GOVERNMENT OF INDIA
(Ministry of Home Affairs)
DIRECTORATE GENERAL
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066

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No. B.V-7/2019-20-C (CQC) Dated, the 03 June'2019

To

1. DIG (Comn), ITBP
   Block No. 2, CGO Complex
   Lodhi Road, New Delhi-03

2. DIG (Comn), NSG
   Meharam Nagar
   Palam, New Delhi-37

3. DIG (Comn), SSB
   East Block-V, R.K Puram
   New- Delhi-66

4. AIG (Comn), CISF
   Block No. 13, CGO, Complex
   Lodhi Road, New Delhi-03

5. DIG (Prov), BSF
   Block No. 10, CGO Complex
   Lodhi Road, New Delhi-03

6. Liaison Office, Assam Rifle
   Room No-171, North Block, MHA
   New Delhi -01

Subject: Regarding QRs/TDs of Carrier Quad Cable (CQC).

Please find enclosed QRs and TDs of Carrier Quad Cable (CQC) as Annexure-A & Annexure-B respectively duly approved by the competent authority is forwarded herewith for further necessary action.

Encl: (QRs & TDs of Carrier Quad Cable (CQC))

{P.R.Jha, DC (Comn)}
For DIG (Equipment)
Directorate General, CRPF

QRs FOR CARRIER QUAD CABLE (CQC)

S.N	Parameters	Specifications
1	**General**	i) This specification covers requirements of Carrier Quad Cable which has been designed for use in line communication 4 channel carrier system. ii) The cable must be mechanically strong, tough and flexible. It must have good ageing properties and be capable of giving satisfactory service throughout a wide range of temperature (- 40 degree C to + 60 degree C or better) and climatic conditions.
2	**PERFORMANCE**	
	i) Temp Range	-40 degree C to +60 degree C or better
	ii) Conductor Resistance	≤ 47.06 ohms/loop Km
	iii) Pair capacitance	≤ 50 pF/m
	iv) Impedance	144 ohms at 10 Khz and above, 125 ohm at 60 Khz and above, 120 ohms at 100Khz and above
	v) Attenuation	0.9 dB/Km at 1.6 Khz, 1.8 dB/Km at 16 Khz , 3.2 dB/Km at 100 Khz
3	**CHARACTERISTICS**	
	i) Conductor	a) The conductor shall consist of 7/0.367 mm diameter plain annealed copper wires, standard with a left hand lay of 13 mm to 16 mm (Diameter over the conductor being 1.10 mm). b) Conductor Joints: - Joints in the individual strand shall be hard soldered or welded. In the stranding stage, joints in the complete conductor shall be similarly made, provided each strand joint is spaced at least 300 mm apart. Joints in the complete conductor shall be at least 100 meters apart.
	ii) Insulation	a) The insulation shall be of polythene natural for one pair and compound polythene black for other pair.
		b) The conductor shall be uniformly insulated with polythene (Black /Natural) to a minimum wall thickness of 0.356 mm. A high degree of concentricity of conductors must be obtained to achieve the capacity unbalance requirements. The polythene compound shall be a heat stabilized, non-oxidizing and shall confirm to relevant specification as above.
		c) All insulation repairs shall be made with polythene as specified in clause-a and shall be preferably molded. The finished repair shall be cylindrical and smooth, minimum wall thickness shall comply with clause-b. The maximum overall length of repair shall be 100 mm.
		d) Insulation should have following properties: i) Density 0.94 to 0.95 gm/cc ii) MFI (190 degree/5kg) : (0.7±0.1)gm/10 min iii) Tensile Strength (TS): ≥ 22 N/Sq mm iv) Elongation: ≥ 500 % v) Dielectric constant : ≤ 2.35 vi) Retention of TS and Elongation after aging (100° C, 2 days) ≥80%

S.N	Parameters	Specifications
	iii) Cabling	Four cores shall be laid up in Star Quad formation around a centre of HDPE filler with a right hand lay of 50.08 mm ±3.18 mm. Two opposite cores (which form a pair) shall be coloured black and the other two natural.
	iv) Filler	a) HDPE of dia 0.8 mm b) Density 0.93 to 0.94 gm/cc c) MFI (190 degree/5kg) : (0.6 ± 0.1) gm/10 min d) Tensile Strength (TS) : ≥ 18 N/Sq mm e) Elongation: ≥ 400 % f) Retention of TS and Elongation after aging (100° C, 2 days) ≥80%
	v) Belt	Material for belting over laid up cores shall be of polythene. The laid up cores shall be covered and filled with polythene to an overall diameter of 5.92 mm ±0.127mm. The belt shall securely locate the cores in quad formation and shall as far as possible leave no air gap in the interstices. It must be possible to prepare the cores from the belt and each other without damage to the core insulation. It should have following properties: a) Density: 0.94 to 0.96 gm/cc b) MFI (190 degree/5kg) : (0.6 ± 0.1) gm/10 min c) Tensile Strength (TS): ≥25 N/Sq mm d) Elongation: ≥ 500 % e) Retention of TS and Elongation after aging (100 °C, 2 days) ≥80%
	vi) Tape	The carbon tape of 0.127mm ±0.013 mm thickness and 19.00 ±0.50 mm width shall be applied helically over the polythene belt with an overlap of 1.59 mm ±0.795 mm or 25.4 mm. The surface resistivity of the tape taken from the finished cable shall range between 1000 ohms/mm and 10,000 ohms/mm.
	vii) Metal Braid	An open braid of 16 stainless steel wires (each of 0.381 mm ±0.013 mm in diameter) shall be applied over the carbon tape with a lay of approximately 38 to 50 mm. The braid shall be electrically continuous throughout the cable length. Joints in individual wires shall be permitted, if necessary, provided that they are spaced at least 0.609 meters apart. All joints shall be brazed, hard soldered or other approved methods.
	viii) Sheath	A tough tight fitting low temperature grade Flame Retardant PVC sheath shall be extended over the stainless steel braid. The sheath shall in grey colour conforming to BS6746 a) Density: 1.40 to 1.55 gm/cc b) Tensile Strength (TS): ≥ 12 N/Sq mm c) Elongation: ≥ 150 % d) Thermal stability @ 200 °C : ≥ 80 minutes
4	**TENTIONING OF CABLE**	The cable should be able to bear a tensioning load of minimum 136 kgs.
5	**MANUFACTURER'S IDENTIFICATION**	A coloured cotton yarn or tape bearing the manufacturers name shall be laid between the carbon tape and the steel wire braid. The colour of the cotton yarn shall be in accordance with the approved identification colour's allotted to the manufacturers by BIS.
6	**DIMENSIONS AND TOLERANCE**	1) Conductor shall be made up of copper wires of 7/0.367 mm. Conductor diameter shall be 1.10 mm (Nom). 2) Diameter over polythene insulated cores shall be 1.93mm ±0.076mm. 3) Diameter over polythene belt shall be 5.92 mm. 4) Carbon tapes shall be of 0.127 mm ±0.013 mm thickness and 19.00 mm ±0.50 mm width applied helically. Alternatively 25.4 mm in width shall be applied longitudinally over the polythene belt. 5) Stainless steel wires used for braiding shall be of 0.381 mm ±0.013 mm diameter. 6)Overall diameter over the PVC sheath shall be 9.144 mm ±0.254 mm.

S.No	Parameters	Specifications
7	**WORKMANSHIP AND FINISH**	The cable should have proper finishing.
8	**PACKING AND MARKING**	i) The cable shall be packed in unit length of 400 meters ±6 meters on cable drum. ii) The top layer of the cable shall be protected from damage and transit by wrapping with layers of water proof paper of class approved quantity and covered with two layers of hessian cloth. iii) Each drum shall carry a label upon which the following information shall be written. (a) Cat/Part no. of the cable (b) Designation of the cable (c) Cat/Part No. of the reel/Drum (d) Designation of the reel/Drum (e) Length of the cable (f) Date of manufacture (g) Name of the manufacture (h) Contract number (i) Government property mark (Broad arrow)

AC-I R. K. Giri
NSG

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CISF

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BSF

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Assam Rifles

Hemant Chaturvedi, AC(T)
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Rajnish Kumar, PSO(E)
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Ajay Kumar Yadav, IPS
IGP(Comn &IT),CRPF

Md. Jawed Akhtar, IPS
ADG (Work & Comn),CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS
DG, CRPF

TRIAL DIRECTIVES (TD) FOR CARRIER QUAD CABLE (CQC)

All parameters/ specifications mentioned in QRs will be accepted by Board of Officers (B.O.O) by verifying following check in the presence of representative of the Firm.

2. i) **Physical Checks**:- In this category , specifications of the cable will be checked physically as per QRs.

ii) **Functional Checks**:- Firms will show all features /configuration of the cable to the board of officers during evaluation.

iii) **Submission of Certificate**:- Specification, which cannot be checked due to lack of testing facilities /expertise, certificate of any Government Authorized/National/International Accredited Laboratory has to be provided by the firm, during evaluation as mentioned against the parameters.

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1	**General**	i) This specification covers requirements of CARRIER QUAD CABLE which has been designed for use in the communication 4 channel carrier system. ii) The cable must be mechanically strong, tough and flexible. It must have good ageing properties and be capable of giving satisfactory service throughout a wide range of temperature (- 40 degree C to +60 degree C or better) and climatic conditions.	i) Board will check practically. ii) Board will check practically and firm will submit certificate of any Govt lab or NABL or ILAC accredited laboratory certificate or OEM certificate.
2	**PERFORMANCE**		
	i)Temp Range	-40 degree C to +60 degree C or better	Firm will submit certificate of any Govt lab or NABL or ILAC accredited laboratory certificate or OEM certificate.
	ii)Conductor Resistance	≤ 47.06 ohms/loop Km	
	iii)Pair capacitance	≤ 50 pF/m	
	iv)Impedance	144 ohms at 10 Khz and above, 125 ohm at 60 Khz and above, 120 ohms at 100 Khz and above	
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		d) Insulation should have following properties: i) Density 0.94 to 0.95 gm/cc ii) MFI (190 degree/5kg) : (0.7±0.1)gm/10 min iii) Tensile Strength (TS): ≥22 N/Sq mm iv) Elongation: ≥ 500 % v) Dielectric constant : ≤ 2.35 vi) Retention of (TS)and Elongation after aging (100° C, 2 days) ≥80%	Firm will submit certificate of any Govt lab or NABL or ILAC accredited laboratory certificate or OEM certificate.
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7	**WORKMAN SHIP AND FINISH**	The cable should have proper finish.	Board will check practically.

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