire Diameter	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL						CU	AL
mm2	mm	mm2	mm	mm	kg/km		mm2	mm	mm	mm	mm	kg / km	
35	5.5	16	2.7	51	3750	2880	5.2	1.5	2.5	2.8	62.3	6870	6140
50	5.5	16	2.8	54	4240	3250	5.4	1.5	2.5	2.9	65.6	7710	6810
70	5.5	16	2.9	58	5050	3650	5.9	1.6	2.5	3.0	69.0	8710	7370
95	5.5	16	3.0	62	6010	4110	6.2	1.7	2.5	3.2	73.1	10000	8130
120	5.5	16	3.1	65	6990	4660	6.6	1.7	3.15	3.3	77.7	12040	9730
150	5.5	25	3.2	68	8130	5330	6.9	1.8	3.15	3.4	81.7	13550	10750
185	5.5	25	3.3	72	9410	5870	7.4	1.9	3.15	3.6	85.5	15150	11610
240	5.5	25	3.5	79	11490	6880	7.8	2.0	3.15	3.7	91.3	17710	12840
300	5.5	25	3.7	84	13710	7890	8.2	2.0	3.15	3.9	96.0	20170	14360
400	5.5	35	3.9	91	17230	9440	9.0	2.2	3.15	4.1	104.8	24520	16480

Electrical Data

Nom. Cross-Section Area						Unarmoured Cables	Steel Wire Armoured Cables			Current Ratings		
										Ground	Duct	Air

	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reac-tance	Induc-tance	CU	AL	CU	AL	CU	AL
mm2	μΩ/m	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m	A		A		A	
35	524/868	668/1113	5.0/3.2	168	0.67	2.6	0.7	129	410	170	135	155	120	180	145
50	387/641	494/822	6.8/4.4	183	0.73	2.6	0.8	122	390	210	160	185	140	225	175
70	268/443	343/568	9.8/6.3	207	0.83	2.6	0.8	115	370	255	195	225	170	275	215
95	193/320	248/410	13.3/8.5	229	0.92	2.6	0.9	110	350	295	230	260	205	330	260
120	153/253	196/325	17.2/11.0	249	1.00	2.6	0.9	106	340	335	260	300	235	380	300
150	124/206	159/265	21.2/13.5	266	1.06	4.3	1.0	103	330	375	290	335	265	430	335
185	99.1/164	128/211	26.6/17.0	289	1.16	4.3	1.0	100	320	420	330	380	300	490	390
240	75.4/125	98/161	34.9/22.3	318	1.27	4.3	1.1	95	300	480	380	430	345	570	460
300	60.1/100	80/130	43.8/28.0	348	1.39	4.3	1.2	93	300	530	425	480	385	650	520
400	47.0/77.8	64/102	57.3/36.6	383	1.53	5.8	1.3	87	280	590	480	520	420	700	570

Three Core 19/33KV (Um=36KV) Dimensional Data

Nom. Cross-Section Area		Unarmoured Cables					Steel Wire Armoured Cables					
	Nom.Insulation Thickness	Copper Wire Screen Area	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Copper Tape Screen Area	Nom. Bedding Thickness	Nom. Armour Wire Diameter	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight
					CU	AL						CU AL
mm2	mm	mm2	mm	mm	kg/km		mm2	mm	mm	mm	mm	kg / km

35	8.0	16	3.1	60	3750	2880	6.5	1.7	2.5	3.2	74.9	9460	8700
50	8.0	16	3.2	65	5240	4260	6.7	1.8	3.15	3.4	79.0	10620	9680
70	8.0	16	3.3	70	6120	4730	7.1	1.8	3.15	3.5	82.5	11840	10440
95	8.0	16	3.4	74	7140	5240	7.5	1.9	3.15	3.6	86.4	13200	11350
120	8.0	16	3.5	77	8080	5710	7.9	2.0	3.15	3.7	89.9	14520	12190
150	8.0	25	3.6	80	9120	6220	8.2	2.0	3.15	3.8	93.6	16070	13280
185	8.0	25	3.7	84	10440	6940	8.6	2.1	3.15	3.9	97.3	17710	14090
240	8.0	25	3.9	91	12620	8010	9.2	2.2	3.15	4.1	103.2	20370	15460
300	8.0	25	4.0	95	14690	8800	9.7	2.3	3.15	4.3	108.2	22980	17210
400	8.0	35	4.3	103	17720	10230	10.3	2.4	3.15	4.5	116.8	27480	19450

Electrical Data

Nom. Cross-Section Area						Unarmored Cables	Aluminium Wire Armoured Cables			Current Ratings					
	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reac-tance	Induc-tance	Ground		Duct		Air	
										CU	AL	CU	AL	CU	AL
mm2	μΩ/m	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m	A		A		A	
35	524/868	668/1113	5.0/3.2	132	0.79	2.6	0.9	140	460	170	135	155	120	180	145

50	387/641	494/822	6.8/4.4	142	0.85	2.6	1.0	134	430	210	160	185	140	225	175
70	268/443	343/568	9.8/6.3	159	0.95	2.6	1.0	127	400	255	195	225	170	275	215
95	193/320	248/410	13.3/8.5	175	1.05	2.6	1.1	121	390	295	230	260	205	330	260
120	153/253	196/325	17.2/11.0	189	1.13	2.6	1.1	117	370	335	260	300	235	380	300
150	124/206	159/265	21.2/13.5	201	1.21	4.3	1.2	113	360	375	290	335	265	430	335
185	99.1/164	128/211	26.6/17.0	217	1.30	4.3	1.2	109	350	420	330	380	300	490	390
240	75.4/125	98/161	34.9/22.3	237	1.42	4.3	1.3	104	330	480	380	430	345	570	460
300	60.1/100	80/130	43.8/28.0	258	1.55	4.3	1.4	101	320	530	425	480	385	650	520
400	47.0/77.8	64/102	57.3/36.6	282	1.69	5.8	1.5	96	290	590	480	520	420	700	570