Thermo Cables

Thermo Group, a name synonymous with Innovation, Excellence and Quality is the manifestation of a seed sown over 35 years ago.

With strong footings in Hyderabad, India, Thermo Group today has its reach in every corner of the Globe. The group companies are:
Thermo Cables – manufacturers of a wide range of cables,
Thermopads – specialists in Industrial, Commercial and Domestic Heating, and Thermosystems – an EPC company in the field of Fuel Oil Handling System, Fire Detection and Protection Systems, Utility Piping, Heat Tracing, LP Piping and Misc. Tanks.

Major Approvals

AVANT GARDE
BHEL
BPCL
DCPL
DESEIN LTD
DGMS
DVC
ENGINEERS INDIA LTD
FICHTNER CONSULTING
GSPC
HINDUSTAN SHIPYARD
HOLTECH ENGINEERS
HPCL
INDIAN REGISTER OF SHIPPING
IOCL
ISRO
JACOB'S H & G
KNPC, KUWAIT
KOC, KUWAIT
KVAERNER POWERGAS LTD
MECON
METRO RAIL
MN DASTUR & CO.
NPCIL
NTPC
ONGC
PDIL
PDO, OMAN
SAIL
TATA CONSULTING ENGINEERS
TECNIMONT ICB LTD
TOYO ENGINEERING INDIA LTD
UHDE INDIA

Stringent quality requirements, global standards of precision and increasingly demanding customers is the order of the day. Thermo Cables Ltd, sensitive to this reality, designs, manufactures and supplies a wide range of cables to satisfy customers' specifications and requirements.

Product Range

- LT PVC/XLPE Power & Control Cables
- Instrumentation Cables
- Fire Resistant/Survival Cables
- Thermocouple Extension/Compensating Cables
- High Temperature Flouropolymer (PTFE/FEP/PFA/ETFE) Cables
- Rubber - Silicone/EPR/TPR/TPU Cables
- Fibreglass Varnished Cables
- Wind Power Cables
- Solar DC Cables
- CRD, Trailing, Festooning & Composite Cables
- Foundation Fieldbus, Modbus, Profibus, RS - 485 Cables
- HO7RN - F Cables
- Marine Cables
- Automation & Robotic Cables

Quality

- Policy : To achieve excellence in quality and services, customer satisfaction, upgradation of technology & techniques
- Cables licensed to carry ISI mark for IS 694/IS 1554/IS 7098
- Full fledged In-house testing laboratory to conduct Routine, Type & Acceptance Tests as per relevant standards
- **ISO 9001 Certified Company**

Technology

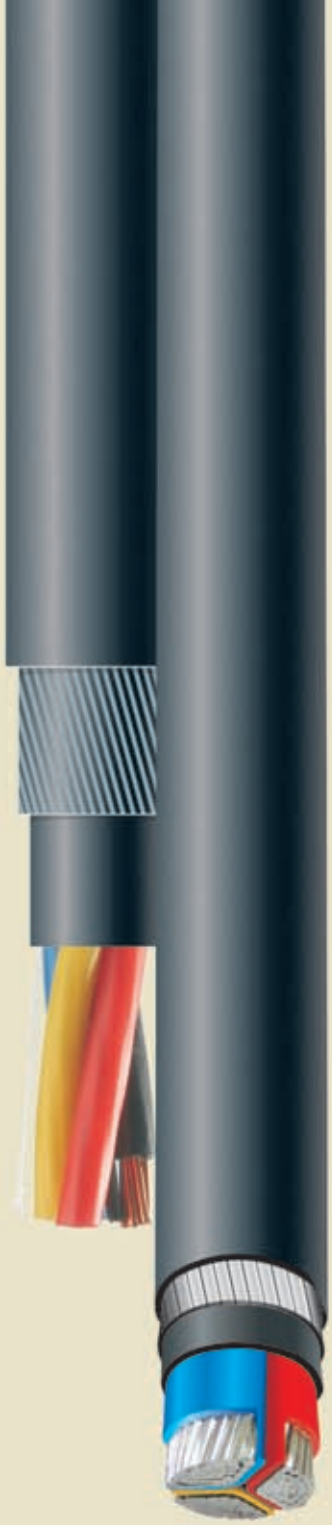
- Cables designed and manufactured conforming to various national and international standards such as IS-613, IEC-60228, IS-694, IS-1554, IS-7098, BS-6346, BS-5308 (Part 1 & 2), IS-8784, IEC-60331, IEC-60332 (Part I, II & III), IEC-60383, IEC754-1, IEC-60502, IEC-60189, JSS:51034, ANSI, VDE & DIN standards BS-7629, BSEN-50288, BS-5839, BS-6387 CWZ, IS-9968

Accolades

- Best Technology Award from IBM Corp.USA at International Level
- Best Performance in SSI Sector - Sir Visvesvaraya Industrial Award
- Many other Recognitions

Reliability

- In-house Wire Drawing and PVC Compounding facilities ensure consistent quality and adherence to stringent time schedules
- Wide sales network ensures prompt and customized services
- In-house insulation facilities for special materials like FEP, PTFE, Silicone Rubber EPR, PU, PFA



Power & Control Cables

Constructiion	:	Single core / Multicore
Voltage Grade	:	Up to 1100 V
Conductor	:	Aluminum / Copper, Solid / Standard / Flexible Conductor
Range	:	Single core up to 1000 Sq mm Multicore up to 400 Sq mm Max 61 cores of 1.5 Sq mm & 2.5 Sq mm
Primary Insulation	:	General Purpose PVC / Heat Resistant PVC / LDPE / XLPE
Inner Sheath	:	PVC / HRPVC / FRPVC / FRLS PVC / ZHFR / LSF
Armouring	:	GI Round Wire / Flat strip or Wire Braiding
Outer sheath	:	General purpose PVC / HRPVC / FRLS PVC / ZHFR / LSF
Standards	:	IS-694, IS-1554 (Part-I), IS-7098 (Part-I) IEC 60502-1 & BS-6346.

Core Identification

Cores shall be identified by different colours of PVC insulation. Following colour scheme shall be adopted

1 Core	:	Any single colour.
2 Core	:	Red and Black.
3 Core	:	Red, Yellow & Blue.
4 Core	:	Red, Yellow, Blue & Black.
5 Core	:	Red, Yellow, Blue, Black & Grey.
6 Cores and above	:	Two adjacent cores (counting and direction core) in each layer, Blue & Yellow, remaining cores Grey.

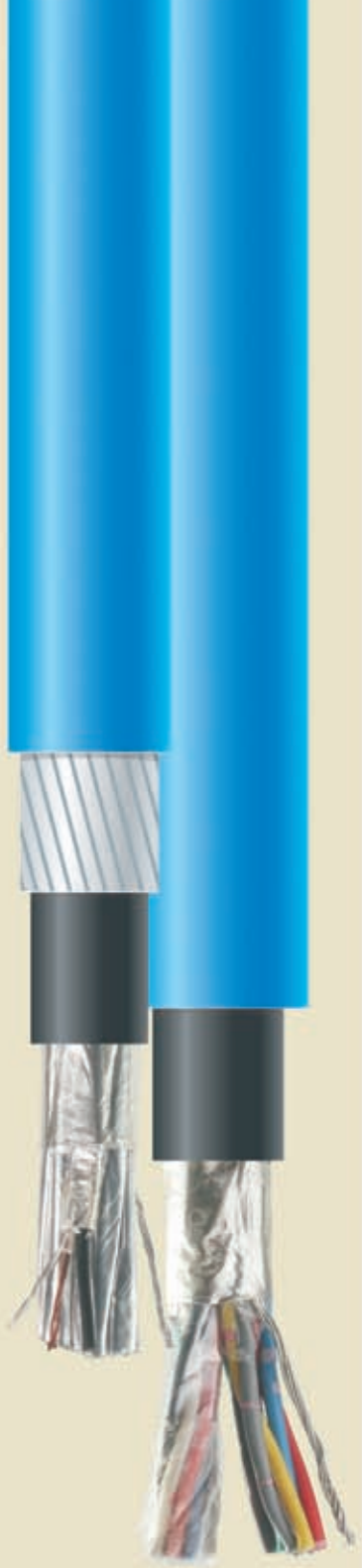
In addition to these, combinations from the following colours can also be offered -
Red, Black, Blue, Brown, Green, Grey, Orange, Violet, White, Yellow.

Alternately, any single colour insulation on all cores with number printing can also be provided.

Designation code

Y	--	PVC insulation.
W	--	Steel round wire armour
F	--	Steel strip armour
WW	--	Steel double round wire armour
FF	--	Steel double strip armour.
Y	--	PVC outer sheath.
A	--	Aluminum conductor.

No Abbreviations used when the conductor material is Copper.



Instrumentation Cables

Instrumentation Cables are specially designed to transmit signals without any external interference. They are used in Data Acquisition Systems, connections to Instruments, Computer Networking, PA Systems, Digital / Analog Control / Measuring & Communication Systems.

Construction : Cores, pairs, triads or quads

Voltage Grade : Up to 1100 V

Conductor : Electrolytic grade copper Bare / Tinned Solid / Stranded/Flexible conductors

Range : 0.5 / 0.75 / 1.0 / 1.5 / 2.5 Sq mm up to 48 Pair

Primary Insulation : General purpose PVC / Heat Resistant PVC / LDPE / XLPE / PTFE / Fibre Glass / FEP / Silicone Rubber

Screening : Individual and/or overall with following options -
- Aluminum Mylar/Copper Tape with Tinned Copper Drain Wire or
- Braided with Bare or Tinned or Nickel Plated or Silver Plated Copper

Inner Sheath : PVC / HRPVC / FRPVC / FRLS PVC / ZHFR / LSF

Armouring : GI round Wire / Flat strip or Wire Braiding

Outer Sheath : PVC / HRPVC / FRPVC / FRLS PVC / ZHFR / LSF

Rip Cord : For easy removal of sheath

Standards : BS-5308 Part-1 & 2, BS-7655, IEC-189 (1 & 2), VDE-0815 & 0816 and BS EN 50288

Additional Features : Communication pairs, Bi-colour extrusion

Note:- These cables are also designed as Data/Analogue cables.

Technical Data

Conductor Resistance at 20^0 C Ohms/Km	Conductor Size mm^2	0.5	0.75	1.0	1.5	2.5
	Maximum Resistance	39.0	26.0	19.5	13.3	7.98
Capacitance nf/Km	Between Conductors	Less than 250 nf/km				
	Between Conductors & screen	Less than 400 nf/km				
Inductance mH/Km		Less than 1.0				
L/R Ratio μH/Ohm	Conductor Size mm^2	0.5	0.75	1.0	1.5	2.5
	L/R	<25	<25	<25	<40	<40
Insulation Resistance at 20^0 C M ohm-Km	PVC	More than 100				
	LDPE	More than 5000				
Electrostatic noise rejection ratio		More than 76.0 db				

Thermocouple Extension/Compensating Cables

Construction : Single or Multiple Pairs

Voltage Grade : Up to 1100 V

Cable Code : Kx,Kx(A), Tx,Jx,Ex,Sx / Rx,Bx,Nx,Ux,Wx

Range : 16 AWG / 18 AWG / 20 AWG up to 48 Pair

Primary Insulation : General purpose PVC / HEAT RESISTANT PVC / LDPE / XLPE / PTFE / Fibre Glass / FEP / Silicone Rubber

Screening : Individual and/or overall with following options -
- Aluminum Mylar/Copper Tape with Tinned Copper Drain Wire or
- Braided with Bare or Tinned or Nickel Plated or Silver Plated Copper

Inner Sheath : PVC / HRPVC / FRPVC / FRLS PVC/ ZHFR / LSF / PTFE / Fibre Glass

Armouring : GI round Wire / Flat strip or Wire Braiding

Outer sheath : PVC / HRPVC / FRPVC / FRLS PVC / ZHFR / LSF / PTFE / Fibre Glass

Rip cord : For easy removal of sheath

Standards : ANSI:MC-96.1, IS-8784, DIN, BS & IEC 584-3

Note:- Other conductor sizes and insulation materials on request.

Technical Data

CABLE CODE		Kx	Kx(A)	Tx	Jx	Ex	Sx/Rx
CABLE TYPE		EXT.	COMP	EXT.	EXT.	EXT.	COMP
Conductor	+Ve leg	Chromel	Copper	Copper	Iron	Chromel	Copper
	-Ve leg	Alumel	Constantan	Constantan	Constantan	Constantan	Copper Alloy
Suitable for Thermocouple Type		Kx	Kx	Tx	Jx	Ex	Sx/Rx
Conductor Combination		Chromel Alumel	Copper Alumel	Copper Constantan	Iron Constantan	Chromel Constantan	Platinum 10/13% Rhodium Platinum
Temperature range of measuring junction °C		0 to +1100	☆	-185 to +300	+20 to +700	0 to +800	0 to + 1550/ 0 to + 1600
Applicable standards for ouput of Thermocouple conductors		BS4937 part 4 ANSI/MC 96.1 type K DIN 43710 NF C 42-321 JISC 1602	☆	BS4937 part 5 ANSI/MC 96.1 type T NF C 42-321 JISC 1602	BS4937 part 3 ANSI/MC 96.1 type J NF C 42-321 JISC 1602	BS4937 part 6 ANSI/MC 96.1 type E NF C 42-321 JISC 1602	BS4937 part 1 ANSI/MC 96.1 type S, R, NF C 42-321 JISC 1602
COLOUR CODING	BS						
	ANSI						
	DIN						
	NF						
	JISC						
Approximate generated EMF change per °C mV/C at	100°C	42	☆	46	46	68	8/8
	500°C	43	☆	—	56	81	9/10

NOTES : ☆Used for interconnecting Type 'K' thermocouples and instrumentation as an alternative to type 'k' material. Only used where the interconnection temperature is in the range 0°C to +80°C

We can also offer NX, UX and WX Cables ◐ Kx(A) - also known as Vx

Fire Resistant Cables

Finds applications where electrical integrity of the cable has to remain intact for at least three hours, so as to activate and maintain crucial functions such as fire fighting, public announcements, smoke extraction systems, sprinklers, emergency lighting, evacuation path lighting systems etc.

The areas for Fire resistant cable applications include places where large number of people congregate for short or limited period of time such as shopping malls, cinema theaters, educational institutions, airport terminals, mass transit systems (metro rail networks), high rise office buildings etc. FR cables also find use in power generation facilities, petrochemical complexes, nuclear power facilities, mines etc. for phased shut down of the plant and to keep critical functions like communication, rescue and evacuation systems functional during a fire.

Construction	:	Single Core / Pair / Triad and Multi Cores / Pairs / Traids
Voltage Grade	:	600/1100 VAC
Conductor	:	Stranded or solid annealed bare or Tinned Copper Conductor
Fire Barrier	:	Glass mica tape
Insulation	:	Silicone rubber or Cross linked polyolefin elastomer
Screening	:	Individual and/or overall with following options - - Aluminum Mylar/Copper Tape with Tinned Copper Drain Wire or - Braided with Bare or Tinned or Nickel Plated or Silver Plated Copper
Inner Sheath	:	LSOH / ZHFR or equivalent
Armouring	:	Galvanised Steel wire helical armouring or wire braiding
Outer Sheath	:	LSOH / ZHFR or equivalent
Standards	:	BS:5308 or equivalent with fire resistance to BS:6387 category CWZ and IEC:60331 tested for 950°C for 3 hrs.

- Fire Resistance cable type tested at BRE global (UK) for BS 6387 CWZ category

UKAS TESTING
0578

Foundation Fieldbus Cables

These Cables are meant for bi-directional communications protocol used for communications among field devices and to the control system. Installed in many process applications such as refining, petrochemicals, power generation, even in food & beverage, pharmaceuticals and nuclear applications.

Construction

Voltage Grade : 300 V / 600 V

Conductor : Plain/Tinned Annealed Copper (up to 120 Deg. C)
Silver Plated Annealed Copper (up to 200 Deg. C)
Nickel Plated Annealed Copper (up to 260 Deg. C)

Range : 22 AWG / 18 AWG / 16 AWG / 14 AWG

Insulation : Solid Polyethylene/ XLPE / PFA for temp. >150 Deg. C

Screening : Individual and/or overall with following options -
- Aluminum Mylar/Copper Tape with Tinned Copper Drain Wire or
- Braided with Bare or Tinned or Nickel Plated or Silver Plated Copper

Inner Sheath : PVC/HR PVC/FR PVC/FRLS PVC/ZHFR/LSF/FEP/PFA

Armouring : Round Galvanized Steel Wire / Flat Strip / Steel Wire Braid

Outer Sheath : PVC/HR PVC/FR PVC/FRLS PVC/ZHFR/LSF/FEP/PFA with Plain Orange Jacket or with strip for easy identification and Blue jacket available for Intrinsically Safe applications

Standards : Cable specification Foundation Fieldbus FF-844 H1,
Cable design based on EN 50288-7/BS-5308 Part 1, IEC 60332
Electrical properties: FF-844 H1 and IEC 61158-2, Type A

Our FF Cable Features : Excellent Electrical Charateristics
Low Capacitance (for long runs)
RoHs compliant and CE marked

Technical Data

	Cable Type →	Trunk	Spur
Conductor Resistance @ 20 Deg C Ohms/Km	Minimum Conductor Size Sq mm	18 AWG	22 AWG
	Maximum Resistance	23.5	59.4
Capacitance nf/Km	Between Conductors	Less Than 150 nf/Km	
	Between Conductors & Screen	Less Than 400 nf/Km	
Inductance mH/Km		Less than 1.0	
Insulation Resistance @20 Deg C M Ohm-Km		More Than 5000	
Characteristic impedance		100 Ω±20%	
Wave Attenuation @ 39 KHz:		< 3 dB/km	
Capacitive unbalance to shield		⩽4 nF/km	
Temperature range		-30°C to+ 90°C	

Fieldbus Foundation

Complete In-house expertise & facilities to provide the entire range of High Temperature Insulations

High Temperature Cables

High temperature cables are used in areas where both working temperatures and ambient temperatures are too high. They are made with a wide range of conductors, insulating materials and screening materials depending on the temperatures and conditions under which the cable has to perform.

Single core high temperature hook-up wires & Multi core / Multi pair, Screened & Unscreened and Armoured & Unarmoured cables:

Construction : Single Core or Multi Core / Pairs

Voltage Grade : 250VAC, 600VAC & 1000VAC (Rating as per MIL 16878, VDE, DIN, ANSI)

Conductors : Annealed bare and/or tinned copper conductor (up to 120° C)
Annealed silver plated copper conductor (up to 200° C)
Nickel plated conductors (up to 260° C)

Insulation

Insulation Material	Temperature Range	Characteristics
Varnished Fibre Glass Braid	-72° C to 350° C	High Temperature Resistance
FEP	-200° C to 200° C	Good Chemical Resistance Thin wall insulation due to good electrical properties
PFA	-200° C to 250° C	Good Chemical Resistance, Thin wall insulation due to good electrical properties, Good flexibility
PTFE	-200° C to 260° C	Excellent chemical resistance , High temperature stability
Kapton tape	-250° C to 300° C	Very thin wall insulation, High temperature resistance
PEEK	-160° C to 250° C	Mechanically very tough High temperature and radiation resistance
ETFE	-150° C to 150° C	Mechanically tough
Silicone Rubber	-40° C to 200° C	Flexible & abrasion resistance

Screening : Individual and/or overall with following options -
- Aluminum Mylar/Copper Tape with Tinned Copper Drain Wire or
- Braided with Bare or Tinned or Nickel Plated or Silver Plated Copper

Armouring : Armouring of galvanized wire, stainless steel wire, high strength steel wire etc.

Standards : Conforming to IS 8130/ IEC 60228 / VDE 0295

Industry & Applications

Steel : Cables for blast furnace, electric arc furnace, hot & cold rolling mills, steel refining facilities etc.

Communication : High frequency co-axial cables for VHF, UHF and XHF transmission

Marine : Engine proximity wiring for good resistance to high temperatures, fuel oils, chemicals, saline air/water etc.

Petrochemical : Instrumentation & control, temperature sensing, fire warning etc.

Power : In proximity to the turbines, boilers, ash handling etc.

Wind Power Cables

Torsion Cables

These cables are used for transmitting power from the generator mounted in the nacelle of the wind tower to base station. These are flexible cables made of special elastomeric compounds, so as to meet the torsional stresses exerted on the cable due to rotation of the nacelle in relation to wind direction.

Construction

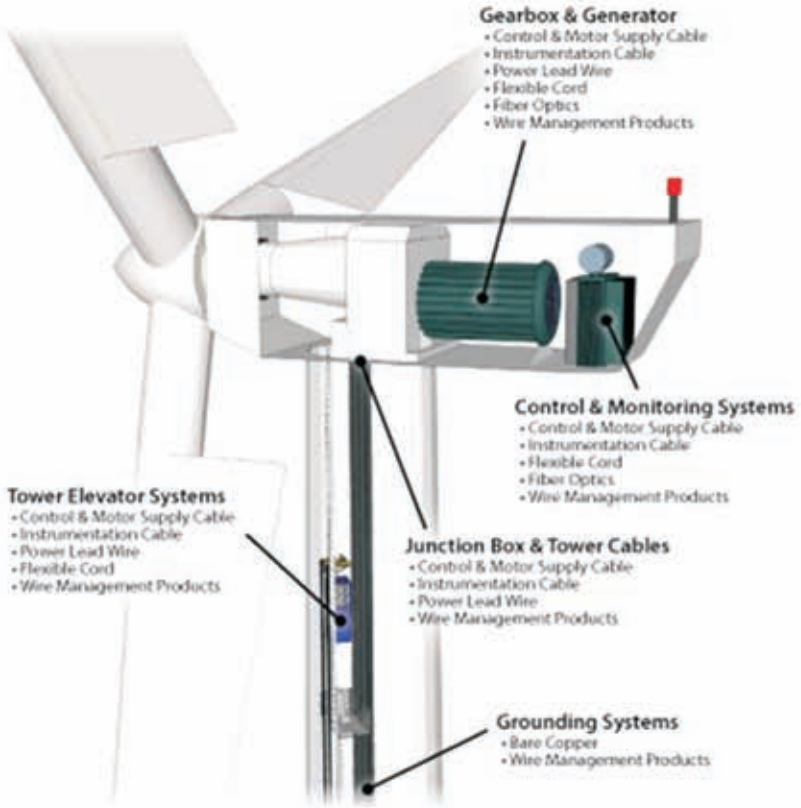
Voltage Grade	:	600 V / 1100 V
Conductor	:	Flexible class-5 tinned or bare copper conductors, made to IEC-60228/IS-8130
Range (single core)	:	10 Sq mm to 300 Sq mm
Insulation	:	EPR - in conformance to IEC-60502/ IS-6380
Sheath	:	Special elastomer compound with Oil, Fire, Hydrolysis and Torsion Resistant properties. (Zero halogen sheath available on request)

Features

Maximum conductor temperature (continuous)	:	+ 90 Deg C
Short circuit temperature(max) for up to 5 seconds	:	+ 250 Deg C
Maximum permissible tensile load on cable	:	15 N/mm^2
Torsion angle	:	± 100° per meter
Minimum bending radius	:	10 D

Control & Instrumentation Cables

These Cables are used in Wind Energy applications such as rotor blade pitch control, Yaw control, Top box, Anemometer feed back, Remote data logging etc. Construction of Cables shall be as per Customers' requirement and conforming to various National/International Standards.

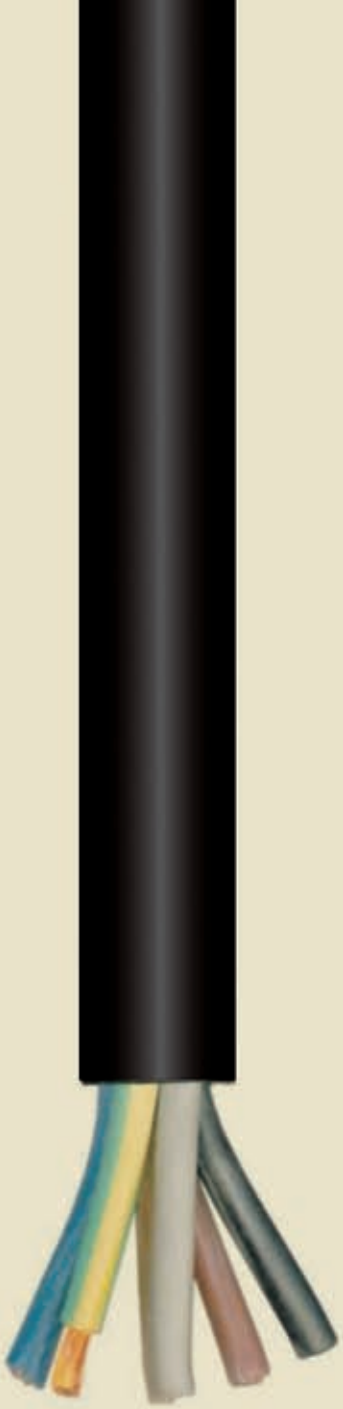


CRD and Trailing Cables

These cables are used in conveyor machinery such as transfer cars, boom-stackers, side arm chargers, bulk material conveyors etc.

They find application in almost every industry segment like Steel Mills, Cement Plants, Docks, Power Plants, Automobile Industries & Refineries and Petrochemicals.

Construction	:	Single cable comprising multiple elements like power cores, control cores, signaling pairs, etc for multipurpose functions.
Voltage Grade	:	600/1100 V-AC
Conductor	:	Class-5 flexible tinned or bare copper
Insulation	:	EPR
Screening (if applicable)	:	Tinned or bare copper wire braid
Inner Sheath	:	HOFR- Elastomer
Anti Kink Braid	:	Fabric braid embedded between inner and outer sheath
Outer Sheath	:	HOFR Elastomer
Features	:	Designed to withstand continuous reeling and unreeling Sheath materials that have a high degree of flex fatigue resistance Excellent heat, oil and fire resistant properties
Operating Temperature	:	-20 Deg C to +90 Deg C
Test Voltage	:	2500 V-AC
Bending Radius	:	10 D
Core Marking	:	1-5 cores colour coded as Green/Yellow, Blue, Brown, Black, Grey or Coloured Rubberised cotton tapes. 6 cores and above with numbered cores, with one earth core of Green/Yellow.
Standards	:	IEC-60228, IEC-60502, IEC-60332



HO7RN-F- Heavy Duty Rubber Cables

These heavy duty elastomer cables are used in generators, heavy machinery, portable power tools and equipment, moving machinery in wet, hot or oily environments.

Their flexibility permits use in constricted spaces with sharp and complex bends. They can be made with special abrasion resistant sheaths to withstand rough use in portable equipment.

Construction

Voltage Grade	:	450/750 V-AC
Conductor	:	Bare or tinned flexible class-5 conductors as per IEC-60228/1
Range	:	Single Core: up to 300 Sq mm
		Multi Core: 1 Sq mm - 2.5 Sq mm up to 37 cores
		4 Sq mm - 6 Sq mm up to 19 cores
		10 Sq mm - 35 Sq mm up to 5 cores
Insulation	:	EPR
Sheath	:	Black heavy duty elastomer
Temperature Range	:	-25 Deg C to + 85 Deg C
Colour Coding	:	1-5 cores colour coded as Green/Yellow, Blue, Brown, Black, Grey or Coloured Rubberised cotton tapes. 6 cores or more with numbered cores and earth core of Green/Yellow.

Telephone Cables

These cables will be with 0.5 or 0.63 mm dia ATC Conductor with 0.3 to 0.4 mm Insulation thickness of PVC or HR PVC. Individual pair may be with or without polyester tape lapping. The cables will be Unarmoured for indoor applications and Armoured for outdoor applications and are with or without Screening.

Co-axial Cables

The Cable will be constructed with one Conductor (Normally ATC) with LDPE as Primary Insulation. A woven Mesh (Braiding) surrounding the Insulated Core forms the second Conductor and Outer PVC Sheathing will be done above Braiding.
These Cables are used for VHF (Very High Frequency) Signal transmission.

Super Flexible Battery Cables

Rope-lay stranded, flexible class 6 bare copper conductors, insulated with flexible elastomer compound. To be used for inter connection of batteries (jumper cables) in moving platforms such as electric forklifts, golf carts or other battery powered vehicles.

Marine Cables

Tinned/bare copper conductor, insulated with thermosetting compounds, shielded/unshielded cables with armors of copper, ss wires, bronze wires etc, and sheathing of SHF 1 and SHF 2, both in fire retardant and circuit integrity versions.

For use in shipboard power, control, signaling and communication applications, for oil exploration work in both on shore and off shore applications, mast lighting etc.

Solar Photovoltaic Cables

Solar photovoltaic cables are used for transmitting electrical power generated from the solar panel to the charging units, battery banks, change over systems, inverters etc. The cables that are used to carry power from the solar panels to the charging units have to function effectively while remaining exposed to a wide range of severe environmental conditions.

Construction

Size (Sq mm)	**Number of Strands/ Diameter**	**Nominal Outer dia** (mm)	**Max Conductor Resistance** Ohms/km
2.5	50/0.25	5.50	8.21
4.0	56/0.30	6.00	5.09
6.0	85/0.30	6.80	3.39
10.0	140/0.30	7.70	1.95
16.0	128/0.40	8.80	1.24

Size (Sq mm)	**Single cable in Air** (Amps)	**Single cable on surface** (Amps)	**Multiple Cable on Surface** (Amps)
2.5	41	39	33
4.0	55	52	44
6.0	70	67	57
10.0	98	93	79
16.0	132	125	107

Voltage Grade : 600/1000 VAC
1000/1800 VDC

Ambient Working Temperature : -40° C to 90° C

Maximum Conductor Temperature : 120° C
Withstands 250° C for 5 seconds

Standards : TUV - 2PfG 1169/07.2008 (Standard for Photovoltaic cables)

Features : Resistant to Oils, Ozone, Water absorption, & severe environmental conditions

Working life of more than 25 years

Technical Data - Power Cables

TABLE 1

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS

650/1100V, Aluminum / Copper Conductor, XLPE insulated and PVC sheathed, Unarmoured (A2XY/2XY) & Armoured (A2XWaY/2XWaY & A2XFaY/2XFaY) Cables

Number of cores	Nominal Area of Conductor (mm^2)	Unarmoured				Armoured						A.C. Current rating of Aluminum m cables (in trefoil)			A.C. Current rating of Copper cables (in trefoil)		
		Nominal thickness of insulation (mm)	Approx Overall Diameter (mm)	Approximate Weight (kg/km)		Nominal thickness of insulation (mm)	Nominal Aluminum arm. Size (mm)		Approx Overall Diameter (mm)	Approximate Weight (kg/km)		In Air at 40° C (A)	In Ground at 30° C (A)	In Duct at 30° C (A)	In Air at 40° C (A)	In Ground at 30° C (A)	In Duct at 30° C (A)
				Aluminum	Copper		Wire	Strip		Aluminum	Copper						
1	10	0.7	9	95	157	1.0	1.4		12	160	222	59	61	61	75	77	76
	16	0.7	11	130	229	1.0	1.4		13	210	309	80	79	77	103	101	99
	25	0.9	12	170	325	1.2	1.4		15	260	415	98	96	88	126	124	114
	35	0.9	13	205	422	1.2	1.4		16	300	517	121	114	105	152	148	136
	50	1.0	15	255	564	1.3	1.4		17	365	674	147	135	124	189	174	160
	70	1.1	16	330	763	1.4	1.1		19	460	893	187	166	153	240	213	196
	95	1.1	18	420	1008	1.4		4 x 0.8	20	520	1108	230	198	182	297	256	236
	120	1.2	20	510	1252	1.5		4 x 0.8	22	615	1357	268	225	207	346	289	266
	150	1.4	22	630	1558	1.7		4 x 0.8	24	725	1653	309	253	233	390	326	300
	185	1.6	24	765	1910	1.9		4 x 0.8	26	865	2010	360	286	263	460	366	337
	240	1.7	27	955	2440	2.0		4 x 0.8	28	1065	2550	433	332	305	552	425	391
	300	1.8	29	1140	2996	2.1		4 x 0.8	31	1290	3146	501	376	346	640	479	441
	400	2.0	33	1470	3945	2.4		4 x 0.8	35	1620	4095	596	431	397	753	544	500
	500	2.2	36	1830	4924	2.6		4 x 0.8	38	2005	5099	693	490	451	865	611	562
	630	2.4	40	2285	6183	2.8		4 x 0.8	42	2505	6403	814	557	512	1001	684	629
	800	2.6	45	2885	7835	3.1		4 x 0.8	47	3100	8050	968	632	581	1167	762	701
	1000	2.8	50	3605	9792	3.3		4 x 0.8	52	3845	10032	1102	701	645	1299	828	762

Note: The dimensions indicated above are considering following construction:

1. Conductor:
   10mm^2 : Solid / Stranded Circular Aluminum and stranded circular Copper
   16mm^2 : Stranded Circular
   25mm^2 onwards : Stranded compact Circular

TABLE 2

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS

650/1100V, Aluminum / Copper Conductor, XLPE insulated and PVC sheathed, Unarmoured (A2XY/2XY) & Armoured (A2XWY/2XWY & A2XFY/2XFY) Cables

Number of cores	Nominal Area of Conductor (mm^2)	Unarmoured				Armoured						A.C. Current rating of Aluminum m cables (in trefoil)			A.C. Current rating of Copper cables (in trefoil)		
		Nominal thickness of XLPE insulation (mm)	Approx Overall Diameter (mm)	Approximate Weight (kg/km)		Nominal Aluminum arm. Size (mm)			Approx Overall Diameter (mm)	Approximate Weight (kg/km)		In Air at 40° C (A)	In Ground at 30° C (A)	In Duct at 30° C (A)	In Air at 40° C (A)	In Ground at 30° C (A)	In Duct at 30° C (A)
				Aluminum	Copper	Wire	Strip			Aluminum	Copper						
2	10	0.7	15	230	354	1.4			17	565	689	59	65	54	75	83	69
	16	0.7	16	260	458	1.4			19	615	813	74	83	69	98	107	89
	25	0.9	19	355	664			4 x 0.8	20	540	849	98	107	90	131	137	115
	35	0.9	21	430	863			4 x 0.8	21	635	1068	124	131	109	156	167	143
	50	1.0	23	530	1149			4 x 0.8	24	780	1399	156	161	137	194	196	173
	70	1.1	26	695	1561			4 x 0.8	28	1030	1896	188	190	167	244	244	214
	95	1.1	29	915	2091			4 x 0.8	30	1255	2431	231	226	202	288	286	256
	120	1.2	31	1085	2570			4 x 0.8	32	1470	2955	263	250	226	331	327	280
	150	1.4	34	1305	3161			4 x 0.8	36	1760	3616	300	286	250	381	369	321
	185	1.6	38	1630	3919			4 x 0.8	39	2080	4369	344	327	286	438	417	357
	240	1.7	43	2055	5025			4 x 0.8	44	2605	5575	406	381	327	513	482	411
	300	1.8	47	2525	6237			4 x 0.8	48	3115	6827	456	422	363	581	536	458
	400	2.0	53	3185	8135			4 x 0.8	54	3855	8805	525	458	411	663	583	506

Note: The dimensions indicated above are considering following construction:

1. Conductor:
   10mm^2 : Solid / Stranded Circular Aluminum and stranded circular Copper
   16mm^2 onwards : Stranded Sector
2. Innersheath : Taped / Extruded

Details for specification / construction / delivery length other than above will be furnished on request. Specifications are subjected to change without any further notice.

Technical Data - Power Cables

TABLE 3

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS

650/1100V, Aluminum / Copper Conductor, XLPE insulated and PVC sheathed, Unarmoured (A2XY/2XY) & Armoured (A2XWY/2XWY & A2XFY/2XFY) Cables

Number of cores	Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Unarmoured			Armoured					A.C. Current rating of Aluminum m cables (in trefoil)			A.C. Current rating of Copper cables (in trefoil)		
			Approx Overall Diameter (mm)	Approximate Weight (kg/km)		Nominal Aluminum arm. Size (mm)		Approx Overall Diameter (mm)	Approximate Weight (kg/km)		In Air at 40^0 C (A)	In Ground at 30^0 C (A)	In Duct at 30^0 C (A)	In Air at 40^0 C (A)	In Ground at 30^0 C (A)	In Duct at 30^0 C (A)
				Aluminum	Copper	Wire	Strip		Aluminum	Copper						
3.5	25	0.9	22	530	1093		4 x 0.8	23	760	1323	96	94	89	123	122	112
	35	0.9	24	635	1384		4 x 0.8	25	910	1659	117	113	107	151	146	134
	50	1.0	27	810	1893		4 x 0.8	28	1125	2208	142	133	126	183	172	158
	70	1.1	32	1115	2631		4 x 0.8	33	1505	3021	179	164	156	231	211	194
	95	1.1	35	1425	3498		4 x 0.8	36	1850	3923	221	196	186	285	253	233
	120	1.2	39	1750	4410		4 x 0.8	40	2285	4945	257	223	212	330	287	264
	150	1.4	43	2135	5352		4 x 0.8	44	2670	5887	292	249	237	375	321	295
	185	1.6	48	2660	6682		4 x 0.8	49	3250	7272	337	282	268	430	361	332
	240	1.7	54	3390	8587		4 x 0.8	55	4080	9277	399	326	310	508	416	383
	300	1.8	60	4140	10636		4 x 0.8	60	4890	11386	455	367	349	575	464	427
	400	2.0	67	5290	13859		4 x 0.8	68	6095	14664	530	418	397	661	521	479

Note: The dimensions indicated above are considering following construction:

1. Conductor:
   $10mm^2$: Solid / Stranded Circular Aluminum and stranded circular Copper
   $16mm^2$ onwards : Stranded Sector
2. Innersheath : Taped / Extruded

TABLE 4

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS

650/1100V, Aluminum / Copper Conductor, XLPE insulated and PVC sheathed, Unarmoured (A2XY/2XY) & Armoured (A2XWY/2XWY & A2XFY/2XFY) Cables

Number of cores	Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Unarmoured			Armoured					A.C. Current rating of Aluminum m cables (in trefoil)			A.C. Current rating of Copper cables (in trefoil)		
			Approx Overall Diameter (mm)	Approximate Weight (kg/km)		Nominal Aluminum arm. Size (mm)		Approx Overall Diameter (mm)	Approximate Weight (kg/km)		In Air at 40^0 C (A)	In Ground at 30^0 C (A)	In Duct at 30^0 C (A)	In Air at 40^0 C (A)	In Ground at 30^0 C (A)	In Duct at 30^0 C (A)
				Aluminum	Copper	Wire	Strip		Aluminum	Copper						
3	10	0.7	16	285	471	1.4		18	640	826	50	55	46	65	71	60
	16	0.7	17	320	617		4 x 0.8	18	510	807	64	71	60	83	92	76
	25	0.9	21	460	924		4 x 0.8	22	690	1154	96	94	89	123	122	112
	35	0.9	23	565	1215		4 x 0.8	24	815	1465	117	113	107	151	146	134
	50	1.0	26	715	1643		4 x 0.8	26	1005	1933	142	133	126	183	172	158
	70	1.1	30	985	2284		4 x 0.8	31	1350	2649	179	164	156	231	211	194
	95	1.1	33	1245	3008		4 x 0.8	34	1655	3418	221	196	186	285	253	233
	120	1.2	35	1495	3722		4 x 0.8	36	1925	4152	257	223	212	330	287	264
	150	1.4	39	1865	4649		4 x 0.8	40	2335	5119	292	249	237	375	321	295
	185	1.6	44	2300	5734		4 x 0.8	44	2835	6269	337	282	268	430	361	332
	240	1.7	49	2935	7390		4 x 0.8	50	3550	8005	399	326	310	508	416	383
	300	1.8	54	3610	9178		4 x 0.8	55	4255	9823	455	367	349	575	464	427
	400	2.0	60	4550	11974		4 x 0.8	61	5295	12719	530	418	397	661	521	479

TABLE 5

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS

650/1100V, Aluminum / Copper Conductor, XLPE insulated and PVC sheathed, Unarmoured (A2XY/2XY) & Armoured (A2XWY/2XWY & A2XFY/2XFY) Cables

Number of cores	Nominal Area of Conductor (mm^2)	Nominal thickness of XLPE insulation (mm)	Unarmoured			Armoured					A.C. Current rating of Aluminum m cables (in trefoil)			A.C. Current rating of Copper cables (in trefoil)		
			Approx Overall Diameter (mm)	Approximate Weight (kg/km)		Nominal Aluminum arm. Size (mm)		Approx Overall Diameter (mm)	Approximate Weight (kg/km)		In Air at 40^0 C (A)	In Ground at 30^0 C (A)	In Duct at 30^0 C (A)	In Air at 40^0 C (A)	In Ground at 30^0 C (A)	In Duct at 30^0 C (A)
				Aluminum	Copper	Wire	Strip		Aluminum	Copper						
4	10	0.7	17	335	582	1.4		20	745	992	50	55	46	65	71	60
	16	0.7	19	395	791		4 x 0.8	21	620	1016	64	71	60	83	92	76
	25	0.9	23	575	1194		4 x 0.8	24	825	1444	96	94	89	123	122	112
	35	0.9	26	710	1576		4 x 0.8	27	1005	1871	117	113	107	151	146	134
	50	1.0	29	900	2137		4 x 0.8	30	1260	2497	142	133	126	183	172	158
	70	1.1	34	1250	2982		4 x 0.8	35	1655	3387	179	164	156	231	211	194
	95	1.1	38	1595	3946		4 x 0.8	39	2065	4416	221	196	186	285	253	233
	120	1.2	41	1975	4945		4 x 0.8	42	2470	5440	257	223	212	330	287	264
	150	1.4	45	2435	6147		4 x 0.8	46	2990	6702	292	249	237	375	321	295
	185	1.6	50	3010	7588		4 x 0.8	51	3620	8198	337	282	268	430	361	332
	240	1.7	57	3865	9805		4 x 0.8	57	4550	10490	399	326	310	508	416	383
	300	1.8	63	4745	12169		4 x 0.8	63	5480	12904	455	367	349	575	464	427
	400	2.0	70	6010	15909		4 x 0.8	71	6810	16709	530	418	397	661	521	479

Note: The dimensions indicated above are considering following construction:

1. Conductor :
   $10mm^2$: Solid / Stranded Circular Aluminum and stranded circular Copper
   $16mm^2$ onwards : Stranded Sector
2. Innersheath : Taped / Extruded

Details for specification / construction / delivery length other than above will be furnished on request. Specifications are subjected to change without any further notice.

Technical Data - Power Cables

TABLE 6

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS
650/1100V, Copper Conductor, XLPE insulated and PVC sheathed, unarmoured (2XY) & Armoured (2XWY) Cables

Number of cores	Nominal Area of Conductor (mm2)	Nominal thickness of XLPE insulation (mm)	Unarmoured		Armoured			A.C. Current rating		
			Approx Overall Diameter (mm)	Approximate Weight (kg/km)	Nominal Steel round wire arm. Size (mm)	Approx Overall Diameter (mm)	Approximate Weight (kg/km)	In Air at 40° C (A)	In Ground at 30° C (A)	In Duct at 30° C (A)
2	4	0.7	13	205	1.4	15	475	44	49	42
	6	0.7	14	255	1.4	16	550	56	60	52
	10	0.7	16	380	1.4	19	740	75	83	69
3	4	0.7	13	255	1.4	15	545	38	43	36
	6	0.7	14	330	1.4	17	645	49	54	45
	10	0.7	17	505	1.4	19	900	65	71	60
4	4	0.7	14	305	1.4	16	620	38	43	36
	6	0.7	15	400	1.4	18	740	49	54	45
	10	0.7	19	625	1.4	21	1075	65	71	60

Note: The dimensions indicated above are considering following construction:
1. Conductor:
   6mm^2 : Solid Circular
   10mm^2 onwards : Stranded Sector
2. Innersheath : Extruded innersheath

TABLE 7

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS
650/1100V, Aluminum Conductor, PVC insulated sheathed, Unarmoured (AYY) & Armoured (AYFaY & AYWaY)

Number of cores	Nominal Area of Conductor Sq. mm	Unarmoured			Nominal thickness of PVC insu. (mm)	Armoured				Max. D.C. Conducter Resistance at 20° C ohm / KM	A.C. Current rating							
		Nominal thickness of PVC insu. (mm)	Approx Overall Diameter mm	Approx. Weight kg / km		Nominal Armour Size mm		Approx Overall Diameter mm	Approximate Weight kg / km		In Air at 40°C				In Ground at 30°C			
						W	F				PVC Insulation Amps		HRPV Insulation Amps		PVC Insulation Amps		HRPV Insulation Amps	
											2C	3C	2C	3C	2C	3C	2C	3C
1 CORE	10	1.0	10	105	1.3	1.4		12	185	3.080	56	47	67	56	59	51	67	58
	16	1.0	12	155	1.3	1.4		14	245	1.910	72	64	86	77	75	66	86	75
	25	1.2	13	190	1.5	1.4		15	290	1.200	99	84	119	101	97	86	111	98
	35	1.2	14	230	1.5	1.4		16	340	0.868	120	105	144	126	120	100	137	114
	50	1.4	16	290	1.7	1.4		18	415	0.641	150	130	180	156	145	120	165	137
	70	1.4	17	370	1.7	1.4		20	520	0.443	185	155	222	186	170	140	194	160
	95	1.6	20	480	1.9		4 x 0.8	21	585	0.320	215	190	258	228	205	175	234	200
	120	1.6	21	590	1.9		4 x 0.8	23	680	0.253	240	220	288	264	230	195	262	222
	150	1.8	23	700	2.1		4 x 0.8	24	810	0.206	270	250	324	300	265	220	302	251
	185	2.0	25	850	2.3		4 x 0.8	27	965	0.164	305	290	366	348	300	240	342	274
	240	2.2	28	1060	2.5		4 x 0.8	29	1190	0.125	350	335	420	402	335	270	382	308
	300	2.4	30	1280	2.7		4 x 0.8	32	1455	0.100	395	380	474	456	370	295	422	336
	400	2.6	34	1640	3.0		4 x 0.8	36	1810	0.0778	455	435	546	522	410	325	467	371
	500	3.0	38	2060	3.4		4 x 0.8	40	2260	0.0605	490	480	588	576	435	345	496	393
	630	3.4	43	2625	3.9		4 x 0.8	45	2860	0.0469	560	550	672	660	485	390	553	445
	800	3.4	47	3180	3.9		4 x 0.8	49	3480	0.0367	640	630	768	756	530	440	604	502
	1000	3.4	51	3910	3.9		4 x 0.8	54	4225	0.0291	740	720	888	864	580	490	661	559

TABLE 8

650/1100V, Aluminum Conductor, PVC insulated sheathed, unarmoured (AYY) & Armoured (AYFY & AYWY)

2 CORE	4	1.0	15.5	190	1.0	1.4		16	460	7.410	27	32	32	36
	6	1.0	15	230	1.0	1.4		17	535	4.610	35	42	40	46
	10	1.0	16	270	1.0	1.4		19	605	3.080	47	56	55	63
	16	1.0	20	385	1.0		4 x 0.8	21	630	1.910	59	71	70	80
	25	1.2	20	420	1.2		4 x 0.8	21	600	1.200	78	94	90	103
	35	1.2	22	500	1.2		4 x 0.8	23	700	0.868	99	119	110	125
	50	1.4	25	640	1.4		4 x 0.8	25	875	0.641	125	150	135	154
	70	1.4	27	800	1.4		4 x 0.8	28	1100	0.443	150	180	160	182
	95	1.6	32	1080	1.6		4 x 0.8	32	1410	0.320	185	222	190	217
	120	1.6	33	1245	1.6		4 x 0.8	34	1595	0.253	210	252	210	239
	150	1.8	36	1515	1.8		4 x 0.8	37	1900	0.206	240	288	240	274
	185	2.0	40	1845	2.0		4 x 0.8	41	2270	0.164	275	330	275	314
	240	2.2	45	2345	2.2		4 x 0.8	46	2810	0.125	325	390	320	365
	300	2.4	50	2890	2.4		4 x 0.8	51	3455	0.100	365	438	355	405
	400	2.6	56	3670	2.6		4 x 0.8	56	4230	0.0778	420	504	385	439

The dimensions indicated above are considering following constructions :
1. As per IS 1554 Pt.1/1998 core cables will not have innersheath.
2. Innersheath for 2 core cables - Upto and including 16 sq. mm - Extruded innersheath, 25 sq. mm and above - Taped innersheath
3. Conductor - Upto and including 10 sq. mm - Solid Round Cond., for 16 sq. mm and above stranded Sector Shaped Cond.
4. A.C. Current Ratings given for 2 core cables are for Single Cable only.

Details for specification / construction / delivery length other than above will be furnished on request. Specifications are subjected to change without any further notice.

Technical Data - Power Cables

TABLE 9

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS
650/1100V, Aluminum Conductor, PVC insulated and sheathed, unarmoured (AYY) & Armoured (AYFY/AYWY)

Number of cores	Nominal Area of Conductor Sq. mm	Nominal thickness of PVC insu. (mm)	Unarmoured		Armoured				Max. D.C. Conducter Resistance at 20° C ohm / KM	A.C. Current rating			
										In Air at 40°C		In Ground at 30°C	
			Approx Overall Diameter mm	Approx. Weight kg / km	Nominal Steel Armour Size mm W	F	Approx Overall Diameter mm	Approximate Weight kg / km		PVC Insulation Amps	HRPV Insulation Amps	PVC Insulation Amps	HRPV Insulation Amps
3 Core	4	1.0	15	220	1.4		17	520	7.410	23	28	28	32
	6	1.0	16	265	1.4		18	610	4.610	30	36	35	40
	10	1.0	17	320	1.4		20	720	3.080	40	48	46	52
	16	1.0	19	380		4 x 0.8	20	625	1.910	51	61	60	68
	25	1.2	22	550		4 x 0.8	23	770	1.200	70	84	76	87
	35	1.2	24	665		4 x 0.8	25	905	0.868	86	103	92	105
	50	1.4	27	865		4 x 0.8	29	1155	0.641	105	126	110	125
	70	1.4	31	1140		4 x 0.8	32	1470	0.443	130	156	135	154
	95	1.6	35	1485		4 x 0.8	36	1860	0.320	155	186	165	188
	120	1.6	37	1730		4 x 0.8	38	2160	0.253	180	216	185	211
	150	1.8	41	2115		4 x 0.8	42	2570	0.206	205	246	210	239
	185	2.0	45	2630		4 x 0.8	46	3070	0.164	240	288	235	268
	240	2.2	51	3360		4 x 0.8	52	3910	0.125	280	336	275	314
	300	2.4	56	4115		4 x 0.8	57	4770	0.100	315	378	305	348
	400	2.6	63	5210		4 x 0.8	64	5850	0.0778	375	450	335	382
3.5 Core	25	1.2	25	660		4 x 0.8	26	890	1.2	70	84	76	87
	35	1.2	26	780		4 x 0.8	28	1050	0.868	86	103	92	105
	50	1.4	29	1000		4 x 0.8	30	1300	0.641	105	126	110	125
	70	1.4	33	1310		4 x 0.8	34	1650	0.443	130	156	135	154
	95	1.6	38	1710		4 x 0.8	39	2095	0.320	155	186	165	188
	120	1.6	41	2100		4 x 0.8	42	2500	0.253	180	216	185	211
	150	1.6	45	2450		4 x 0.8	46	2945	0.206	205	246	210	239
	185	2.0	50	3060		4 x 0.8	51	3585	0.164	240	288	235	268
	240	2.2	57	3940		4 x 0.8	57	4480	0.125	280	336	275	314
	300	2.4	63	4695		4 x 0.8	63	5495	0.100	315	378	305	348
	400	2.6	70	6020		4 x 0.8	71	6805	0.0778	375	450	335	382

The dimensions indicated above are considering following construction: Innersheath - Upto and including 16 sq. mm - Extruded innersheath, 25 sq. mm and above - Tapped Innersheath. Conducter - Upto and including 10 sq. mm - Solid Round Cond., for 16 sq. mm and above - Stranded Sector Shaped cond.

TABLE 10

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS
650/1100V, Aluminum Conductor, PVC insulated and sheathed, unarmoured (AYY) & Armoured (AYFY/AYWY)

Number of cores	Nominal Area of Conductor Sq. mm	Nominal thickness of PVC insu. (mm)	Unarmoured		Armoured				Max. D.C. Conducter Resistance at 20° C ohm / KM	A.C. Current rating			
										In Air at 40°C		In Ground at 30°C	
			Approx Overall Diameter mm	Approx. Weight kg / km	Nominal Steel Armour Size mm W	F	Approx Overall Diameter mm	Approximate Weight kg / km		PVC Insulation Amps	HRPV Insulation Amps	PVC Insulation Amps	HRPV Insulation Amps
4 Core	4	1.0	16	275	1.4		18	595	7.410	23	28	28	32
	6	1.0	17	340	1.4		19	700	4.610	30	36	35	40
	10	1.0	19	415		4 x 0.8	20	660	3.080	40	48	46	52
	16	1.0	21	470		4 x 0.8	22	740	1.910	51	61	60	68
	25	1.2	25	690		4 x 0.8	26	925	1.200	70	84	76	87
	35	1.2	27	840		4 x 0.8	28	1110	0.868	86	103	92	105
	50	1.4	32	1145		4 x 0.8	33	1465	0.641	105	126	110	125
	70	1.4	35	1455		4 x 0.8	36	1835	0.443	130	156	135	154
	95	1.6	41	1940		4 x 0.8	41	2360	0.320	155	186	165	188
	120	1.6	43	2290		4 x 0.8	44	2740	0.253	180	216	185	211
	150	1.8	47	2790		4 x 0.8	48	3250	0.206	205	246	210	239
	185	2.0	53	3460		4 x 0.8	53	3990	0.164	240	288	235	268
	240	2.2	59	4395		4 x 0.8	60	5020	0.125	280	336	275	314
	300	2.4	66	5475		4 x 0.8	66	6150	0.100	315	378	305	348
	400	2.6	73	6830		4 x 0.8	74	7625	0.0778	375	450	335	382

DIMENSION, WEIGHTS AND ELECTRICAL CHARACTERISTICS
650 / 1100 v, Copper Conductor, PVC Insulated and Sheathed, Unarmoured (YY) and Armoured (YWY & YFY)

2	4	1.0	14	235	1.4		16	510	4.61	35	42	41	47
	6	1.0	15	290	1.4		17	600	3.08	45	54	50	57
	10	1.0	18	430	1.4		20	785	1.83	60	72	70	80
	16	1.0	20	580		4 x 0.8	21	800	1.15	78	94	90	103
3	4	1.0	15	290	1.4		17	580	4.61	30	36	36	41
	6	1.0	16	365	1.4		18	695	3.08	39	47	45	51
	10	1.0	18	545	1.4		21	980	1.83	52	62	60	68
	16	1.0	19	660		4 x 0.8	20	955	1.15	66	79	77	88
4	4	1.0	16	370	1.4		18	680	4.61	30	36	36	41
	6	1.0	17	470	1.4		19	870	3.08	39	47	45	51
	10	1.0	20	720		4 x 0.8	22	950	1.83	52	62	60	68
	16	1.0	21	850		4 x 0.8	22	1140	1.15	66	79	77	88

The dimensions indicated above are considering following construction: Innersheath - For Aluminum Cable Conductor - Upto and including 10 sq. mm - Solid Round Cond., For 16 sq. mm and above - Stranded Sector Shaped cond. For Copper Cable Conductor - Upto and including 6 sq. mm - Solid Round cond., For 10 sq. mm - Stranded Round, Cond. and 16 sq. mm and above - Stranded Sector Shaped cond. Upto and including 16 sq. mm - Extruded Innersheath, 25 sq. mm and above - Taped Innersheath.

Details for specification / construction / delivery length other than above will be furnished on request. Specifications are subjected to change without any further notice.

Technical Data - Control Cables

TABLE 11

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS
650/1100V, Solid / Stranded Copper Conductor, XLPE insulated and PVC sheathed
Unarmoured (2XY) and Armoured (2XWY & 2XFY) Control Cables

Number of cores	Nominal Area of Conductor (mm2)	Nominal thickness of XLPE insulation (mm)	Unarmoured		Armoured				A.C. Current rating		
			Approx Overall Diameter (mm)	Approx. Weight (kg / km)	Nominal Steel Armour Size mm Wire	Strip	Approx Overall Diameter (mm)	Approximate Weight kg / km	In Air at 40°C (A)	In Ground at 40°C (A)	In Duct at 30°C (A)
2	1.5	0.7	11	140	1.4		13	340	25	27	24
3	1.5	0.7	11	160	1.4		13	370	31	32	29
4	1.5	0.7	12	185	1.4		14	405	31	32	29
5	1.5	0.7	13	215	1.4		15	465	24	24	22
6	1.5	0.7	14	245	1.4		16	520	20	21	18
7	1.5	1.7	14	255	1.4		16	525	20	20	18
8	1.5	0.7	15	290	1.4		17	590	19	19	17
9	1.5	0.7	15	325	1.4		18	635	18	18	16
10	1.5	0.7	17	345	1.4		19	690	17	18	16
12	1.5	0.7	17	385	1.4		19	740	16	17	15
14	1.5	0.7	18	430	1.4		20	815	15	16	14
16	1.5	0.7	19	475		4 x 0.8	20	720	15	15	13
19	1.5	0.7	19	535		4 x 0.8	21	775	14	14	13
24	1.5	0.7	23	680		4 x 0.8	24	945	13	13	11
27	1.5	0.7	23	745		4 x 0.8	25	1035	12	12	11
28	1.5	0.7	23	755		4 x 0.8	25	1045	12	12	11
30	1.5	0.7	24	800		4 x 0.8	26	1180	11	11	10
37	1.5	0.7	26	945		4 x 0.8	27	1255	11	11	10
44	1.5	0.7	29	1125		4 x 0.8	30	1475	10	10	9
48	1.5	0.7	29	1200		4 x 0.8	30	1575	10	10	9
52	1.5	0.7	29	1280		4 x 0.8	31	1680	10	10	9
56	1.5	0.7	31	1355		4 x 0.8	32	1775	9	9	8
61	1.5	0.7	32	1485		4 x 0.8	33	1865	9	9	8
2	2.5	0.7	12	160	1.4		14	385	34	38	32
3	2.5	0.7	12	200	1.4		14	435	43	45	38
4	2.5	0.7	13	235	1.4		15	485	43	45	38
5	2.5	0.7	14	280	1.4		16	550	32	34	29
6	2.5	0.7	15	325	1.4		17	620	27	29	24
7	2.5	0.7	15	340	1.4		17	635	27	28	24
8	2.5	0.7	16	390	1.4		18	710	26	27	23
9	2.5	0.7	17	435	1.4		19	795	24	26	22
10	2.5	0.7	18	465		4 x 0.8	20	665	23	25	21
12	2.5	0.7	19	520		4 x 0.8	20	765	22	24	20
14	2.5	0.7	20	585		4 x 0.8	21	825	21	22	19
16	2.5	0.7	21	675		4 x 0.8	22	920	20	21	18
19	2.5	0.7	22	765		4 x 0.8	23	1030	19	20	18
24	2.5	0.7	25	945		4 x 0.8	26	1255	17	18	16
27	2.5	0.7	26	1045		4 x 0.8	27	1350	16	17	15
28	2.5	0.7	26	1055		4 x 0.8	27	1365	16	17	15
30	2.5	0.7	27	1120		4 x 0.8	28	1455	16	17	15
33	2.5	0.7	27	1225		4 x 0.8	29	1575	15	16	14
37	2.5	0.7	28	1340		4 x 0.8	30	1690	14	15	14
44	2.5	0.7	32	1640		4 x 0.8	33	2040	14	14	13
48	2.5	0.7	33	1755		4 x 0.8	34	2155	13	14	13
52	2.5	0.7	34	1875		4 x 0.8	35	2275	13	14	13
56	2.5	0.7	35	1990		4 x 0.8	36	2410	12	13	11
61	2.5	0.7	36	2125		4 x 0.8	37	2565	12	13	11

Note :

1. The technical detail specified above are considering extruded / taped innersheath.
2. Maximum DC resistance at 20°C for 1.5mm^2 & 2.5mm^2 will be 12.1 ohm / km & 7.41 ohm / km respectively.
3. Maximum AC resistance at 90° C for 1.5mm^2 & 2.5mm^2 will be 15.43 ohm / km & 9.45 ohm / km respetively
4. Delivery length = 1000

Details for specification / construction / delivery length other than above will be furnished on request. Specifications are subjected to change without any further notice.

Technical Data - Control Cables

TABLE 12

DIMENSIONS, WEIGHTS AND ELECTRICAL CHARACTERISTICS

650/1100 V, Solid Copper Conductor, PVC insulated and sheathed, unarmoured (YY) & Armoured (YFY/YWY)

Number of cores	Nominal Area of Conductor Sq. mm	Nominal thickness of PVC insu. (mm)	Unarmoured		Armoured				Max. D.C. Conducter Resistance at 20° C ohm / KM	A.C. Current rating			
										In Air at 40°C		In Ground at 30°C	
			Approx Overall Diameter mm	Approx. Weight kg / km	Nominal Steel Armour Size mm W	Nominal Steel Armour Size mm F	Approx Overall Diameter mm	Approximate Weight kg / km		PVC Insulation Amps	HRPV Insulation Amps	PVC Insulation Amps	HRPV Insulation Amps
2	1.5	0.8	12	150	1.4		13	350	12.1	20	24	23	26
3	1.5	0.8	12	175	1.4		14	390	12.1	17	20	21	26
4	1.5	0.8	13	200	1.4		15	425	12.1	17	20	21	24
5	1.5	0.8	13	240	1.4		16	485	12.1	17	20	21	24
6	1.5	0.8	14	257	1.4		16	545	12.1	12	14	14	16
7	1.5	0.8	14	285	1.4		16	555	12.1	12	14	14	16
8	1.5	0.8	15	330	1.4		17	625	12.1	12	14	13	15
9	1.5	0.8	16	375	1.4		18	690	12.1	11	13	13	15
10	1.5	0.8	17	390	1.4		20	740	12.1	11	13	12	14
12	1.5	0.8	18	435		4x0.8	19	640	12.1	10	12	11	13
14	1.5	0.8	19	490		4x0.8	20	730	12.1	9	11	11	13
16	1.5	0.8	20	540		4x0.8	21	790	12.1	9	11	10	11
19	1.5	0.8	21	630		4x0.8	22	880	12.1	8	10	10	11
24	1.5	0.8	24	775		4x0.8	25	1070	12.1	8	10	9	10
27	1.5	0.8	24	845		4x0.8	26	1160	12.1	7	8	8	9
30	1.5	0.8	25	920		4x0.8	27	1235	12.1	7	8	8	9
33	1.5	0.8	26	990		4x0.8	27	1340	12.1	7	8	8	9
37	1.5	0.8	27	1090		4x0.8	28	1430	12.1	6	7	7	8
44	1.5	0.8	30	1275		4x0.8	32	1685	12.1	6	7	7	8
48	1.5	0.8	31	1390		4x0.8	32	1800	12.1	6	7	7	8
52	1.5	0.8	32	1500		4x0.8	33	1895	12.1	6	7	7	8
56	1.5	0.8	33	1600		4x0.8	34	2015	12.1	6	7	7	8
61	1.5	0.8	34	1710		4x0.8	35	2150	12.1	6	7	7	8
2	2.5	0.9	13	190	1.4		15	420	7.41	27	32	32	36
3	2.5	0.9	13	230	1.4		15	465	7.41	24	29	27	31
4	2.5	0.9	14	275	1.4		16	525	7.41	24	29	27	31
5	2.5	0.9	15	320	1.4		17	600	7.41	24	29	27	31
6	2.5	0.9	16	375	1.4		18	685	7.41	17	20	20	23
7	2.5	0.9	16	390	1.4		18	705	7.41	17	20	20	23
8	2.5	0.9	17	460	1.4		20	810	7.41	16	19	19	22
9	2.5	0.9	18	520		4x0.8	20	765	7.41	15	18	18	21
10	2.5	0.9	20	540		4x0.8	22	810	7.41	14	17	17	19
12	2.5	0.9	21	630		4x0.8	22	880	7.41	14	17	16	18
14	2.5	0.9	22	710		4x0.8	23	980	7.41	13	16	15	17
16	2.5	0.9	23	790		4x0.8	24	1060	7.41	12	14	15	17
19	2.5	0.9	24	895		4x0.8	25	1190	7.41	11	13	14	16
24	2.5	0.9	28	1110		4x0.8	29	1485	7.41	10	12	12	14
27	2.5	0.9	28	1210		4x0.8	29	1575	7.41	10	12	12	14
30	2.5	0.9	29	1325		4x0.8	31	1735	7.41	9	11	11	13
33	2.5	0.9	30	1440		4x0.8	32	1850	7.41	9	11	11	13
37	2.5	0.9	32	1620		4x0.8	33	2010	7.41	9	11	10	11
44	2.5	0.9	36	1900		4x0.8	37	2365	7.41	8	10	10	11
48	2.5	0.9	36	2040		4x0.8	37	2500	7.41	8	10	10	11
52	2.5	0.9	37	2190		4x0.8	38	2670	7.41	8	10	10	11
56	2.5	0.9	38	2335		4x0.8	39	2840	7.41	8	10	10	11
61	2.5	0.9	39	2500		4x0.8	40	3010	7.41	8	10	10	11

The Technical Details specified above are considering Extruded Innersheath (for Control Cables only)

Details for specification / construction / delivery length other than above will be furnished on request. Specifications are subjected to change without any further notice.

International Approvals

شركة البترول الوطنية الكويتية
KNPC

VENDORS & CONTRACTORS EVALUATION COMMITTEE

DATE: 21/06/2011
REF: VC/V-4790-11-0985L
FILE NO: V - 4790

M/S THERMO CABLES LTD., INDIA.
PLOT NO:G1, G2(A) GREEN INDUSTRIAL PARK JADCHERLA-509301,
DIST-MAHBOOBNAGAR -AP
India

SUBJECT: VENDOR APPROVAL - ADD LOCAL AGENT RELATIONSHIP
Local Agent: GULF ENERGY COMPANY ,KUWAIT.
Agency Validity: From: 21.09.2010 to 20.09.2013

GENTLEMEN,
REFERENCE TO YOUR LETTER DT. 13/06/2011 ON THE ABOVE SUBJECT, THE SAME HAS BEEN UPDATED IN OUR RECORDS EFFECTIVE 21/06/2011. YOUR APPROVAL AS A VENDOR REMAINS VALID FOR THE SUPPLY OF THE FOLLOWING PRODUCT(S) FOR K.N.P.C REFINERIES.

PRODUCT	DESCRIPTION
T3 40	CABLE, INSTRUMENTS (INCLUDING THERMOCOUPLE WIRE & CABLE)

THE COMPANY (VENDOR) CODE ALLOCATED TO YOUR COMPANY IS 177128.
PLEASE ENSURE TO QUOTE THIS CODE AND ABOVE FILE NO. ON ALL YOUR FUTURE CORRESPONDENCE.

VERY TRULY YOURS,

CC: GULF ENERGY COMPANY ,KUWAIT.
THE INTERNAL CODE ALLOCATED TO YOUR COMPANY IS 700051

NOTE: THIS LETTER SUPERSEDES OUR LETTER DATED 29.09.2011
KINDLY BE INFORMED THAT LOCAL AGENT RELATIONSHIP HAS BEEN UPDATED IN OUR RECORDS. VALIDITY OF AGENCY IS UPTO 20.09.2013 HENCE YOU ARE KINDLY REQUESTED TO SUBMIT RENEWED AGENCY CERTIFICATE ON OR BEFORE 20.09.2013. IN ORDER TO KEEP THE RELATIONSHIP CONTINUOUSLY

Page 1 of 1

eni

saipem

San Donato Milanese, 21/03/2013

Protocol Number VN-3238-13-SC-AI

Kind attn. of the Legal Representative

Messrs
THERMOCABLES LTD.
NAGARJUNA HILLS # 28
500082 HYDERABAD - INDIA

We are pleased to inform you that your Company has successfully completed the qualification process in accordance with Saipem procedures.
The qualification stands for the supply of goods and/or services for the following commodities:

H02850021 CABLES FOR INSTRUMENTATION

Please note that you have been registered in our Vendor Management Data Base with code 509023 that you are kindly requested to mention in all communication with Saipem.
Your Company is now registered in Saipem "Vendor List"; such registration shall not create or impose any obligation or liability on Saipem.
The qualification has a 36 (thirty-six) month validity, and this qualification status will be monitored through feedback analysis and, if required, audit visits at your offices and/or premises.
We kindly ask you to promptly inform us of any change of your Company organisation by entering our website www.saipem.com and joining "Qualification Management" area.
We remain at your disposal for any clarification.
Best regards,

Kuwait Oil Company

(1255)

TO: M/s Thermo Cables Limited.
India.
Fax No. 0091 40 23350663

Date: 10th October 2011
Mag. No: PQAN/100C/2011
Total No. of Pages: 1

FROM: Team Leader Purchasing II,
Commercial Affairs Group
P.O. Box - 9758
61008 Ahmadi, Kuwait
Fax No.: (965) 23880677

SUBJECT: NOTIFICATION OF VENDOR APPROVAL

OUR REF.: VEC-34563/N/IOC/021/2011

Dear Sirs,

We are pleased to inform you that you have been approved for inclusion in KOC's Approved List of Manufacturer for the product category and manufacturing facility mentioned here below:

PRODUCT CATEGORY : INSTRUMENT & COMPENSATING CABLES (NON LEAD SHEATHED CABLES ONLY)
FACILITY ADDRESS : M/s. THERMO CABLES LIMITED, PLOT NO: G-1, G-2 (A), GREEN INDUSTRIAL PARK, JADCHERLA, MAHBOOBNAGAR (DISTRICT), INDIA.
Validity : From 10th October 2011 to 9th October 2016 (5 years)

This notification of approval is issued subject to the following, failing which failure for cancellation at any time at the discretion of KOC

- To update regularly with the latest product catalogue / information.
- To furnish Budgetary Quotations as & when requested
- To furnish Audited financial details for every two years.
- To update with latest contact details / Change in Local Agent
- To update with Name Change / Merging / Factory Shifting
- To submit request for Re-Qualification (if required) 3 months prior the above expiry date.

Sincerely,
For Kuwait Oil Company

Jassem Mohd. Al-Fares

cc: M/s. Gulf Energy Co., Kuwait; Fax: - 22496355

شركة تنمية نفط عمان ش.م.م
Petroleum Development Oman L.L.C.

CERTIFICATE OF REGISTRATION – PRODUCTS VENDOR

CERTIFICATE NUMBER: 104158
Date of Issue: 02/067/2012
First Registered With PDO:

PETROLEUM DEVELOPMENT OMAN LLC
CERTIFIES THAT:

Contractor Name: : Thermo Cables Limited
Country of Origin : India
Local Agent : Global Pavilion LLC
Postal Address : P.O. Box 845, PC 130 Al Athelbah- Sultanate of Oman

IS REGISTERED WITH THE COMPANY AS AN APPROVED SERVICE VENDOR WITH EFFECT FROM THE DATE OF ISSUE OF THIS CERTIFICATE FOR THE FOLLOWING PRODUCT GROUP CATEGORIES:

Instrumentation

AVME 37.020 - CABLE, TYPE B, UNDERGROUND, BS-5308 WITH PE OUTER SHEATH, MESC 68.51.35.0X1.0 - SSI 68AANA 26 12 16 CABLE, INSTRUMENT/COMMUNICATION
AVME 37.021 - CABLE, 2X2X1.13, BS-5308 WITH PE OUTER SHEATH, MESC 68.51.35.013.0 - SSI 68AANA 26 12 16 CABLE, INSTRUMENT/COMMUNICATION
AVME 37.022 - CABLE, 3X2.5 MM2, BS-5308 WITH PE OUTER SHEATH, MESC 68.44.14.X03.0 - SSI 68AANA 26 12 16 CABLE, INSTRUMENT/COMMUNICATION
AVME 37.060 - CABLE TIMF - SSI 68AANA 26 12 16 CABLE, INSTRUMENT/COMMUNICATION
AVME - 37.080 - CABLE XLPE - SSI 68AANA 26 12 16 CABLE, INSTRUMENT/COMMUNICATION
AVME 37.070 - CABLE THERMOCOUPLE EXTENSION - SSI 68ADAA 26 12 16 CABLE, THERMOCOUPLE, NOT FLAME RETARDENT

HAMOUD AL HADHRAMY (FPB/3)
HEAD BUSINESS DEVELOPMENT

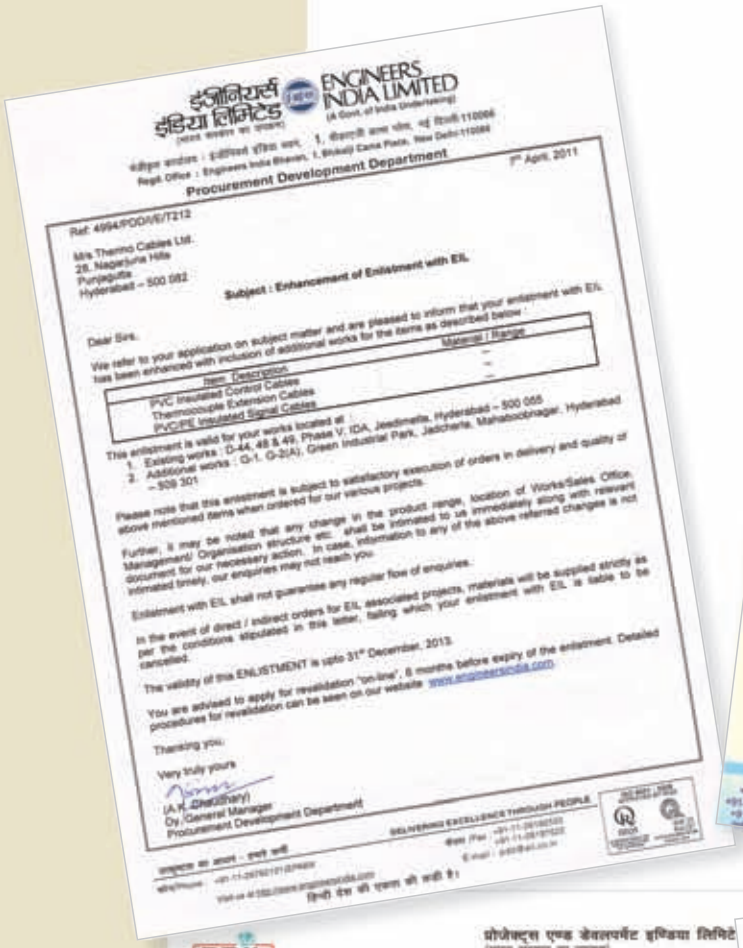
NB: THIS CERTIFICATE IS VALID UNTIL: 30/03/2015
PLEASE REFER OVERLEAF FOR DETAILS.

Ren

Address post registration, non procurement related queries to e-mail Permanent(vendor)reg@pdo.co.om
telephone number + (968) 24673314.

September, 2009

Major Approvals



ENGINEERS INDIA LIMITED
(A Govt. of India Undertaking)
Regd. Office : Engineers India Bhawan, 1, Bhikaiji Cama Place, New Delhi-110066
Procurement Development Department

7th April, 2011

Ref: 4994/PODA/E/T212

M/s Thermo Cables Ltd.
28, Nagarjuna Hills
Punjagutta
Hyderabad – 500 082

Subject : Enhancement of Enlistment with EIL

Dear Sirs,

We refer to your application on subject matter and are pleased to inform that your enlistment with EIL has been enhanced with inclusion of additional works for the items as described below :

Item Description	Material / Range
PVC Insulated Control Cables	–
Thermocouple Extension Cables	–
PVC/PE Insulated Signal Cables	–

This enlistment is valid for your works located at
1. Existing works : D-44, 45 & 49, Phase V, IDA, Jeedimetla, Hyderabad – 500 055
2. Additional works : G-1, G-2(A), Green Industrial Park, Jadcherla, Mahabubnagar, Hyderabad – 509 301

Please note that this enlistment is subject to satisfactory execution of orders in delivery and quality of above mentioned items when ordered for our various projects.

Further, it may be noted that any change in the product range, location of Works/Sales Office, Management/ Organisation structure etc. shall be intimated to us immediately along with relevant document for our necessary action. In case, information to any of the above referred changes is not intimated timely, our enquiries may not reach you.

Enlistment with EIL shall not guarantee any regular flow of enquiries.

In the event of direct / indirect orders for EIL associated projects, materials will be supplied strictly as per the conditions stipulated in this letter, failing which your enlistment with EIL is liable to be cancelled.

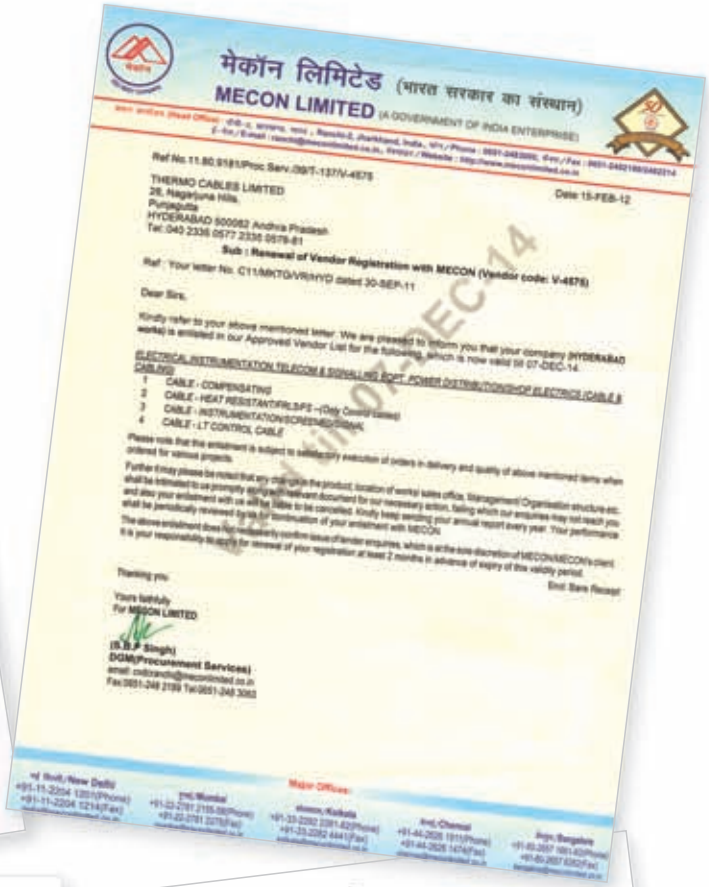
The validity of this ENLISTMENT is upto 31st December, 2013.

You are advised to apply for revalidation "on-line", 6 months before expiry of the enlistment. Detailed procedures for revalidation can be seen on our website www.engineersindia.com

Thanking you.

Very truly yours
(A.K. Bhardhany)
Dy. General Manager
Procurement Development Department

DELIVERING EXCELLENCE THROUGH PEOPLE



मेकॉन लिमिटेड (भारत सरकार का संस्थान)
MECON LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)

Ref No.11.80.0181/Proc.Serv./09/T-137/V-4676

Date 15-FEB-12

THERMO CABLES LIMITED
28, Nagarjuna Hills,
Punjagutta
HYDERABAD 500082 Andhra Pradesh
Tel: 040 2336 0577 2336 0578-81

Sub : Renewal of Vendor Registration with MECON (Vendor code: V-4676)

Ref : Your letter No. C11/MKTG/VR/HYD dated 30-SEP-11

Dear Sirs,

Kindly refer to your above mentioned letter. We are pleased to inform you that your company (HYDERABAD works) is enlisted in our Approved Vendor List for the following, which is now valid till 07-DEC-14.

ELECTRICAL INSTRUMENTATION TELECOM & SIGNALLING EQPT. POWER DISTRIBUTION/SHOP ELECTRICAL/CABLE & CABLING

1 CABLE - COMPENSATING
2 CABLE - HEAT RESISTANT/FIRL/SFE –(Only Control Cables)
3 CABLE - INSTRUMENTATION/SCREENED/SIGNAL
4 CABLE - LT CONTROL CABLE

Please note that the enlistment is subject to satisfactory execution of orders in delivery and quality of above mentioned items when ordered for various projects.

Further it may please be noted that any change in the product, location of works/ sales office, Management/ Organisation structure etc. shall be intimated to us promptly along with relevant document for our necessary action, failing which our enquiries may not reach you and also your enlistment with us will be liable to be cancelled. Kindly keep sending your annual report every year. Your performance shall be periodically reviewed by us for continuation of your enlistment with MECON.

The above enlistment does not necessarily confirm issue of tender enquiries, which is at the sole discretion of MECON/MECON's client. It is your responsibility to apply for renewal of your registration at least 2 months in advance of expiry of this validity period.

Thanking you.

Encl: Bank Receipt

Yours faithfully
For MECON LIMITED

(S.B.P. Singh)
DGM(Procurement Services)
email: cmdcandc@meconlimited.co.in
Fax:0651-248 2199 Tel:0651-248 3082

Major Offices:

PDIL
प्रोजेक्ट्स एण्ड डेवलपमेंट इण्डिया लिमिटेड
(भारत सरकार का उपक्रम)
PROJECTS & DEVELOPMENT INDIA LTD.
(A GOVT. OF INDIA UNDERTAKING)
PDIL BHAWAN, A-14, SECTOR-1, NOIDA-201 301
DIST. GAUTAM BUDH NAGAR, (U.P.) INDIA

PNM&R/EGN/ P2809
Date : 21.08.2010

M/s THERMO CABLES LIMITED
D-44-45, 48 & 49, PHASE V,IDA, JEEDIMETLA
HYDERABAD-500055

Subject : VENDOR REGISTRATION CERTIFICATE

Dear Sirs,

We are pleased to inform you that you have been enlisted with PDIL as an approved vendor for the item(s) described below:

ITEM CODE	ITEM DESCRIPTION	MATERIAL / RANGE
311601	INSTRUMENT POWER & CONTROL CABLES	
311602	EXTENSION & COMPENSATING CABLES	

Please refer the above reference number in all your future correspondence related to above subject.

Kindly note that this enlistment is subject to satisfactory execution of orders in delivery and quality of above mentioned items when ordered for our various projects.

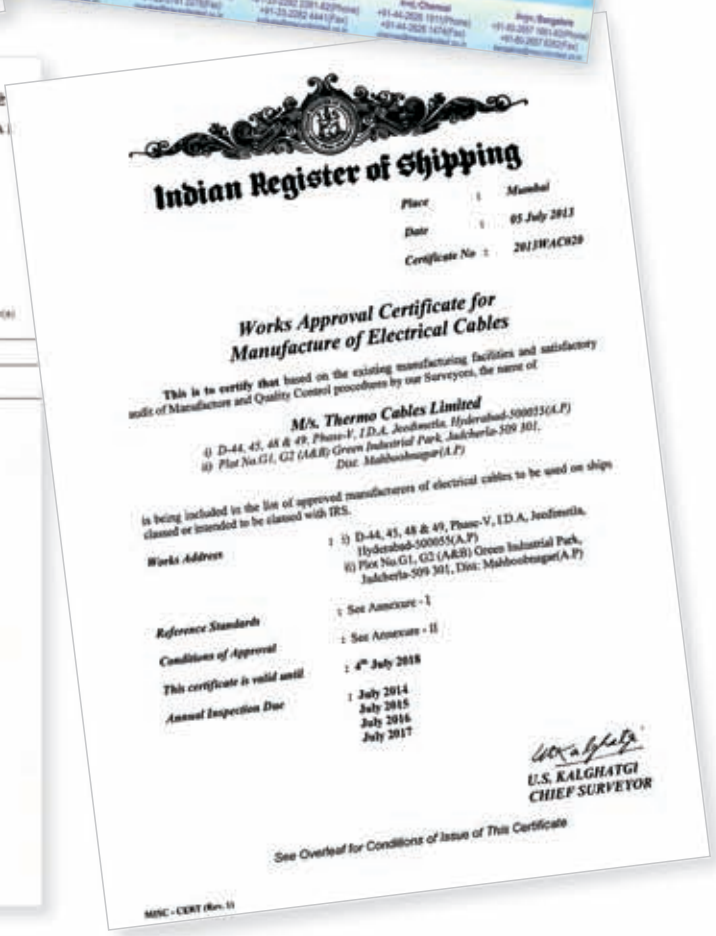
Further, it may be noted that any change in the product range, location of Works / Sales office, Management/ Organisation structure etc. shall be intimated to us immediately along with relevant documents for our necessary action. In case, information to any of the above referred changes is not intimated timely, the enlistment with us is liable to be cancelled. Your performance shall be reviewed for continuation of your enlistment with PDIL.

This registration is valid till 20.08.2015. You shall contact us at least 180 days in advance for revalidation of your registration with us, failing which ,your name may be deleted from our vendors list.

Thanking You.

Yours faithfully,
(R.S.Suhag)
Dy. General Manager (MM)

ISO 9001:2008



Indian Register of Shipping

Place : Mumbai
Date : 05 July 2013
Certificate No : 2013WACR20

Works Approval Certificate for Manufacture of Electrical Cables

This is to certify that based on the existing manufacturing facilities and satisfactory audit of Manufacture and Quality Control procedures by our Surveyors, the name of

M/s. Thermo Cables Limited
i) D-44, 45, 48 & 49, Phase-V, I.D.A. Jeedimetla, Hyderabad-500055(A.P)
ii) Plot No.G1, G2 (A&B) Green Industrial Park, Jadcherla-509 301, Dist. Mahboobnagar(A.P)

is being included in the list of approved manufacturers of electrical cables to be used on ships classed or intended to be classed with IRS.

Works Address : i) D-44, 45, 48 & 49, Phase-V, I.D.A, Jeedimetla, Hyderabad-500055(A.P)
ii) Plot No.G1, G2 (A&B) Green Industrial Park, Jadcherla-509 301, Dist. Mahboobnagar(A.P)

Reference Standards : See Annexure - I
Conditions of Approval : See Annexure - II
This certificate is valid until : 4th July 2018
Annual Inspection Due : July 2014, July 2015, July 2016, July 2017

U.S. KALGHATGI
CHIEF SURVEYOR

See Overleaf for Conditions of Issue of This Certificate

MISC - CERT (Rev. 1)

Accolades

ABB

Dated October 8, 2011

TO WHOM SO EVER IT MAY CONCERN

This is to certify that M/s Thermo Cables Limited Hyderabad have successfully executed the below mentioned Order to our entire satisfaction.

- P.O. No. 3191369342 dated May 04,2011.
- CONSULTANT :- MECON LTD, RANCHI.
- MAIN CONTRACTOR :- TATA PROJECTS LTD.
- PROJECT :- SAIL, ROURKELA STEEL PLANT, Blast Furnace # 5.
- ITEMS : - Instrumentation Cables
- Qty & Value:- 100 Km, Rs.173.82 Lacs.

In addition to this pre order, post order response & attending to emergencies is appreciable.

The vendor has been a regular supplier for varieties of Cables & has successfully executed various orders for our reputed clients meeting the stringent technical & quality norms.

For ABB Limited

Arnab Kundu
Manager - Project Management
Process Automation - Metals
Bajajnagar Industrial Estate
560044, Bangalore, Karnataka, INDIA
Phone: +91 80 12346200
email: arnab.kundu@in.abb.com

Copy to:- Mr.Rahul Bhattasali -Sr.G.M. -Marketing- Thermo Cables Limited Hyderabad-500082

ABB Limited

BGR ENERGY

BGR ENERGY SYSTEMS LIMITED
443,ANNA SALAI,TEYNAMPET, CHENNAI-600018 INDIA
TEL: 91 44 24326171, 24326179 FAX: 91 44 24326576
Web site : www.bgrenergy.com

10th December, 2012

TO WHOMSOEVER IT MAY CONCERN

M/s.Thermo Cables Ltd. Hyderabad have supplied LT Control and Instrumentation Cables for our following Projects.

500 MW TPP Unit # 7 VTPS (Vijayawada Thermal Power Station) of APGENCO

500 MW TPS KTPP (Kakatiya Thermal Power Project) of APGENCO

500 MW TPS KTPS (Kothagudem Thermal Power Station) of APGENCO

500 MW KHAPERKHEDA TPS Expansion Project, MAHAGENCO.

The supplies for above projects were made in stipulated Delivery period (from 2008 to 2010) and the quality found to be satisfactory. The response of the Vendor has been very good.

For BGR ENERGY SYSTEMS LTD.

N. SATISH
Assistant Vice President-C&I

REGISTERED OFFICE :
A.S.RAMANAIDU INDUSTRIAL ESTATE, KHANIPURAM POST, SULURPET TALUK, NELLORE DISTRICT, ANDHRA PRADESH 524401 INDIA
TEL: 91 44 27960181, 27968549 FAX: 91 44 27968249

BHARAT HEAVY ELECTRICALS LIMITED
RAMACHANDARAPURAM :: HYADERABAD – 32
PURCHASE DEPARTMENT (PUMPS)

TO WHOM SO EVER IT MAY CONCERN

This is to certify that power, control and signal cables of various sizes have been, being supplied by M/s. Thermo Cable Limited Hyderabad against various Purchase Orders vide nos:F7/08/A040 Dt:17.07.2008 Project RINL, F7/08/A091 Dt: 25.11.2008 Project Sikka, RINL ,RIL,SAIL & TISCO by BHEL Hyderabad and the performance of these Cables has been found to be satisfactory with regard to quality and delivery.

ON BEHALF OF Bharat Heavy Electricals Limited

P.R.D.Raju
Sr.DGM/Pur(Pumps)

P.R.D. RAJU

JSW

JSW Energy Limited

06/01/2013

TO WHOM SO EVER IT MAY CONCERN

This is to certify that *M/s.Thermo Cables Ltd.* have supplied Various Sizes Cables through M/S. EDAC Engineering Ltd against PO No.EDAC/PO/JSWERL/Thermo/UV/155 dtd.UV.UV.2009 for our 4 X 300 MW Coal Based Thermal Power Plant for JSW Energy Ltd. (JSWERL) at Jaidgad, Ratnagiri (Maharashtra).

Thermo Cables Ltd. have supplied -all the ordered qty. within the stipulated delivery period. We are pleased to confirm that the supplied Cables are under operation for more than 2 Years and are working to our entire satisfaction.

This letter is issued on request of Supplier.

Thanking You,
For JSW Energy Limited

Authorised Signatory

Regd. Office :
Jindal Mansion,
5-A, Dr. G. Deshmukh Marg,
Mumbai - 400 026.
Phone : 022-2351 3000
Fax : 022-2352 8420

Part of O.P. Jindal Group

Infrastructure

Machinery

Sl. No.	Name of the Machine	Qty (in Nos)
1	ROD BREAK DOWN MACHINE	3
2	MULTI WIRE DRAWING MACHINE	1
3	FINE WIRE DRAWING MACHINE	7
4	TINNING MACHINE	3
5	BUNCHING MACHINE	11
6	45 mm EXTRUDER MACHINE	1
7	65 mm INSULATION EXTRUDERS	7
8	70/35 mm INSULATION EXTRUDER	1
9	80 mm INSULATION EXTRUDER	1
10	CORE REWINDING MACHINE	8
11	PARING MACHINE	7
12	HORIZONTAL TAPING MACHINE	4
13	PAIRING & TAPING MACHINE	7
14	VERTICAL TAPING MACHINE	10
15	13B LAYING MACHINE	1
16	7B LAYING MACHINE	1
17	19B LAYING MACHINE	4
18	37B LAYING MACHINE	3
19	30B ARMOURING MACHINE	2
20	40B ARMOURING MACHINE	1
21	48B ARMOURING MACHINE	4
22	72B ARMOURING MACHINE	1
23	96B ARMOURING MACHINE	1
24	100 mm SHEATHING EXTRUDER	1
25	80 mm SHEATHING EXTRUDER	3
26	75 mm SHEATHING EXTRUDER	2
27	CABLE REWINDING MACHINE	4
28	1+6 SKIP STRANDING MACHINE	1
29	54B STRANDING MACHINE	1
30	1600/2240 DRUM TWISTER	1
31	LASER DIAMETER GUAGE	6
32	OFFLINE PRINTER	1
33	NOZZLING MACHINE	4
34	BRAIDING MACHINE	6
35	HAND POINTING MACHINE	2
36	STRANDING MACHINE	1
37	BRAZING MACHINE	9
38	BUTT WELDING MACHINE	15
39	HOIST	24
40	GI WIRE REWINDING MACHINE	18
41	GI STRIP REWINDING MACHINE	4
42	PVC CUTTER	2
43	2 HP AIR COMPRESSOR	1
44	10 HP AIR COMPRESSOR	4
45	7.5 HP AIR COMPRESSOR	1
46	5 HP AIR COMPRESSOR	2
47	3 HP AIR COMPRESSOR	1
48	50 HP AIR COMPRESSOR	2
49	100 HP AIR COMPRESSOR	1
50	365 KVA GENSET	2
51	82.5 KVA GENSET	1
52	600 KVA GENSET	1
53	320 KVA DG SET	1
54	COOLING TOWERS	7
55	INKJET PRINTERS	10
56	3 T EOT CRANE	1
57	7.5 T EOT CRANE	2
58	0.5 T BOILER	1
59	1.0 T BOILER	1

Testing Equipment

Sl. No.	Name of the Measuring Instrument	Range / LC
1	ELECTRONIC BALANCE	0- 180 gram /0.1 milligram
2	ELECTRONIC WEIGHING BALANCE	0 - 5 Kg / 1 gram
3	DIGITAL MICRO OHM METER	19.999 micro Ohm - 19.999 Kilo Ohm
4	FOUR CELL AGEING OVEN	_
5	FLAMABILITY TESTER AS PER IEC -332-3	_
6	HOT AIR OVEN	0 - 300 Deg C
7	COLD CHAMBER	-20 Deg to - 50 Deg C
8	HCL GAS EMMISON TEST	_
9	HYDRAULIC PRESS	_
10	HOT SET TEST APPARATUS	0 - 300 Deg C
11	DIG LCR Q METER	_
12	MELT FLOW INDEX	_
13	DIG MILLION MEGOHM METER	0 - 10 ^ 9 Megha - Ohms
14	OXYGEN AND TEMP INDEX	_
15	SMOKE DENSITY TESTER	_
16	HIGH VOLTAGE TESTER	0 - 7.5 /15 KV
17	DIG TEMP INDICATOR WITH SENSOR	_
18	THERMAL STABILITY	_
19	WATER ABSORPTION TESTER	_
20	DC-HIGH VOLTAGE TESTER	0 - 5 KV
21	ELECTRONIC TENSILE TESTER	0 - 30 KN
22	DIGIMATIC MICROMETER	0 - 25 mm , 0.001 mm
23	DIGIMATIC CALIPER	0 - 150 mm , 0.01 mm
24	SLICING MACHINE	_
25	MICROSCOPE	_
26	DIGITAL STOP WATCH	_
27	pH & CONDUCTIVITY TESTER	_
28	ROLLING MILL	_
29	ATN & XTALK TEST SYSTEM	_
30	ELECTROSTATIC NOISE REJECTION RATIO EQUIPMENT	_
31	PROFILE PROJECTOR	_
32	IMPEDANCE METER	_
33	SENIOR KELVIN BRIDGE	0.02 Micro Ohm - 1.1 Ohm
34	FLAMABILITY TESTER AS PER IEC -332-1	_
35	SWEDISH CHIMNEY	_
36	FIRE SURVIVAL TEST - CWZ	_
37	DUMBELL CUTTER	_
38	TORSION TESTER	_

OUR CUSTOMERS

Thermo Cables Ltd
An ISO 9001 Certified Company

28, Nagarjuna Hills, Punjagutta, Hyderabad - 500 082, INDIA
Phone: +91-40 44429292, Fax: +91-40 23350583,
E-mail: info@thermocables.com
Overseas Office London, Ph: +44(0) 207 286 9569,
Email: medhapattem@thermopads.com

Hyderabad - hydsales@thermopads.com,
Mumbai - Ph: 022-26590022, Fax No. 022-26590337, Email: mumbai@thermopads.com,
Delhi - Ph: 011 29535168/69, Fax No. 011-29535168/69, Email: delhi@thermopads.com,
Chennai - Ph: 044-26447333, Tele Fax No. 044-26443282 Email: chennai@thermopads.com,
Kolkata - 09332395749, Email: kolkota@thermocables.com,
Bengaluru - Ph: 080-22224791, Fax No. 080-22217071, Email: bangalore@thermocables.com,
Pune - Tele Fax: 020-27502255, Email: pune@thermopads.com,
Baroda - Ph: 0265-2355576, Email: baroda@thermopads.com,
www.thermocables.com

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