

### 10-3. HYBRID CAMERA CABLE AND CONNECTORS

The Hybrid camera cable (HCC) shall consist of one RG-59/U type analog video coaxial cable, one 6-No. 22 AWG conductor group, one 8-No. 26 AWG conductor group and a two twist pair 4-No. 26 AWG conductor group in a common outer jacket. The hybrid camera cable cross section is shown on the plans.

The Coaxial cable shall conform to:

Electrical	Coax
Capacitance (picofarads/ft nominal)	17.3
Impedance (ohms-nominal)	75
Velocity of propagation (nominal)	78 percent
Nominal Diameter (inch)	0.242
Insulation Rating	300 V

The cable attenuation at 20 °C shall measure at maximum as:

Frequency (MHz)	Nominal dB/ 100 ft
1	0.30
10	0.90
50	2.10

The coaxial cable physical measurements:

Component	Nominal O.D. (inches)
Copper center conductor	0.040
Foam polyethylene dielectric	0.180
Sealed APA tape with 0.06-inch overlap	0.216
Woven aluminum braid	0.241
PVC outer jacket	0.297

(APA = Aluminum polyolefin and aluminum with adhesive)

The 6-No. 22 AWG shall be stranded 7 x 30, tinned copper insulated with 0.009" nominal wall of S-R PVC and a nominal O.D. of 0.048". The 6 conductors shall be color coded as follows:

1. Black
2. Red
3. Green
4. White
5. Blue
6. Yellow

The 8-No. 26 AWG shall be stranded 7 x 34, tinned copper insulated with 0.009" nominal wall of S-R PVC and a nominal O.D. of 0.037". The 8 conductors shall be color coded as follows:

1. Brown

2. Blue
3. Orange
4. Yellow
5. Purple
6. Gray
7. White with Black Stripe
8. Red with Green Stripe

The 4-No. 26 AWG in 2 twisted pairs shall be stranded 7 x 34, tinned copper insulated with 0.009" nominal wall of S-R PVC and a nominal O.D. of 0.037". The 4 conductors shall be color coded as follows:

Pair 1

1. Black
2. White

Pair 2

3. Red
4. Green

The HCC shall also have a 36 AWG tinned copper braid with 90 percent coverage, an O/A binder of 0.001" polyester 25 percent overlap, and an outer jacket conforming to: color to match Fed-Std-595 color [No.-24091](#), material 0.032" dark gray UV resistant PVC to 0.425" O. D. and must pass the VW-1 vertical flame test. Fillers shall be used as required to form a uniform round cable. The insulation rating of the overall cable jacket shall be 300 V.

The manufacture identification shall be surface printed in white ink every foot along the length of the cable.

The HCC shall be continuous from the integrated camera unit to CCU in the controller cabinet without splicing, unless shown on the plan or approved by the Engineer. The maximum length of HCC is 750 feet.

The HCC shall be terminated with cable connectors on both ends. Connector AMP 206036-3 with a full set crimp contact pins and strain relief back shell, AMP 206070-1 shall be installed on the cable end toward CCU. Connector AMP 206037-1 with a full set crimp contact sockets and strain relief back shell, AMP 206070-1 shall be installed on the cable end toward the integrated camera unit. All connector contact shall be constructed with brass contact body material and with stainless steel spring that are sub-plated with 0.000050-inch nickel and plated with 0.000030-inch gold. Contact size shall be 16. AMP No. 305183 contact extraction tool shall be used to replace contact. AMP hand tool assembly 58495-1 with die assembly 58495-2 shall be used to place contacts on to each conductor. No other tool, unless approved by the Engineer shall be used for this work.

### **INSPECTION AND TESTING**

Testing of HCC and connectors shall be performed in accordance with provisions in Section 86-2.14B, "Field Testing" of the Standard Specifications and these special provisions. Any cable lengths found to have faults shall be replaced and retested. The Contractor shall dispose of the removed faulty cable. The cable termination shall be randomly inspected for contact crimping quality control. Any contact found not crimped with the correct crimping tool and is defect shall be rejected. The Contractor shall redo the termination until all defects are corrected.

Prior to the beginning of work, the coaxial cable length of HCC shall be tested for attenuation and faults to ensure compliance with specifications contained herein using a time domain reflectometer (TDR). For the purpose of these special provisions, one or more of the following defines a fault in a long length of cable:

- a. Return loss measurements indicating that attenuation exceeds 3 dB at 5 MHz to 30 MHz in a portion of cable less than 10 feet long.
- b. A return loss measurement indicating that there is a short in the cable.
- c. A return loss measurement indicating a cut or open circuit in the cable.
- d. A visual inspection that reveals exposure of or damage to the cable shielding.