KEC INTERNATIONAL LIMITED

INSTRUMENTATION
cables

RPG CABLES
(A Division of KEC International Limited)

THE MYSORE UNIT OF RPG CABLES MANUFACTURES A RANGE OF INSTRUMENTATION CABLES

The Mysore Unit of RPG Cables is the largest and most diversified cables manufacturing facility in the South of India. The unit manufactures:

- Jelly Filled Telecom Cables
- Optical Fibre Cables
- Low Tension Power & Control Cables
- Instrumentation Cables

Over the years, the cables manufactured at Mysore have been exported to over 25 countries. The plant is accredited to ISO 9001, ISO 14001 and ISO 18001 standards. It has won several quality and other Awards since inception.

INSTRUMENTATION CABLES

Instrumentation cables are multiple conductor cables that convey low energy electrical signals used for monitoring or controlling electrical power systems and their associated processes.

These cables are used in diverse applications within industrial process manufacturing plant for control, communication, data (analog/digital) and voice transmission signals, industrial signaling and process control circuit required typically in process industries, oil, gas & petrochemical industry, fertilizers, cement, steel etc.

For Instrumentation cables screening plays a vital role; the Al-Mylar screen of the Instrumentation cables, designed and manufactured by RPG Cables, captures the external noise pickups. Also, the ATC drain wire earths the noise pickups which would otherwise cause interference in the low level signals passed between the measuring end and display units. These cables are designed with a minimum overlap of 25% of the shield that ensures 100% coverage even when the cable is flexed.

The carefully produced stranded copper conductors used in the cable maintain high system accuracy and sensitivity. Maximum rejection of electro magnetic noise is achieved by twisting the insulated conductors. Twisting causes the noise to be cancelled in adjacent sections of the wire.

Instrumentation cables are generally designed & manufactured based on BS EN 50288 (formerly *BS 5308), EIL 6-52-46 and generally as per IS 1554-1, IS 7098-1, IEC 60502-1.*

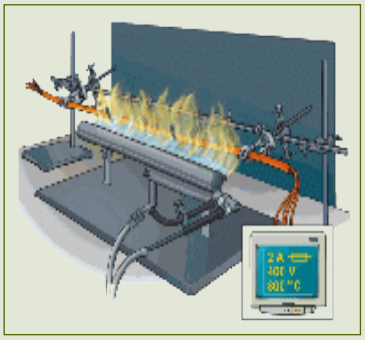
THERMOCOUPLE EXTENSION & COMPENSATING CABLES

The construction of Thermocouple extension & compensating cables is identical to Instrumentation cables. These cables are used to pass the EMF signal from the thermocouple end to the control panel. The thermo-electric properties of the conductors used for these cables are the same as that of the thermocouple used for sensing the temperature.

Thermocouple extension & compensating cables are generally designed & manufactured based on BS EN 50288 (formerly BS 5308), EIL 6-52-45, ANSI MC 96.1, IEC 60584, IS 8784 and generally as per IS 1554-1, IS 7098-1, IEC 60502-1.

SPECIAL APPLICATION CABLES - FIRE SURVIVAL CABLES

Fire Survival Cables are manufactured with Glass Backed Mica Tape applied over conductor and are used where the applications require circuit integrity during a fire mainly in Fire Alarm systems, sprinkler systems in schools, hospitals, shopping malls, cinemas etc. The circuit integrity is maintained for 3 hours at 750°C.



CONSTRUCTION

CONDUCTOR

Instrumentation cables are manufactured with Electrolytic Copper (Plain or Tinned) conductor in form of Solid (class 1), Stranded Circular (class 2) or Flexible (class 5) as per IS 8130, IEC 60228 & BS EN 60228. Thermocouple Extension cables are manufactured with Solid (16AWG, 18AWG, 20AWG) conductors depending on type of thermocouple i.e. K, E, T, J types as per ANSI MC 96.1, IEC 584 & IS 8784.

INSULATION

Based on rated conductor temperature & electrical characteristics insulation materials such as PVC (70°C), HR PVC (85°C), XLPE (90°C) or Polyethylene (70°C) are offered.

INDIVIDUAL SCREEN

Twisted Pair or Triad are individually shielded with Aluminium-Mylar tape alongwith ATC Drain wire in continuous contact with Aluminium side of the tape. Shielding of Copper tape can also be provided to meet specific requirements.

PAIR/TRIAD IDENTIFICATION

Pair or Triad identification can be done by numbered polyester tape applied over each pair / triad or by number printing on core of each pair / triad or by different colour coding.

OVERALL SCREEN

Multipair / Multitriad are laid up together and are shielded with Aluminium-Mylar tape alongwith ATC Drain wire in continuous contact with Aluminium side of the tape. Shielding of Copper tape can also be provided to meet specific requirements.

INNERSHEATH

Extruded PVC / LSZH innersheath is applied as a protection over the laid up pairs / triads.

ARMOUR

Galvanized steel wire or strip are applied spirally over innersheath as a mechanical protection for cable.

OUTERSHEATH

Extruded sheath is provided depending on the application requirements such as temperature, flame retardancy (FR), reduced smoke & acid gas emission (FRLS), Halogen free (LSZH / ZHFR).

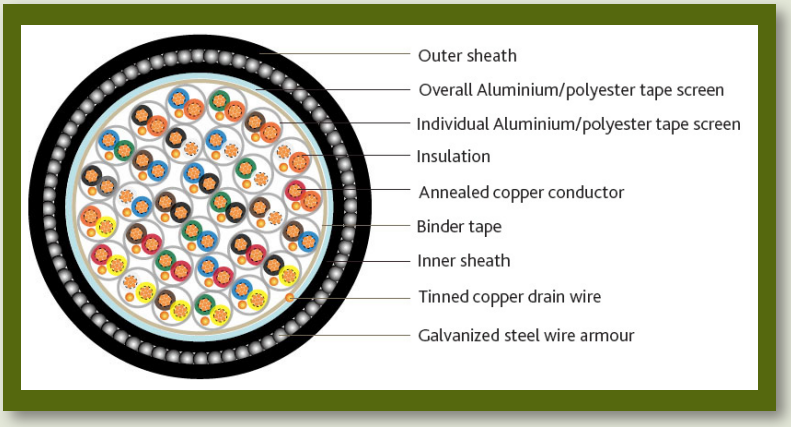
SPECIAL APPLICATION FIRE SURVIVAL CABLE

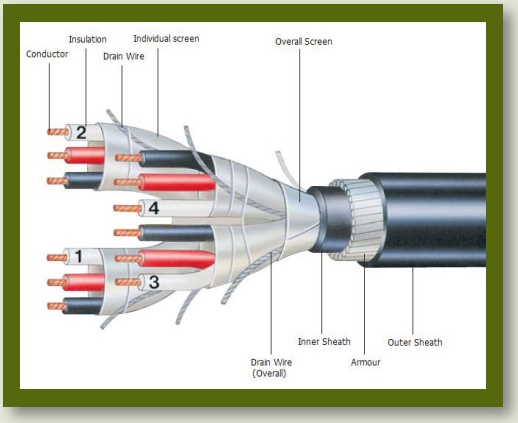
Heat Barrier Glass Backed Mica Tape applied over conductor to meet the test requirements of 750°C for 3 hours as per IEC 60331.

GENERAL PARAMETERS FOR INSTRUMENTATION CABLES

PARAMETER	UNIT	CONDUCTOR AREA				
		0.5 mm^2	0.75 mm^2	1.0 mm^2	1.5 mm^2	2.5 mm^2
Maximum D.C. Resistance of plain copper conductor at 20°C	Ω/km	39.7	26.5	18.5	12.3	7.56
Maximum D.C. Resistance of Tinned copper conductor at 20°C	Ω/km	40.5	27.0	18.9	12.5	7.7
Maximum D.C. Resistance of 0.5mm^2 ATC Drain wire at 20°C	Ω/km	30	30	30	30	30
Maximum mutual capacitance core to core (PVC insulated)	nF/km	250	250	250	250	250
Maximum mutual capacitance core to core (PE, XLPE insulated)	nF/km	115	115	115	115	115
L/R ratio maximum	µH/ohm	25	25	30	40	70
Electrostatic Noise Rejection Ratio as per IEEE Vol3 (minimum)	dB	76	76	76	76	76
Minimum Insulation Thickness	mm	0.5	0.5	0.5	0.5	0.5
Minimum Insulation Resistance at 27°C (PVC insulated) at 500V	MΩ/km	10	10	10	10	10
Minimum Insulation Resistance at 27°C (XLPE, PE insulated) at 500V	MΩ/km	100	100	100	100	100
High Voltage test	kV	1kV for 1 minute				

» Instrumentation cables can be specially designed to meet specific requirements of Capacitance, L/R ratio etc.





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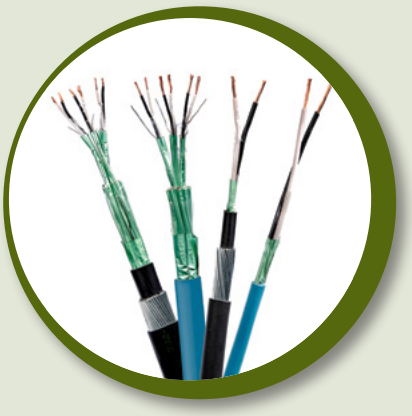
GENERAL DETAILS FOR THERMOCOUPLE EXTENSION & COMPENSATING CABLES

TYPE	CONDUCTOR COMBINATIONS		ANSI MC 96.1			IS 8784			IEC 60584-3		
			COLOUR CODE		EMF TOLERANCE ± °C	COLOUR CODE		EMF TOLERANCE ± °C	COLOUR CODE		EMF TOLERANCE ± °C
	+VE	-VE	+VE	-VE		+VE	-VE		+VE	-VE	
Kx	Nickel-Chromium (Chromel)	Nickel-Aluminium (Alumel)	Yellow	Red	2.2	Red	Green	2.2	Green	White	2.5
Ex	Nickel-Chromium (Chromel)	Copper-Nickel (Constantan)	Purple	Red	1.7	Red	Violet	1.7	Violet	White	2.5
Tx	Copper	Copper-Nickel (Constantan)	Blue	Red	1.0	Red	Black	1.0	Brown	White	1.0
Jx	Iron	Copper-Nickel (Constantan)	White	Red	2.2	Red	Blue	2.2	Black	White	2.5
Vx (KxA)	Copper	Copper-Nickel (Constantan)	-	-	-	-	-	-	Brown	White	2.5
Rxa / Sxa	Copper	Copper-Nickel (Constantan)	Black	Red	1.5	Red	White	1.5		White	2.5

MAXIMUM D.C LOOP RESISTANCE FOR THERMOCOUPLE CONDUCTORS AT 20^{0}C Ω/KM

CONDUCTOR SIZE	Kx	Ex	Tx	Jx	Vx (KxA)	Rx / Sx
16 AWG (1.29mm)	746	905	385	475	385	110
18 AWG (1.02mm)	1210	1470	623	770	623	175
20 AWG (0.81mm)	1910	2311	980	1212	980	280



QUALITY, ENVIRONMENTAL & SAFETY SYSTEMS

BUREAU VERITAS
Certification

BUREAU VERITAS 1828

KEC INTERNATIONAL LIMITED
RPG CABLES, MYSORE

RPG

349 / 350, HEBBAL INDUSTRIAL AREA, BELAVADI POST, HOOTAGALLI, MYSORE – 570 018, KARNATAKA, INDIA.

Bureau Veritas Certification certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standards

ISO 9001:2008, ISO 14001:2004 & BS OHSAS 18001:2007

Scope of certification

1) DESIGN, DEVELOPMENT AND MANUFACTURE OF POLYETHYLENE INSULATED JELLY FILLED CABLES (PIJF) AND OPTICAL FIBRE CABLES (OFC) FOR TELECOMMUNICATION AND INDUSTRIAL APPLICATIONS.
2) DESIGN, DEVELOPMENT AND MANUFACTURE OF POLY VINYL CHLORIDE (PVC) AND CROSS LINKED POLYETHYLENE (XLPE) INSULATED ALUMINIUM AND COPPER CABLES FOR CONTROL, LT POWER TRANSMISSION AND DISTRIBUTION APPLICATIONS.
3) DESIGN, DEVELOPMENT AND MANUFACTURE OF POLY VINYL CHLORIDE (PVC), CROSS LINKED POLYETHYLENE (XLPE) AND POLYETHYLENE (PE) INSULATED COPPER CABLES FOR INSTRUMENTATION, TRANSMISSION AND SIGNALLING APPLICATIONS.

Certification cycle start date: **14 December 2013**

Subject to the continued satisfactory operation of the organisation's Management System, this certificate expires on: **13 December 2016**

Original certification date: **14 December 2013**

Certificate No. **IND13.5890U/Q/E/HS** Version : 1 Revision date: **14 December 2013**

Certification Authority
R. K. SHARMA - Director

UKAS MANAGEMENT SYSTEMS 008

Certification body address: *Brandon House, 180 Borough High Street, London SE1 1LB, United Kingdom*

Local office: *"Marwah Centre" 6th Floor, Krishanlal Marwah Marg, Opp. Ansa Industrial Estate, Off Saki Vihar Road, Andheri (East), Mumbai – 400 072, India.*

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization.
To check this certificate validity please call **+91 22 6695 6300.**

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