Hitachi Cable

Hitachi Cable (S) Pte. Ltd.
No.17 LOKYANG WAY, JURONG TOWN SINGAPORE 628634

SPEC No.
SP-EH 20008
Rev. 3

SPECIFICATION

FOR

UL, CUL RECOGNIZED
HEAT RESISTANT LEAD FREE PVC INSULATED
FLAT RIBBON WIRES

(UL2651 P2.5 LF)

Pitch Type 2.5 mm

WRITTEN	CHECKED	APPROVED
KWAN H.K. 7 JAN 2003 H.C.S.	IMAI 7 JAN 2003 H.C.S.	IMAI 7 JAN 2003 H.C.S.

MADE IN SINGAPORE

1 Scope

This specification covers UL and CUL (CSA) recognized heat resistant, lead free PVC insulated flat ribbon wires (pitch type 2.5 mm)

UL AWM style No.	2651
CSA TYPE	AWM Class I, Group A
Rating	105°C, 300V

2 Applicable standard

2.1 UL subject 758 "Appliance Wiring Material"
USE Internal wiring of Electronic Equipment
2.2 CSA C22.2 No. 210.2 "Appliance Wiring Material"
2.3 Electrical Appliance and Material Safety Law

3 Construction and Material

3.1 Conductor

3.1.1	Material	Tin over coated tinned annealed stranded copper wire (TASC)
3.1.2	Size	see Table 1
3.1.3	Stranding	see Table 1
3.1.4	Diameter	see Table 1

3.2 Insulation

3.2.1	Material	Heat resistant, lead free PVC
3.2.2	Thickness	nom. 0.44 mm min. ave. 0.38 mm min. 0.33 mm
3.2.3	Dimension	see Table 1
3.2.4	Colour	Black with white marking or grey with black marking

4 Properties

4.1	Conductor resistance	see Table 1
4.2	Insulation resistance	Min. 15MΩ-km at 20°C, 500V-DC
4.3	Dielectric strength	A.C.2,000V/1min.
4.4	Flammability	VW-1 (UL), FT1 (CSA), -F-Mark

5 Packing

5.1	Unit length	see Table 1
5.2	Packing	Coil

6 Approved data

6.1	UL file No.	E41447
6.2	CSA file No.	E41447
6.3	F mark	F-HCS1-003 (for 2 to 7 cores) F-HCS1-012 (8 to 15 cores)

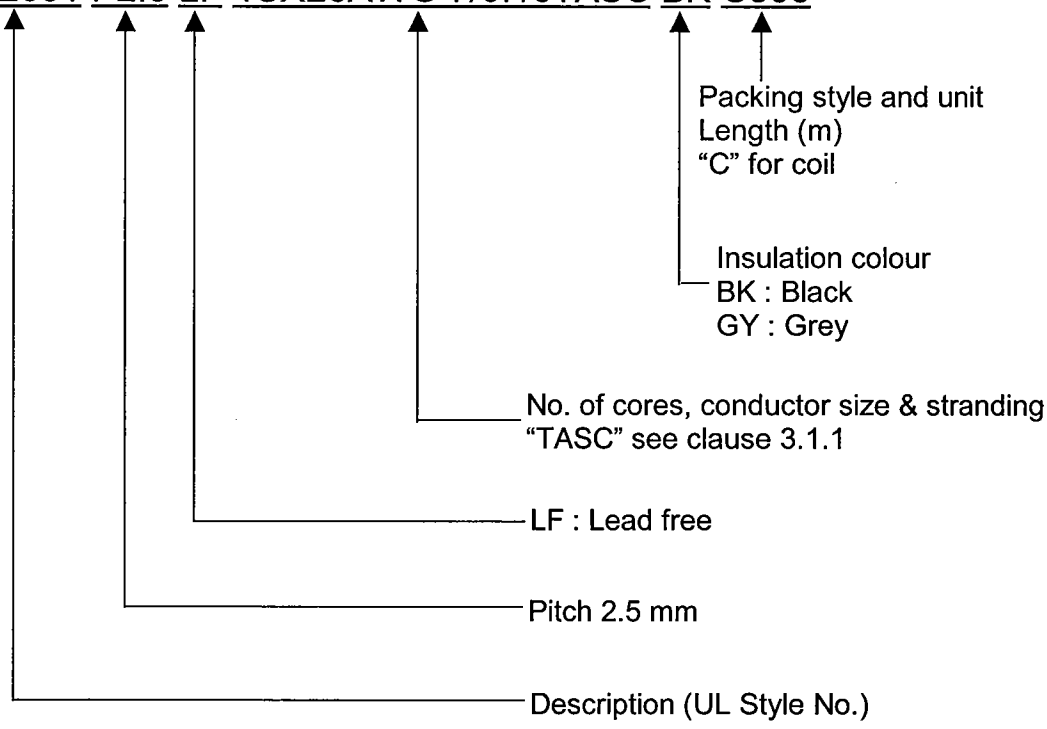
7 Environmental Harmful Substance Compliance

EHSL02019 – Certificate of Compliance for Environmental Harmful Substance*

*To be submitted upon request

8 Order form

Ex.) UL2651 P2.5 LF 4CX26AWG 7/0.16TASC BK C305



9 QC Inspection

No.	Test Items	Specification	Standard	Tests		
				Routine*	Type*	Approval*
1	No. of conductor strands	see table 1	-	YES	NO	YES
2	Conductor Diameter	see table 1	ASTM B286 UL Subject 758	YES	NO	YES
3	Conductor Resistance	see table 1	ASTM B286	YES	NO	YES
4	Insulation Thickness	see table 1	UL Subject 758 CSA C22.2 No. 210.2	YES	NO	YES
5	Overall Diameter	see table 1	-	YES	NO	YES
6	Pitch	Refer to 2.4 - 2.6 mm	-	YES	NO	YES
7	Bridge Thickness	0.40 - 0.60 mm	-	YES	NO	YES
8	Insulation Tensile Strength (unaged)	min. 10.3 MPa	UL Subject 758 CSA C22.2 No. 210.2	YES	YES	YES
9	Insulation Tensile Strength (aged)	min. 70% (aged at 136°C, 7 days)	UL Subject 758	NO	YES	YES
		min. 65% (aged at 136°C, 7 days)	CSA C22.2 No. 210.2	NO	YES	YES
10	Insulation Elongation (unaged)	min. 100 %	UL Subject 758 CSA C22.2 No. 210.2	YES	YES	YES
11	Insulation Elongation (aged)	min. 65% (aged at 136°C, 7 days)	UL Subject 758 CSA C22.2 No. 210.2	NO	YES	YES
12	Heat Shock	No crack (136°C, 1 hour, Mandrel : 1/8 inch) Continue with 16	CSA C22.2 No. 210.2	NO	YES	YES
13	Cold Bend	No crack (-20°C, 1 hour, Mandrel : 1/8 inch)	UL Subject 758	NO	YES	YES
		No crack (-15°C, 4 hrs, Mandrel : 12.7mm) Continue with 16	CSA C22.2 No. 210.2	NO	YES	YES
14	Insulation Resistance	min 15MΩ-km (20°C, 500Vdc)	UL 1581	NO	YES	YES
15	Deformation	max 50% (121°C, 250gf, 1 hour)	UL Subject 758	NO	YES	YES
		max 50% (121°C, 150gf, 1hour)	CSA C22.2 No. 210.2	NO	YES	YES
16	Dielectric Strength	No breakdown (1 hr in water, 1KV for 1 minute) To be tested after 12, 13.	CSA C22.2 No. 210.2	NO	YES	YES
		No breakdown (1KV for 1 minute, length=1.5m)	CSA C22.2 No. 210.2	NO	YES	YES
		No beakdown (2KV for 1 minute)	UL 1581	NO	YES	YES
17	Durability of print	Not erased (105°C, 7 days)	CSA C22.2 No. 210.2	NO	YES	YES
18	Correctness of Printing	Refer to Figure 1	-	YES	YES	YES
19	Flame Test	VW-1	UL Subect 758	NO	YES	YES
		FT1	CSA C22.2 No 210.2	NO	YES	YES
20	Flexing Test (aged)	No crack (136°C, 7 days, "U" bend aroung mandrel : 1/8 inch)	UL Subject 758	NO	YES	YES
21	Flexing Test (unaged)	No crack ("U" bend around mandrel : 1/8 inch)	UL Subject 758	NO	YES	YES

*Note Routine test : QC inspection conducted in every production
Periodic test : QC inspection performed once every 3 months
Approval test : For product approval purposes.

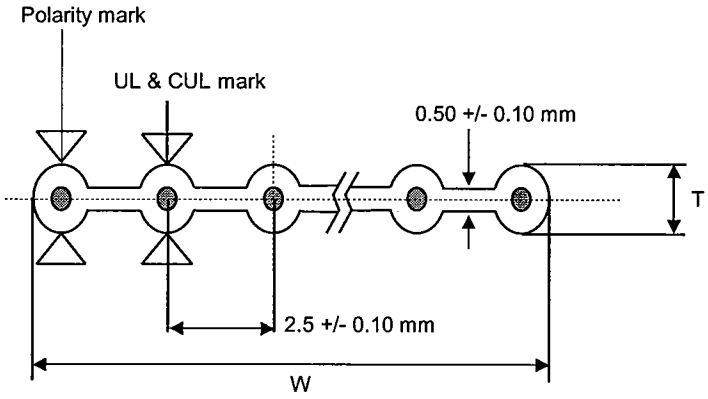
10 Revision Record

10.1 Rev. 0
- Issue date 16/10/000

10.2 Rev. 1
- Clause 7 ~ Typographical error

10.3 Rev. 2
- Amend section 2.3 to "Electrical Appliance and Material Safety Law"
- Amend section 4.4 to "-F-Mark"
- Amend sector 6.3 heading to "F mark"
- Additional of section no. 7 Environmental Harmful Substance Compliance

10.3 Rev. 3
- Revise section 9 : No. 7 - Bridge thickness from 0.40 – 0.50 mm to 0.40 – 0.60 mm



<UL,CUL Marking>
" AWM E41447-HCS 2651 LF **AWG 105C 300V VW-1 C AWM I A 105C 300V FT1 **AWG HITACHI -F- " (Note ** : size of conductor)

Fig. 1 Cross-section of wire

Table 1 : Dimension and Packing Style

Conductor				Insulation		Approx.	Conductor	Unit Length
No. of Conductors	Size	Stranding	Diameter	Thickness	Dimension (T x W)	Weight	resistance (at 20°C)	
	AWG	No/Nom. mm	Nom. mm	Nom. mm	mm	kg/km	Max. Ω/km	m
2	26	7/0.16	0.48	0.44	1.36±0.08 X 3.86±0.20	7	139	305
3					1.36±0.08 X 6.36±0.20	11		305
4					1.36±0.08 X 8.86±0.20	15		305
5					1.36±0.08 X 11.36±0.20	18		305
6					1.36±0.08 X 13.86±0.25	22		153
7					1.36±0.08 X 16.36±0.25	26		153
8					1.36±0.08 X 18.86±0.25	30		153*
9					1.36±0.08 X 21.36±0.25	34		153*
10					1.36±0.08 X 23.86±0.25	37		153*
11					1.36±0.08 X 26.36±0.30	41		153*
12					1.36±0.08 X 28.86±0.30	45		153*
13					1.36±0.08 X 31.36±0.30	49		153*
14					1.36±0.08 X 33.86±0.30	53		153*
15					1.36±0.08 X 36.36±0.30	56		153*
2	24	7/0.203	0.60	0.44	1.48±0.08 X 3.98±0.20	9	87.6	305
3					1.48±0.08 X 6.48±0.20	13		305
4					1.48±0.08 X 8.98±0.20	18		305
5					1.48±0.08 X 11.48±0.20	23		305
6					1.48±0.08 X 13.98±0.25	27		153
7					1.48±0.08 X 16.48±0.25	32		153
8					1.48±0.08 X 18.98±0.25	37		153*
9					1.48±0.08 X 21.48±0.25	41		153*
10					1.48±0.08 X 23.98±0.25	46		153*
11					1.48±0.08 X 26.48±0.30	51		153*
12					1.48±0.08 X 28.98±0.30	55		153*
13					1.48±0.08 X 31.48±0.30	60		153*
14					1.48±0.08 X 33.98±0.30	65		153*
15					1.48±0.08 X 36.48±0.30	69		153*

* Single Layer Coil