

Subject: TWISTED PAIR ROUND CABLE FE[5x(4*2*AWG28)N]N/SN/ST/M

Customer: CERN **Order n.:** DT200330 (TK22367)

CERN P/N: 04.71.06.400.0 **TK P/N:** 508E0022

Performed test:

- a) Visual inspection - check dimensions
- b) Transmission performance test (impedance, capacitance, propagation delay skew time between pairs)
- c) Fire test according to IEC60332-1
- d) Insulation resistance

Reference document : TECHNICAL SPECIFICATION CERN SCEM 04.71.06.400.0

Test execution date : 03-02-05

Department: TECNIKABEL Quality Control Laboratory

Test result: a,b,c,d CONFORMING

The results are relevant only for the tested samples.

Measurement performed by: Mr. S.Carrè

Quality Control: Mr. S.Carrè

Report date: 03-02-05

Approved by : Ing. Demaria

Measurement data

a) Visual and dimension examination

Conductor

	<i>Required</i>	<i>Measured</i>	<i>u/m</i>
Material	Tinned Copper	Tinned Copper	
Construction	7 x 0,127	7 x 0,127	mm
Nr of conductors	40 (20 pairs)	40 (20 pairs)	
Nominal Section	0,09 (AWG28)	0,09 (AWG28)	mm ²

Insulation

	<i>Required</i>	<i>Measured</i>	<i>u/m</i>
Material	High Density Polyethylene	High Density Polyethylene	
Overall Diameter	0,70 Nominal	0.69-0.70	mm
	Conductors assembled in groups (5) each of them composed by 4 pairs. Each groups tied by means of a (1 ÷ 5) numbered tape :		
Colour of the pairs each groups	White – Blue	White – Blue	
	White – Orange	White – Orange	
	White – Green	White – Green	
	White – Brown	White – Brown	

The 5 groups are assembled with a central filler.
Total laid-up protective by Mica Tape (Fire Barrier)

Shield

	<i>Required</i>	<i>Measured</i>	<i>u/m</i>
	I•	II•	
Type of shield	Tape	Tape	
Material	Aluminum/Polyester	Aluminum/Polyester	
Coverage	100	100	%
	II•	II•	
Type of shield	Braid	Braid	
Material	Tinned Copper	Tinned Copper	
Coverage	≥ 75	79.9	%

Sheath

	<i>Required</i>	<i>Measured</i>	<i>u/m</i>
Material	LSZH flame retardant compound	LSZH flame retardant compound	
Colour	Blue Ral 5015	Blue Ral 5015	
Max Outer Diameter	10	9.5	mm
Average Thickness		0.95	
Marking :	TECNIKABEL (TO) – ITALY – CERN 04.71.06.400.0 – Zero halogen – IEC 60332-1 – 02/2005 – (Metric Marking) m		

b) Transmission performance test

Pairs	Mutual Capacitance [pF/m]	Impedance [ohm]		V %	Propagation Delay [nsec/100m]	Skew Time Delay between pairs into sigle group [nsec/25m]
		@1Mhz	@10Mhz			
1White – Blue	49,13	115,9	112	66,7	499,7	0,275
1White – Orange	49,62	116	109	66,8	499,2	
1White – Green	48,98	115,8	108,3	66,8	499	
1White – Brown	48,95	115,5	108,8	66,9	498,6	
2White – Blue	48,79	116,1	108,2	67	497,3	0,350
2White – Orange	49,11	116,3	109,2	67	497,6	
2White – Green	48,58	116,1	108,9	67,1	497	
2White – Brown	48,32	118,3	111,5	67,2	496,2	
3White – Blue	48,14	117,4	108,9	67,3	495,6	0,375
3White – Orange	48,01	118,2	106,4	67,4	494,2	
3White – Green	48,09	117,7	110,46	67,3	495,3	
3White – Brown	47,91	116,3	107,64	67,5	494,1	
4White – Blue	48,75	116,9	105,4	66,9	498,1	0,325
4White – Orange	49,01	114,9	103,2	67	497,2	
4White – Green	48,76	115,1	108,6	66,9	498,2	
4White – Brown	48,45	117,4	109,1	67,1	496,9	
5White – Blue	48,02	118,6	112,7	67,3	495	0,375
5White – Orange	47,92	117,4	110,8	67,5	494,2	
5White – Green	47,86	117,6	107	67,4	494,8	
5White – Brown	47,61	118,6	112	67,5	493,5	

via Brandizzo, 243 10088 VOLPIANO (TO) - ITALY tel. +39 - 011 - 995.19.97 fax +39 - 011 - 995.30.62

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c) Fire test according to IEC60332-1

Performance requirements

The wire or cable shall pass the test if the distance between the lower edge of the top support and the onset charring is greater than 50mm . In addition, a failure shall be recorded if burning extends downwards to a point greater than 540mm from the lower edge of the top support.



cable before the test



cable after the test

Test measurements: CONFORMING

Distance between the lower edge of the top support : >50mm -- <540mm	380mm -- 500mm
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c) Dielectric strength

	Required	Measured	u/m
conductor / conductor	1000	pass	kV d.c. x 1 min.
conductors / screen	1000	pass	

d) Insulation resistance at 20°C (500 V d.c.)

	Required	Measured	u/m
conductor / screen	>1	>100	Gohm*km

Test equipment

Micrometer 1/1000 Mitutoyo cod. MC 40

Profile Projector Mitutoyo PJ 300 cod. PP1

Megaohmmeter General Radio 1836 cod. MH3

CPMS cable measurement parameter system

Fire test according to IEC60332-1