PTCL CABLES

PAKISTAN TELEPHONE CABLES LIMITED

In Technical Collaboration with
Furukawa Electric Co. Ltd., Japan

Content

AL RAEE GROUP OF COMPANIES

Al Raee Group of Companies is involved diversified business activities in Saudi Arabia and Pakistan. Brief introduction of Al Raee Group is as follows:

GENTLEMAN WATCH COMPANY - 1947

Gentleman Watch Company was established by ALHAJ ABDULAZIZ AL RAEE at Faisalabad, Pakistan. In a very short period emerged as one of the leading and famous watch stores in the area.

PAK MAHAL - 1950

Pak Mahal was established in Makkah, Saudi Arabia which became very famous for watch business. Pak Mahal introduced world renowned brands of Swiss and Japanese watches Rolex, Omega, West-End & Citizen in Saudi Arabian market.

ISLAMABAD HOTEL - 1975

Islamabad Hotel, the first ever Five Star Hotel in Islamabad, Pakistan was established with local and foreign investment, It was inaugurated by President of Pakistan Choudhary Fazal Elahi in the year 1975, with 147 elegant rooms with Royal & Executive Suites along with excellent dinning & banquet facilities.

SAUDI GOLD - 1978

Saudi Gold Limited, was established in Industrial Estate of Riyadh, the capital of Saudi Arabia. The first ultra modern plant of its kind in the region which is considered as one at the largest Gold Plants in the world. It produces 18 tons of Gold Jewelry including refining upto bars ingots, gold coins of Government & Non-Government Organizations, light weight Jewelry using latest vacuum casting technology and thousands of chain design using Italian laser technology. It has well equipped laboratory to test gold and precious metals as per International Standards and computerized designing of Jewelry and its moulds, dies and tools.

LYALLPUR COTTON MILLS - 1982

Lyallpur Cotton Mills established in 1934 on 59 acres area in agriculture city of Lyallpur (Faisalabad) in Punjab province and was having 4700 workers in various departments, It has played a vital role in development of textile industry in Pakistan. It was purchased by Al Raee Family from Fauji Foundation with foreign investment. Further investment was made in installing latest spinning machinery of Japan and processing machinery of Holland and Germany.

HOTEL SERVICES - 1984

Al Raee family privileged in serving thousand of Muslim Hajj pilgrims and arranging their accommodation in Al Raee Inn at Makkah Al Mukaramah & Madina Al Munawara, Saudi Arabia.

BELL - 1985

Saudi Gold & Jewellery Marketing Company was established with branches in Riyadh, Jeddah, Madinah Al-Munawarah, Makkah and supplying Gold & Silver Jewellery to 1300 outlets in Saudi Arabia alongwith exporting to different countries.

AL RAEE GROUP OF COMPANIES

PAKISTAN TELEPHONE CABLES LIMITED - 1988

The first plant of its kind in Pakistan with the capacity to produce 2.5 million pair kilometers of various sizes of Telecommunication Cables from 10 to 2400 pairs per year beside recent enhancement to produce Power Cables & Wires, Since July 1988, the company is owned by Al Raee Group.

SAWIL - 1989

Saudi Spinning & Weaving Industries Ltd., was established at red sea port city of Jeddah, Saudi Arabia with latest open end spinning plant of Rieter, Switzerland and complete weaving plant of 56 Swiss Sulzer looms and 24 Tsudakoma Air Jet looms of Japan. It has also complete Laroche Plant of France and doubling machine of Volkmann, Germany. Yarn and Fabric produce will cater local market demand and also exported to 20 countries.

AGRO OIL EXTRACTION INDUSTRIES LIMITED - 1990

Agro Oil Extraction Industries Limited, one of the largest plant of its kind at Port Qasim, Karachi with oil seed crushing capacity of 300 Metric Tons per day. Capable of using all kinds of traditional and non-traditional oil seeds, Recently enhanced the capability for oil refining & packaging of famous cooking oil brand “SAFAA”

CARTON HOTEL - 2002

First sea side Hotel in Pakistan having 118 rooms with Royal, Executive & Deluxe standard suites with dinning banquet and business center facilities.

AL ARABIA - 2006

Al Arabia Company, a joint venture of Al Raee Group and Bin Dawood Group was established for Real Estate and Construction Projects in Pakistan & Saudi Arabia.

AL-RAEE TRAVELS & TOURS (PVT) LTD - 2006

Al Raee Travels & Tours Private Limited to carry on General Sales Agency of National & International Air Lines. The main objective is to provide Hajj & Umrah Services & facilitate the muslim pilgrims in room booking of Al Raee Inn Makkah & Madina.

AL-RAEE FOODS - 2006

Al Raee Foods in engaged in processing, packaging & marketing of different food stuff in Pakistan & Saudi Arabia.

F&H PACKAGING - 2007

F&H Packaging in collaboration with Nestle Pakistan is engaged in their re-packaging of different food products.

AL-RAEE ENGICON - 2007

Al Raee Engicon, a joint venture of Al Raee Group and Engicon Canada engaged in construction of different projects in Saudi Arabia & Pakistan.

CORPORATE OVERVIEW

BOARD OF DIRECTORS

Mr. Raza Abdulaziz Al Raee	**Chief Executive**
Mr. Eijaz Abdulaziz Al Raee	**Director**
Mr. Riyadh Abdulaziz Al Raee	**Director**
Mrs. Asma Hafeez Al Raee	**Director**
Mrs. Sumiah Saeed-ur-Rehman	**Director**
Mrs. Rabia Barkat Ali	**Director**
Mr. Abdullah Raza Al Raee	**Director**
Mr. Muhammad Azhar Jamali	**Company Secretary**

Type of Company:	Public Limited, Shares quoted in Karachi & Lahore Stock Exchanges.
Date of Incorporation:	June 08, 1983
Authorized Capital:	Rs. 220.00 Million (Rupess Two Hundred Twenty Millions Only)
Paid - up Capital:	Rs. 210.00 Million (Rupees Two Hundred Ten Millions Only)
Number of Employees:	200 Employees
Product Range:	All sort of Telecom & Power Cables
Bankers:	Bank Al-Falah Limited, Askari Bank Ltd, The Bank of Khyber, National Bank of Pakistan.
Auditor:	Rehman Sarfaraz Rahim Iqbal Rafiq & Co. Chartered Accountants
Office:	E-3, Block-17, Al Raee Avenue, Behind National Stadium, Gulshan-e-Iqbal Karachi, Pakistan. Ph: +92 21 34815840-4 Fax: +92 21 34802943 E-mail: info@ptclcables.com, sales@ptclcables.com URL: www.ptclcables.com
Factory:	18th Mile, RCD Highway, 27/2/3 Mouza Bairut, Tehsil Hub, District Lasbella, Balochistan, Pakistan. Ph: +92 853 363249, 48 & 47 Fax : +92-853 363245

Pakistan Telephone Cables Ltd.

Pakistan Telephone Cables Limited (PTCL Cables) project was sanctioned in the year 1981 by Investment Promotion Bureau, under Ministry of Industries, Government of Pakistan vide their letter No. IPB/EE(27)/80 dated 03-11-81 for manufacturing of various types of Telecommunication Cables and supply to M/s. Pakistan Telecommunication Company Limited (formerly PT&T).

PTCL Cables plant has capacity to produce 2.5 Million Core Kms of various sizes of Telecommunication Cables from 10 Pairs to 2400 Pairs per year besides recent expansion to produce Power Cables & Conductors Instrumentation Cables, Control Cables.

PTCL Cables project was established in Private Sectors as Public Limited Company duly registered at Karachi Stock Exchange & Lahore Stock Exchange and under Technical Collaboration with M/s. Furukawa Electric Company Limited, Japan.

PTCL Cables project was financed by M/s. Pakistan Industrial Credit & Investment Corporation (PICIC) and M/s. Bankers Equity Limited (BEL), for Foreign Currency Components and Local Currency Components respectively.

PTCL Cables started its Commercial Production in July-1987, since then various Contracts awarded against International Tenders for supply of Telecommunication Cables to M/s. Pakistan Telecommunication Company Limited, National Telecommunication Corporation & Special Communication Organization, Pakistan Army, Navy & Air Force, Pakistan Atomic Energy Commission & Pakistan Aeronautical Complex Board Kamra, Siemens, Karachi Electric Supply Company, National Development Complex, Pakistan Railway and many more.

In July-1988, a well known Saudi Group named “Al Raee Group” having their industrial establishments in Saudi Arabia and in various cities of Pakistan, took over the management of PTCL Cables & Alhamdullilah, successfully running the project since. The enhancement of scope to produce Electrical & General Cables have widened the resources and the management of Al Raee Group believes that in near future PTCL Cables will emerge as the market leader in Power Cables manufacturing as well.

QUALITY SYSTEM & POLICY

QUALITY SYSTEM

PTCL Cables is ISO 9001-2000 certified company and manufacturing all the products Conforming to the quality system. Beside the routine in-process tests that are carried out at each process line to ensure the product meets the design specification. PTCL Cables has deployed Sophisticated Testing Equipment to ensure all the Electrical parameters of finished Telecom & Power Cables. The high speed high performance, high technical measuring system is a major break through in Quality Assurance testing of Telecom & Power Cables.

PTCL Cables tests all the products 100% prior to dispatch from the factory and test result are available upon request.


URS

UKAS QUALITY MANAGEMENT 043

Certificate of Registration

This certificate has been awarded to

Pakistan Telephone Cables Limited.

18th Mile RCD Highway Mouza Bainit Tehsil Hub, District, Lasbella, Balochistan, Pakistan

In recognition of the organization's Quality System which complies with

ISO 9001:2000

The scope of activities covered by this certificate is defined below

Manufacture of Telephone and Power Cables

QUALITY POLICY

PTCL Cables produces and supplies cables according to International Standards and customer requirement.

PTCL Cables utilizes Advanced Processing Techniques, Modern Machinery & Testing Equipments and trained staff. In addition Quality Assurance & Quality Control System is employed, extending from receipt of raw material to delivery of finished cables.

Thus, PTCL Cables achieves quality of production, increased productivity and ensures a high level of customer's satisfaction.

PRODUCT RANGE:

PTCL Cable is exclusive plant of its kind in Pakistan for manufacturing of following Telecommunication Cables from 10 Pairs to 2400 Pairs Pairs.

PRIMARY LOCAL UNDER, GROUND CABLE (PIC-JF-UNARMOURED)

These cables are used for primary network between the exchanges and cross conncetion cabinets for duct installation. These cables are generally based on Pakistan Telecommunication Company Limited Specification LW-32.

PRIMARY LOCAL UNDER GROUND CABLES (PIC-JF-ARMOURED)

These Cables are used for primary network between the exchanges and cross connection cabinets for direct burial installation these cables are generally based on Pakistan Telecommunication Company Limited Specification LW-32.

SECONARY LOCAL UNDER GROUND CABLE (PIC-JF-ARMOURED)

These cables are generally used for distribution in exchange area for direct barrel installation, i.e. between the cross connection cabinets and distribution points, where increase mechanical strength is required. These cables are generally based on Pakistan Telecommunication Company Limited Specification LW-33.

SELF SUPPORTING AERIAL CABLE (PIC-SSAC)

These cables are used for Junction Network in exchange area for Aerial Installation. These cables fully comply with Pakistan Telecommunication Company Limited Specification LW-34.

DROP WIRE

Drop wire is used for the connection between distribution box (DP) and terminal box in the customer's premises. This wire is based on Pakistan Telecommunication Company Ltd Specification LW-40.

PVC INTERCOM CABLE

These cables used for inside wiring application, connector cable and other multi-line Installation. This cable is based on Pakistan Telecommunication Company Ltd. Specification LW-36.

LEAD IN CABLE - 2 PAIRS

These cables used for connection between distribution box (DP) and terminal box in the customer; premisis. This cable is based on Pakistan Telecommunication Company Ltd. specification LW-12

JUMPER WIRE

The Jumper Wire are used for marking wired connection at MDF/Cabinets, signaling plants & equipment. This wire is based on Pakistan Telecommunication Company Ltd Specification LW-49.

Beside Telecom Cables, we also manufacture

- General Housing Wires
- Single, Two, Three & Four Core Cables
- HDBC (Hard Drawn Bare Copper Conductor)
- ACSR (Aluminium Conductor Steel Re-Inforced)
- Instrumentation Cables & Control Cables.

POLYETHYLENE INSULATED JELLY FILLED UNDERGROUND TELEPHONE CABLES

Polyethylene Insulated Jelly Filled Telephone Cables are widely used for Primary and Secondary Underground distribution networks. The cables having single jacket are used as duct cables upto 2400 pairs as primary network. Secondary cables are directly buried and may be Armoured with additional jacket of a tough weather resistance LDPE Compound.

The cables core are fully filled with gel type hydrocarbon base filling compound having the same dielectric constant and fully compatible with the insulation and jacketing materials. The cables are manufactured with high-grade materials according to REA & Pakistan Telecommunication Company Limited Specification or customer's requirement.

CABLE CONSTRUCTION

CONDUCTOR

Fully Annealed High Quality Solid Copper, the Conductor sizes are 0.4, 0.5, 0.6 & 0.9 mm.

INSULATION

Colour High Molecular Weight High-Density Polyethylene (HDPE)

COLOUR CODING

Cables are fully colour coded in accordance with PIC even count colour code.

PAIRING

Two coloured insulated conductors are uniformly twisted together to form a Pair. Varying lay length is designed to minimize the cross talk and capacitance unbalance.

STRANDING / CABLING

Twisted pairs are assembled into unit of 12, 13, 25, 50 & 100 Pairs. When desired for lay-up reason the units are divided into two or more sub-units, which are bind with durably coloured Polyethylene Tapes to form a compact and circular cable.

FILLING COMPOUND

The water resistant filling compound is applied to fill the air spaces within the cable core.

CORE COVERING

A non-hygroscopic and dielectric heat resistant Polyester Tape and Water Blocking Tape are applied helically having a suitable overlap.

FLOODING COMPOUND

Gel type hydrocarbon base compound is applied between the core wrap and shield.

MOISTURE BARRIER INNER PE SHEATH (INNER JACKET)

An Aluminum Tape with Co-polymer coating is applied over the cable core & sheath with Black Polyethylene Compound.

ARMOUR (OPTIONAL)

A Tin Coated Steel Corrugated Tape is applied longitudinally directly over the Inner Sheath with suitable flooding compound.

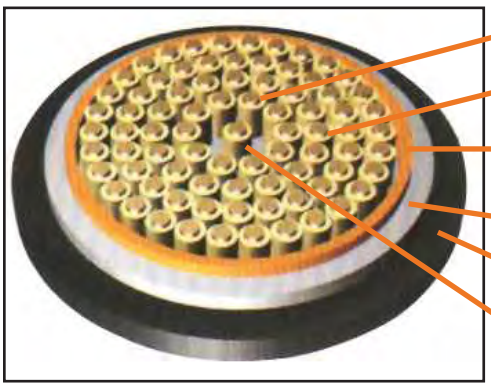
JACKET

Black High Molecular Weight Low Density Polyethylene (LDPE)

IDENTIFICATION

An Identification Tape durable marked with the Manufacturer's Name, Year of Manufacturing, Contract No, Cable Size & Type, if required, is placed under the Core Covering Tape. Alternatively these details may be printed on the outer jacket of cable alongwith Length Marking.

CROSS SECTION



- Conductor: Solid Annealed Copper wire.
- Insulation: Solid High-Density Polyethylene (HDPE).
- Cable Core Wrapping: Non-Hygroscopic Heat Resistance PE Tape.
- Shield: Double-Side Composite Aluminum-Plastic Tape.
- Sheath: Black Low-Density Polyethylene (LDPE)
- Outer Sheath: Black Low-Density Polyethylene (LDPE)

UNIT IDENTIFICATION / COLOUR SCHEME FOR 25 PAIR UNITS

Pair No.	Colour	
	Tip	Ring
01	White	Blue
02	White	Orange
03	White	Green
04	White	Brown
05	White	Slate
06	Red	Blue
07	Red	Orange
08	Red	Green
09	Red	Brown
10	Red	Slate
11	Black	Blue
12	Black	Orange
13	Black	Green
14	Black	Brown
15	Black	Slate
16	Yellow	Blue
17	Yellow	Orange
18	Yellow	Green
19	Yellow	Brown
20	Yellow	Slate
21	Violet	Blue
22	Violet	Orange
23	Violet	Green
24	Violet	Brown
25	Violet	Slate

25 PAIRS UNIT IDENTIFICATION FOR CABLE UPTO 600 PAIRS

25 Pairs Unit Cables	Unit Pairs Count	Colours of Units Identification Tape
01	1-25	White / Blue
02	26-50	White / Orange
03	51-75	White / Green
04	76-100	White / Brown
05	101-125	White / Slate
06	126-150	Red / Blue
07	151-175	Red / Orange
08	176-200	Red / Green
09	201-225	Red / Brown
10	226-250	Red / Slate
11	251-275	Black / Blue
12	276-300	Black / Orange
13	301-325	Black / Green
14	326-350	Black / Brown
15	351-375	Black / Slate
16	376-400	Yellow / Blue
17	401-425	Yellow / Orange
18	426-450	Yellow / Green
19	451-475	Yellow / Brown
20	476-500	Yellow / Slate
21	501-525	Violet / Blue
22	526-550	Violet / Orange
23	551-575	Violet / Green
24	576-600	Violet / Brown

PHYSICAL DIMENSION

UN-ARMOURED CABLES

Conductor Diameter	0.4mm			0.5mm			0.6mm		
Number of Pairs	Outer Diameter MM	Nominal Weight Kg/Km (Approx.)	Standard Length Meters	Outer Diameter MM	Nominal Weight Kg/Km (Approx.)	Standard Length Meters	Outer Diameter MM	Nominal Weight Kg/Km (Approx.)	Standard Length Meters
10	10.20	110.90	1000	11.40	172.50	1000	12.70	175.50	1000
20	12.20	166.47	1000	13.90	223.40	1000	15.70	291.50	1000
30	13.70	218.30	1000	15.90	301.00	1000	17.90	393.00	1000
50	16.20	316.70	1000	18.90	443.70	1000	21.70	600.00	1000
100	20.40	568.16	1000	25.00	801.00	1000	29.10	1090.00	1000
200	28.60	996.00	1000	34.00	1500.00	1000	39.20	2100.00	1000
300	32.40	1418.60	1000	40.40	2161.10	1000	47.10	3014.70	500
600	44.40	2722.00	500	55.80	4170.00	500	65.90	5871.00	500
900	53.10	3985.50	500	67.20	6200.00	500	81.00	933.00	250
1200	60.60	5253.60	250	-	-	-	-	-	-

ARMOURED CABLES

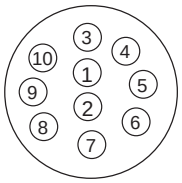
Conductor Diameter	0.4mm			0.5mm			0.6mm		
Number of Pairs	Outer Diameter MM	Nominal Weight Kg/Km (Approx.)	Standard Length Meters	Outer Diameter MM	Nominal Weight Kg/Km (Approx.)	Standard Length Meters	Outer Diameter MM	Nominal Weight Kg/Km (Approx.)	Standard Length Meters
10	16.20	280.17	1000	17.40	325.97	1000	18.70	376.77	1000
20	18.20	361.47	1000	19.90	436.36	1000	21.70	530.00	1000
30	19.70	430.30	1000	21.90	541.00	1000	24.30	671.68	1000
50	22.20	558.70	1000	25.30	736.19	1000	28.10	927.62	1000
100	26.80	847.16	1000	31.40	1168.51	1000	35.90	1526.75	500
200	34.40	1418.16	1000	40.80	1975.12	500	46.40	2663.31	500
300	39.10	1915.50	500	47.60	2782.19	500	54.70	3764.00	500
600	51.60	3400.00	500	63.40	5042.00	500	73.90	6931.61	300

ELECTRICAL CHARACTERISTICS

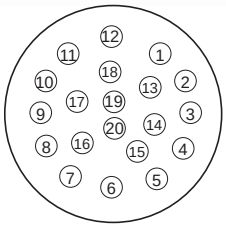
Conductor Core			0.4mm	0.5mm	0.6mm
Conductor Resistance at 20 °C (Ω/km)			145	92	63
Mutual Capacitance at 1000 Hz (nF/km) Individual		Maximum	52 ± 4 nF	52 ± 4 nF	52 ± 4 nF
Average		Maximum	52 ± 3 nF	52 ± 3 nF	52 ± 3 nF
Capacitance Unbalance (pF/300M)	- Pair to Pair				
Average/300M		Maximum	25 pF	25 pF	25 pF
Individual/300M		Maximum	100 pF	100 pF	100 pF
Average/300M	- Pair to Ground	Maximum	175 pF	175 pF	175 pF
Individual/300M		Maximum	800 pF	800 pF	800 pF
Insulation Resistance at 500 v DC (MΩ/km)		Minimum	5000 MΩ	5000 MΩ	5000 MΩ
High Voltage Test	- Conductor to Conductor		2.5 KV	2.5 KV	2.5 KV
	- Conductor to Shield		10 KV	10 KV	10 KV
Cross Talk Coupling Loss at 150 KHz		Minimum	73 dB	73 dB	73 dB
Attenuation (dB/km) 1 Khz			1.88	1.50	1.25
150Khz			11.20	8.40	6.80
772Khz			21.00	16.50	13.90
1024Khz			23.40	19.40	16.10
1500Khz			29.40	23.60	19.50

CABLE FORMATION

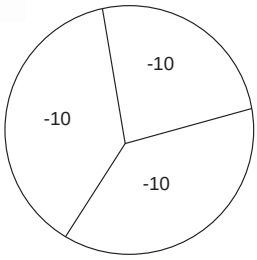
These lay-ups are not requirement but as illustration only



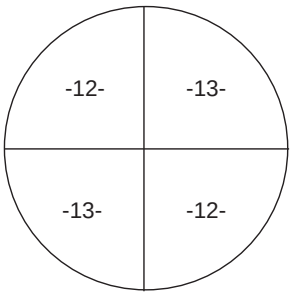
10 PAIRS



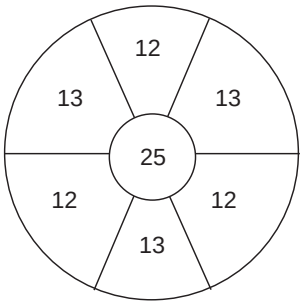
20 PAIRS



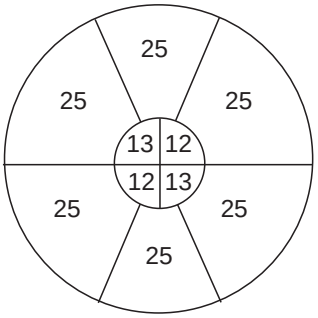
30 PAIRS



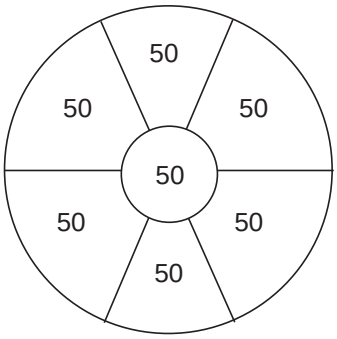
50 PAIRS



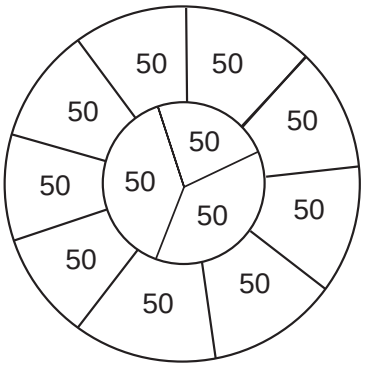
100 PAIRS



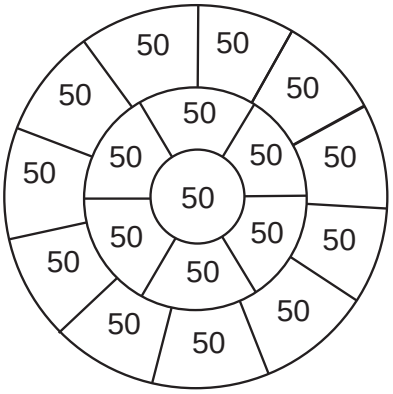
200 PAIRS



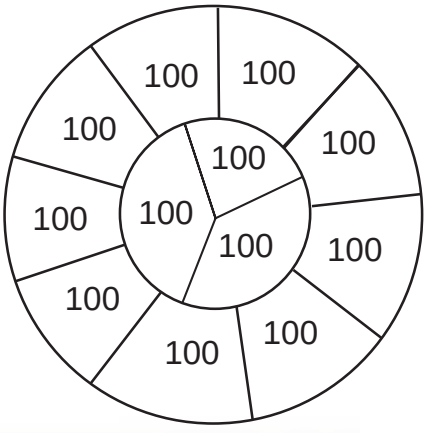
300 PAIRS



600 PAIRS



900 PAIRS



1200 PAIRS

POLYETHYLENE INSULATED SELF SUPPORTING AERIAL TELEPHONE CABLES

These cables are used for junction network in exchange area for Aerial installation. These cables are generally based on REA and Pakistan Telecommunication Company Limited Specification.

CABLE CONSTRUCTION

CONDUCTOR
Fully Annealed High Quality Solid Copper, the conductor size are 0.5, 0.6mm.

INSULATION
Colour High Molecular Weight Solid High Density Polyethylene (HDPE)

COLOUR CODING
Cables fully colour coded in accordance with PIC even count color code.

PAIRING
Two coloured insulated conductors are uniformly twisted together to form a Pair, The twisted length being specially designed to minimize the cross talk and capacitance unbalance.

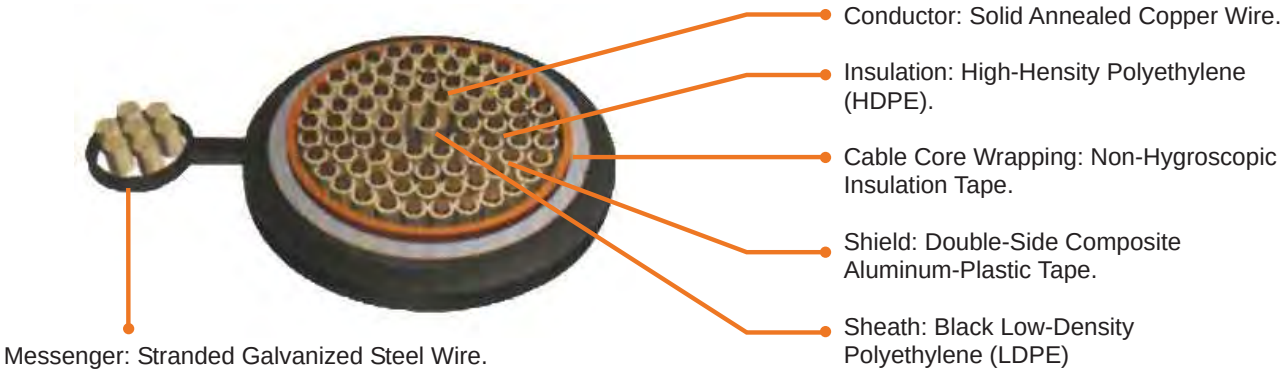
STRANDING UNITING
Twisted pairs are assembled into unit of 12, 13, 25, 50 & 100 Pairs. When desired for lay-up reason the units are divided into two or more sub-units, which are binded with durably coloured Polyethylene Tapes to form a compact and circular cables.

CORE COVERING
The core is wrapped with non-hygroscopic and dielectric polyester Tape with suitable overlap.

SUSPENSION STRAND
Extra high strength of Galvanized Steel Wires Strand use as a support strand to form the shape as defined in the figure blew.

JACKET
Black High Molecular Weight Low Density Polyethylene Compound (LDPE)

IDENTIFICATION
An Identification Tape durably marked with the Manufacture's Name, Year of Manufacturing, Contract Number, Cable Size & Type, if required, is placed under the Core Covering Tape and these details also maybe printed on the outer jacket of cable alongwith Length Marking.



UNIT IDENTIFICATION / COLOUR SCHEME FOR 25 PAIR UNITS

Pair No.	Colour	
	Tip	Ring
01	White	Blue
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04	White	Brown
05	White	Slate
06	Red	Blue
07	Red	Orange
08	Red	Green
09	Red	Brown
10	Red	Slate
11	Black	Blue
12	Black	Orange
13	Black	Green

Pair No.	Colour	
	Tip	Ring
14	Black	Brown
15	Black	Slate
16	Yellow	Blue
17	Yellow	Orange
18	Yellow	Green
19	Yellow	Brown
20	Yellow	Slate
21	Violet	Blue
22	Violet	Orange
23	Violet	Green
24	Violet	Brown
25	Violet	Slate

PHYSICAL DIMENSION

Conductor Diameter	0.5 mm			0.6 mm		
Number of Pairs	Outer Diameter MM	Nominal Weight Kg/Km (Approx)	Standard Length Meters	Outer Diameter MM	Nominal Weight Kg/Km (Approx)	Standard Length Meters
10	9.8 x 17.6	169	1000	12.1 x 19.9	197	1000
20	13.2 x 21.0	226	1000	14.9 x 22.7	279	1000
30	15.0 x 22.8	285	1000	17.2 x 26.5	400	1000
50	17.8 x 27.1	431	1000	20.8 x 30.1	561	1000
100	23.2 x 32.5	698	500	26.9 x 36.2	972	500

ELECTRICAL CHARACTERISTICS

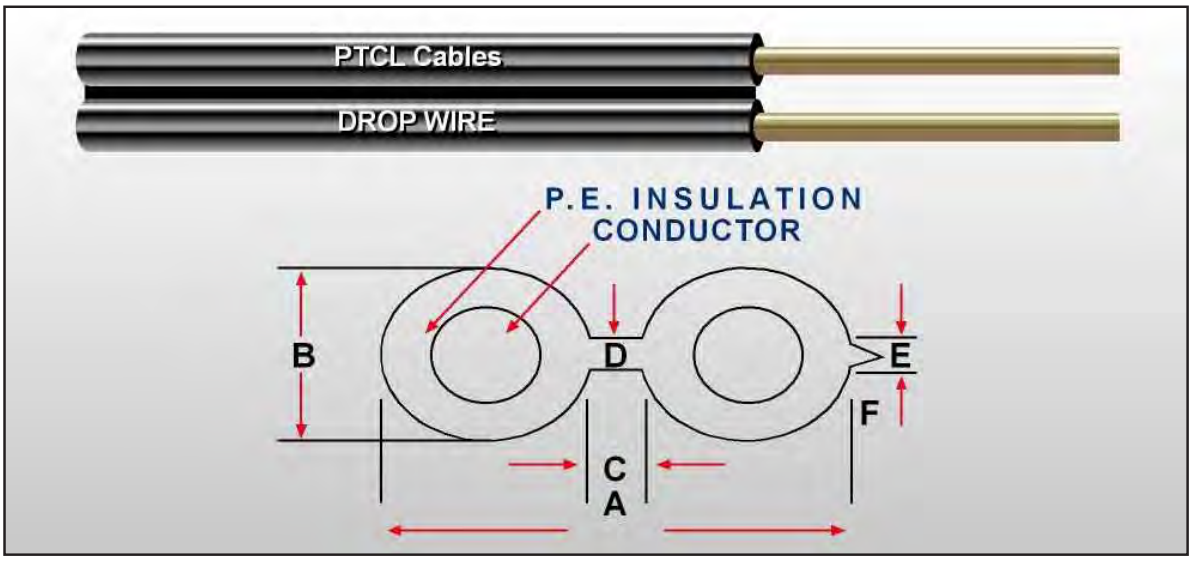
Conductor Core		0.5mm	0.6mm
Conductor Resistance at 20 °C (Ω/km)		92	63
Mutual Capacitance at 1000 Hz (nF/km)	Maximum Individual	52 ± 4 nF	52 ± 4 nF
	Maximum Average	52 ± 3 nF	52 ± 3 nF
Capacitance Unbalance (pF/300M) - Pair to Pair			
	Maximum Average/300M	25 pF	25 pF
	Maximum Individual/300M	100 pF	100 pF
- Pair to Ground	Maximum Average/300M	175 pF	175 pF
	Maximum Individual/300M	800 pF	800 pF
Insulation Resistance at 500 v DC (MΩ/km)	Minimum	5000 MΩ	5000 MΩ
	Maximum b/w pair	10 GΩ	10 GΩ
High Voltage Test - Conductor to Conductor		3 KV	3 KV
- Conductor to Shield		10 KV	10 KV
Cross Talk Coupling Loss at 150 KHz	Minimum	73 dB	73 dB
Attenuation (dB/km)1 Khz		1.50	1.25
150Khz		8.40	6.80
772Khz		16.50	13.90
1024Khz		19.40	16.10
1500Khz		23.60	19.50

DROP WIRE

Drop wire is used for the connection between distribution box (DP) and terminal box in the customer's premises, This cable is based on Pakistan Telecommunication Company Limited specification.

CABLE CONSTRUCTION

Two conductors forming a pair running in parallel shall be insulated with weather resistant, Black High Density Solid Polyethylene (HDPE) extruded in figure below.



PHYSICAL DIMENSION

Conductor Diameter mm	Thickness of Insulation mm	A mm	B mm	C mm	D mm	E mm	E Mm
1.00	1.00	6.4	3.0	0.4	0.5	0.6	0.6

CONDUCTOR

Copper Plated Steel Wire, Size 1.00 MM

INSULATION

Black High Density Soild Polyethylene.

PACKING

Coil/Length 500 meters and maximum weight 12.75 Kgs per Coil.

Drop wire is also available in Packaging of 1000, 2000 & 5000 meters upon request.

ELECTRIC CHARACTERISTICS

Conductor Core	1.00 mm
Copper Plated Steel Wire Diameter (mm)	1.00 mm
Tolerance ±	(+0.02mm), (-0.01mm)
Conductor Resistance at 20 ° C (Ω -km)	70 Ω
Resistance Unbalance	5 %
Mutual Capacitance at 1000 ± 200 Hz (nF / Km)	
Dry Drop Wire (In Air)	≤ 35 nF / Km
Wet Drop Wire (In Air)	≤ 50 nF / Km
Insulation Resistance at 500 v DC (MΩ km)	
Maximum	5000 MΩ
Maximum	10 GΩ
High Voltage Test DC KV	
Between Conductors	10 KV
Insulation Integrity 50 to 60 Hz	1.5 KV
Maximum Attenuation Value 1000 ± 200 Hz	
for Dry Wire (in Air)	1.05 dB / km
Wet Wire (in Air)	1.29 dB / km

PVC INDOOR TELECOM CABLES

PVC Indoor Telecom cables are used for indoor wiring applications and other multiline installations. These cables are based on Pakistan Telecommunication Company Limited specification.

CABLE CONSRUCTION

CONDUCTOR
Fully Anealed High Quality Solid Copper Conductor,
Size 0.6mm & also available in 0.4 & 0.5mm.

INSULATION
Colour High Molecular Weight Solid High Density Polyethylene

COLOUR CODING
Cables are fully colour coded in accordance with PIC even count colour code.

PAIRING
Two coloured insulated conductor are uniformly twisted together to form pair. The twisted length being specially designed to minimize the cross talk and capacitance unbalance.

SHEILD (OPTIONAL):

SHEATHING
High quality PVC Compound.

PHYSICAL DIMENSION

Conductor Diameter	0.6mm		
Number of Pairs	Outer Diameter mm	Nominal Weight KG / KM (Approx)	Standard Length Meters
1	3.38	18.73	1000
2	4.68	32.37	1000
3	5.28	42.73	1000
4	5.80	47.91	1000
5	6.24	62.23	1000
6	6.65	71.75	1000
8	7.36	90.14	1000
10	8.03	108.33	1000
20	8.49	185.70	1000
30	12.39	279.29	1000
50	15.92	462.43	1000
100	20.60	867.00	1000

ELECTRICAL CHARACTERISTICS

Conductor	0.6mm
Conductor Resistance at 20 'C (Ω/KM)	63 Ω/Km
Mutual Capacitance at 100 Hz (nF/Km)	
Maximum Individual	46n F±3
Maximum Average	48n F±3
Capacitance Unbalance (pF300M) (Pair-Pair)	45 nF±3
Insulation Resistance at 500 v DC (MΩ / K m)	5000 MΩ
High Voltage Test (Conductor-Conductor)	2 KV DC
Cross Talk Coupling Loss at 150 KHz	73 dB
Attenuation (dB/Km) 1 KHz	1.25 dB

2 PAIR LEAD-IN CABLES

Lead In Cable 2 Pair are used between terminal box and the customer's premises. These cables are based on Pakistan Telecommunication Company Limited specification.

CABLE CONSTRUCTION

CONDUCTOR
Fully Anealed High Quality Solid Copper Conductor Size 0.6mm

INSULATION
Colour High Molecular Weight Solid High Density Polyethylene Compound

COLOUR CODING
The insulated conductors, twisted together into colour coded pairs:
Blue, White & Green, Black.

PAIRING
Two coloured insulated conductors are uniformly twisted together to form pair. The twisted length being specially designed to minimize the cross talk and capacitance unbalance.

INNER SHEATH
Inner Sheath of Polyethylene is used to fill up spaces between insulated conductors for the purpose of water blocking and give the core a round cross section.

ARMOURING
Bare Aluminum Tape tape is applied over inner Sheath.

OUTER SHEATH
Black High Molecular Weight Low Density Polyethylene Compound

IDENTIFICATION
The manufacturer's Name, Year of Manufacturing, Contract No, Cable Size & Type may be printed on the outer sheath of cable alongwith Length Marking.

PHYSICAL DIMENSION

Conductor	0.6mm		
Number of Pairs	Outer Diameter mm	Nominal Weight Kg / KM (Approx)	Standard Length Meters
2	11.40	123.00	1000

ELECTRICAL CHARACTERISTICE

Conductor	0.6mm
Conductor Resistance at 20 'C (Ω/KM)	63 Ω/Km
Mutual Capacitance at 100 Hz (nF/Km)	52 nF ±3
Capacitance Unbalance (pF/300M) (Pair-Pair)	
Maximum Average	25nF
Maximum Individual	100 nF
Insulation Resistance at 500 v DC (MΩ-Km)	5000 MΩ
High Voltage Test (Conductor-Conductor)	3.6 KV DC
Cross Talk Coupling Loss at 150 KHz	73 dB
Attenuation (dB/Km) 1 KHz	1.04 dB

JUMPER WIRE

APPLICATION

Jumper wire is used for making cross connections on distribution frames and in terminal in the telephone exchanges. This wire is based on latest specifications of Pakistan Telecommunication Company Limited (PTCL).

CABLE CONSTRUCTION DETAIL

CONDUCTOR

0.5 or 0.6 mm plane or tinned soft copper.

INSULATION

Polyvinyl Chloride / Flame Retardant Compound.

COLOUR CODING

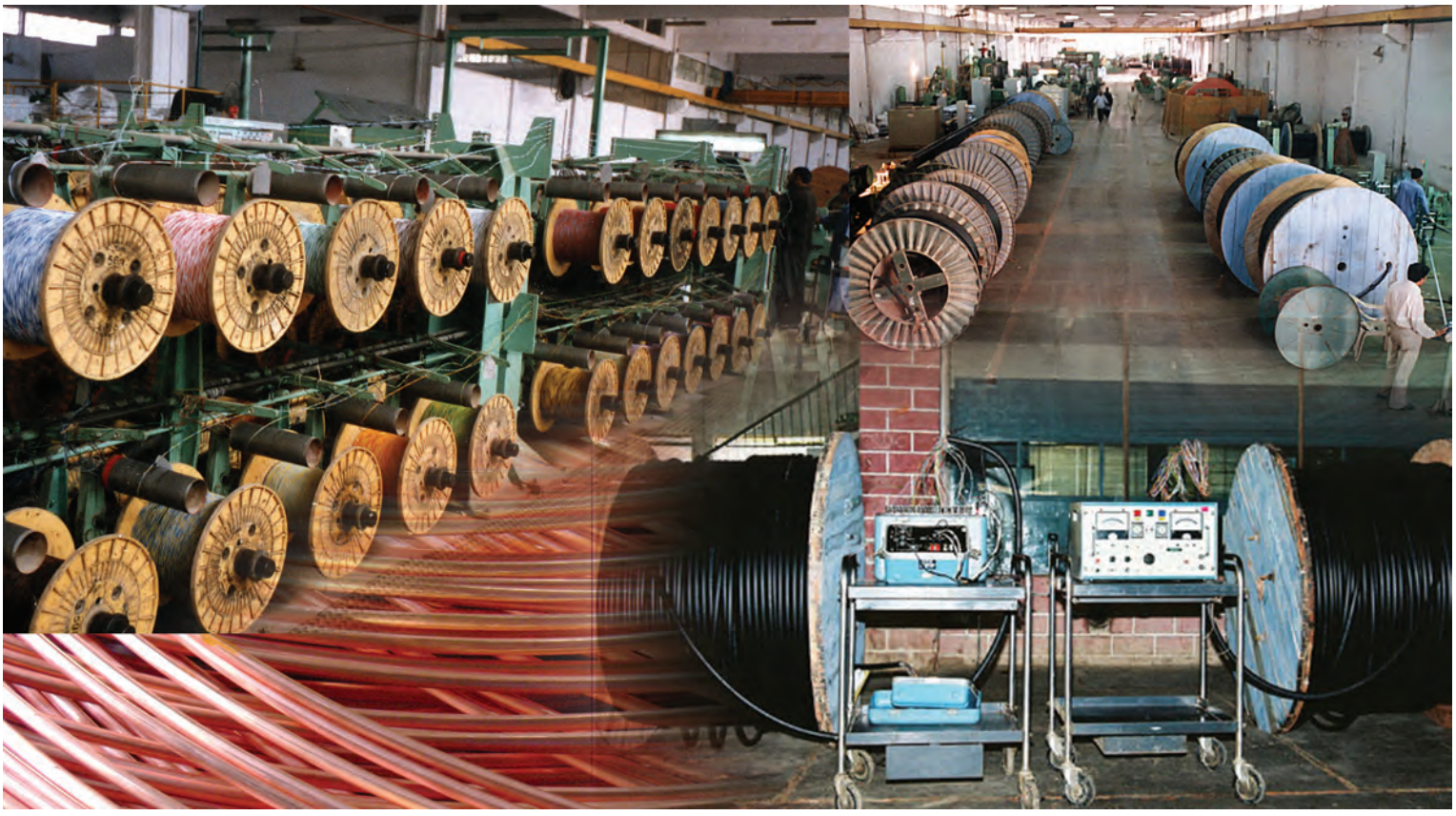
Jumper wire is color coded as per requirement of client or as per P.T.C.L. specification.

LAY-UP

The require number of insulated conductors twisted together.

PACKING

Coils or Reels measuring 100 / 500 Meters.



COMPARISON OF WIRE GUAGES

Comparison of Wire Guages								
Guage	Standard Wire Guage SWG		Bringham Wire Guage BWG		American Wire Guage AWG		US Steel Wire Guage US SWG	
	Inches	equivalent in mm	Inches	equivalent in mm	Inches	equivalent in mm	Inches	equivalent in mm
7/0	0.500	12.70	...	...	...	...	0.4900	12.45
6/0	0.464	11.79	...	...	0.5800	...	0.4615	11.72
5/0	0.432	10.97	...	...	0.5165	...	0.4305	10.94
4/0	0.400	10.16	0.454	11.53	0.4600	11.68	0.3938	10.00
3/0	0.372	9.45	0.425	10.79	0.4096	10.40	0.3625	9.21
2/0	0.348	8.84	0.380	9.65	0.3648	9.27	0.3310	8.41
0	0.324	8.23	0.340	8.64	0.3249	8.25	0.3065	7.78
1	0.300	7.62	0.300	7.62	0.2893	7.35	0.2830	7.19
2	0.276	7.01	0.284	7.21	0.2576	6.54	0.2625	6.67
3	0.252	6.40	0.259	6.58	0.2294	5.83	0.2437	6.19
4	0.232	5.89	0.238	6.05	0.2043	5.19	0.2253	5.72
5	0.212	5.39	0.220	5.59	0.1819	4.62	0.2070	5.26
6	0.192	4.88	0.203	5.16	0.1620	4.11	0.1920	4.88
7	0.176	4.47	0.180	4.57	0.1443	3.67	0.1770	4.49
8	0.160	4.06	0.165	4.19	0.1285	3.26	0.1620	4.11
9	0.144	3.66	0.148	3.76	0.1144	2.91	0.1483	3.77
10	0.128	3.25	0.134	3.40	0.1019	2.59	0.1350	3.43
11	0.166	2.95	0.120	3.05	0.09074	2.30	0.1205	3.06
12	0.104	2.64	0.109	2.77	0.08081	2.05	0.1055	2.68
13	0.092	2.34	0.095	2.41	0.07193	1.83	0.0915	2.32
14	0.080	2.03	0.083	2.11	0.06408	1.63	0.0800	2.03
15	0.072	1.83	0.072	1.83	0.05707	1.45	0.0720	1.83
16	0.064	1.63	0.065	1.65	0.05082	1.29	0.0625	1.59
17	0.056	1.42	0.058	1.47	0.04526	1.15	0.0540	1.37
18	0.048	1.22	0.049	1.24	0.04030	1.02	0.0475	1.21
19	0.040	1.02	0.042	1.07	0.03589	0.91	0.0410	1.04
20	0.036	0.914	0.035	0.889	0.03196	0.812	0.0348	0.884
21	0.032	0.813	0.032	0.813	0.02846	0.723	0.0317	0.805
22	0.028	0.711	0.028	0.711	0.02535	0.644	0.0286	0.726
23	0.024	0.610	0.025	0.635	0.02257	0.573	0.0258	0.655
24	0.022	0.559	0.022	0.559	0.02010	0.511	0.0230	0.584
25	0.020	0.508	0.020	0.508	0.01790	0.455	0.0204	0.518
26	0.018	0.457	0.018	0.457	0.01594	0.405	0.0181	0.460
27	0.0164	0.417	0.016	0.406	0.01420	0.361	0.0173	0.439
28	0.0148	0.376	0.014	0.357	0.01264	0.321	0.0162	0.412
29	0.0136	0.345	0.013	0.330	0.01126	0.286	0.0150	0.381
30	0.0124	0.315	0.012	0.305	0.01003	0.255	0.0140	0.357
31	0.0166	0.295	0.010	0.254	0.008928	0.227	0.0132	0.338
32	0.0108	0.274	0.009	0.229	0.007950	0.202	0.0128	0.325
33	0.0100	0.254	0.008	0.203	0.007080	0.180	0.0118	0.300
34	0.0092	0.234	0.007	0.178	0.006304	0.160	0.0104	0.264
35	0.0084	0.213	0.005	0.127	0.005615	0.143	0.0095	0.241
36	0.0076	0.193	0.004	0.102	0.005000	0.127	0.0090	0.229
37	0.0068	0.173	...	...	0.004453	0.113	0.0085	0.216
38	0.0060	0.152	...	...	0.003965	0.101	0.0080	0.203
39	0.0052	0.132	...	...	0.003531	0.090	0.0075	0.191
40	0.0048	0.122	...	...	0.003145	0.080	0.0070	0.178
41	0.0044	0.112	...	...	...	...	0.0066	0.168
42	0.0040	0.102	...	...	...	...	0.0062	0.157
43	0.0036	0.091	...	...	...	...	0.0060	0.152
44	0.0032	0.081	...	...	...	...	0.0058	0.147
45	0.0028	0.071	...	...	...	...	0.0055	0.140
46	0.0024	0.061	...	...	...	...	0.0052	0.132
47	0.0020	0.051	...	...	...	...	0.0050	0.127
48	0.0016	0.041	...	...	...	...	0.0048	0.122
49	0.0012	0.031	...	...	...	...	0.0046	0.117
50	0.0010	0.025	...	...	...	...	0.0044	0.112

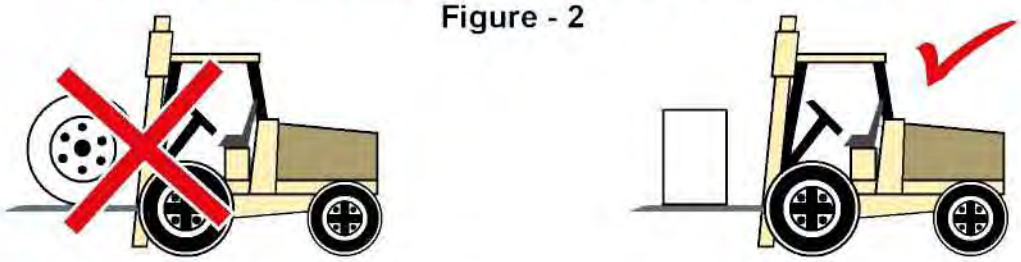
ISO Metric Preferred Sizes (mm)				Nearest SWG Size (Inches)
R10	R20	R40	equivalent in Inches	equivalent in mm
0.025	0.025	0.025	0.00098	...
...	...	0.026	0.00102	0.001
...	0.028	0.028	0.00110	...
...	...	0.030	0.00118	0.0012
0.032	0.032	0.032	0.00126	...
...	...	0.034	0.00134	...
...	0.036	0.036	0.00142	...
...	...	0.038	0.00150	...
0.040	0.040	0.040	0.00158	0.0016
...	...	0.042	0.00165	...
...	0.045	0.045	0.00177	...
...	...	0.048	0.00189	...
0.050	0.050	0.050	0.00197	0.0020
...	...	0.053	0.00209	...
...	0.056	0.056	0.00220	...
...	...	0.060	0.00236	0.0024
0.063	0.063	0.063	0.00248	...
...	...	0.067	0.00264	...
...	0.071	0.071	0.00280	0.0028
...	...	0.075	0.00295	...
0.080	0.080	0.080	0.00315	0.0032
...	...	0.085	0.00335	...
...	0.090	0.090	0.00354	0.0036
...	...	0.095	0.00374	...
0.100	0.100	0.100	0.00394	0.004
...	...	0.106	0.00417	...
...	0.112	0.112	0.00441	0.0044
...	...	0.118	0.00465	0.0048
0.125	0.125	0.125	0.00492	...
...	...	0.132	0.00520	0.0052
...	0.140	0.140	0.00551	...
...	...	0.150	0.00591	0.006
0.160	0.160	0.160	0.00630	...
...	...	0.170	0.00669	0.0068
...	0.180	0.180	0.00709	...
...	...	0.190	0.00748	0.0076
0.200	0.200	0.200	0.00787	...
...	...	0.212	0.00835	0.0084
...	0.224	0.224	0.00882	...
...	...	0.236	0.00929	0.0092
0.250	0.250	0.250	0.00984	0.0100
...	...	0.265	0.01043	...
...	0.280	0.280	0.01102	1.0108
...	...	0.300	0.01181	0.0116
0.315	0.315	0.315	0.01240	0.0124
...	...	0.335	0.01319	...
...	0.355	0.355	0.01398	0.0136
...	...	0.375	0.01476	0.0148
0.400	0.400	0.400	0.01575	...
...	...	0.425	0.01673	0.0164
...	0.450	0.450	0.01772	0.018
...	...	0.475	0.01870	...
0.500	0.500	0.500	0.01969	0.020
...	...	0.530	0.02087	0.021
...	0.560	0.560	0.02205	0.022
...	...	0.600	0.02362	0.024
0.630	0.630	0.630	0.02480	...
...	...	0.670	0.02638	0.026
...	0.710	0.710	0.02795	0.028
...	...	0.750	0.02953	0.030
0.800	0.800	0.800	0.03150	0.032
...	...	0.850	0.03346	0.034
...	0.900	0.900	0.03543	0.036
...	...	0.950	0.03740	0.038
1.00	1.00	1.00	0.03940	0.040
...	...	1.06	0.0417	...
...	1.12	1.12	0.0441	0.044
...	...	1.18	0.0465	...
1.25	1.25	1.25	0.0492	0.048
...	...	1.32	0.0520	0.052
...	1.40	1.40	0.0551	0.056
...	...	1.50	0.0591	0.060
1.60	1.60	1.60	0.0630	0.064
...	...	1.70	0.0669	0.068
...	1.80	1.80	0.0709	0.072
...	...	1.90	0.0748	0.076
2.00	2.00	2.00	0.0787	0.080
...	...	2.12	0.0835	...
...	2.24	2.24	0.0882	0.086
...	...	2.36	0.0929	0.092
2.50	2.50	2.50	0.0984	0.098
...	...	2.65	0.1043	0.104
...	2.80	2.80	0.1102	0.110
...	...	3.00	0.1181	0.116
3.15	3.15	3.15	0.1240	0.122
...	...	3.35	0.1319	0.128
...	3.55	3.55	0.1398	0.136
...	...	3.55	0.1476	0.144
4.00	4.00	4.00	0.1575	0.160
...	...	4.25	0.1673	0.168
...	4.50	4.50	0.1772	0.176
...	...	4.75	0.1870	0.184
5.00	5.00	5.00	0.1969	0.192
...	...	5.30	0.2087	0.212
...	5.60	5.60	0.2205	0.222
...	...	6.00	0.2362	0.232
6.30	6.30	6.30	0.2480	0.252

LIFTING CABLE DRUMS USING CRANE

Figure - 1

LIFT DRUMS ON FORK TRUCKS CORRECTLY

Figure - 2



DO NOT DROP CABLE DRUMS FROM TRUCKS

Figure - 3

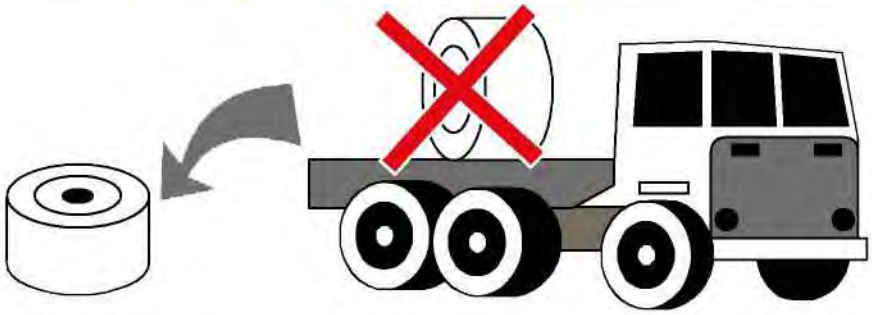


Figure - 4

1. DO NOT LAY DRUMS FLAT ON THEIR SIDES
2. USE PROPER STOPS TO PREVENT DRUMS ROLLING

PTCL CABLES

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