



SPECIFICATION

CUSTOMER : ZHIHE

PRODUCT NAME : IF-2LD

PRODUCT SPEC : IF-2LD2535CJ1

Customer: ZHIHE	Supplier: ITEQ(GUANGZHOU)CORPORATION
Customer:	Auditor : Jim Huang
Date:	Writer : QUNGTINGZHU
	Date:2021. 05. 28

Addition: If your company has no objections to this specification, please sign back this specification in five days after receiving it. If it exceeds the predetermined time and has not sign back yet, it will be regard as you have agreed with us on this specification. In the following trade the two sides should abide the request in the specification strictly. If your company have any changes in quality request in the future, please inform us in time to avoid any unnecessary problems.



Revise Record

Version	Revised Date	Contents	Reasons
1	2021/05/28	New	---
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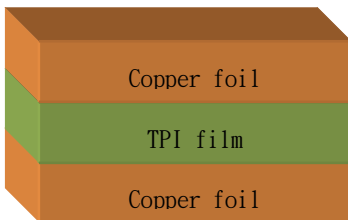
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1 Scope

This specification shall be applied to FCCL (IF-2LD) which is roll material and supplied by ITEQ(GUANGZHOU)CORPORATION to ZHIHE Group.

2 Composition of Product

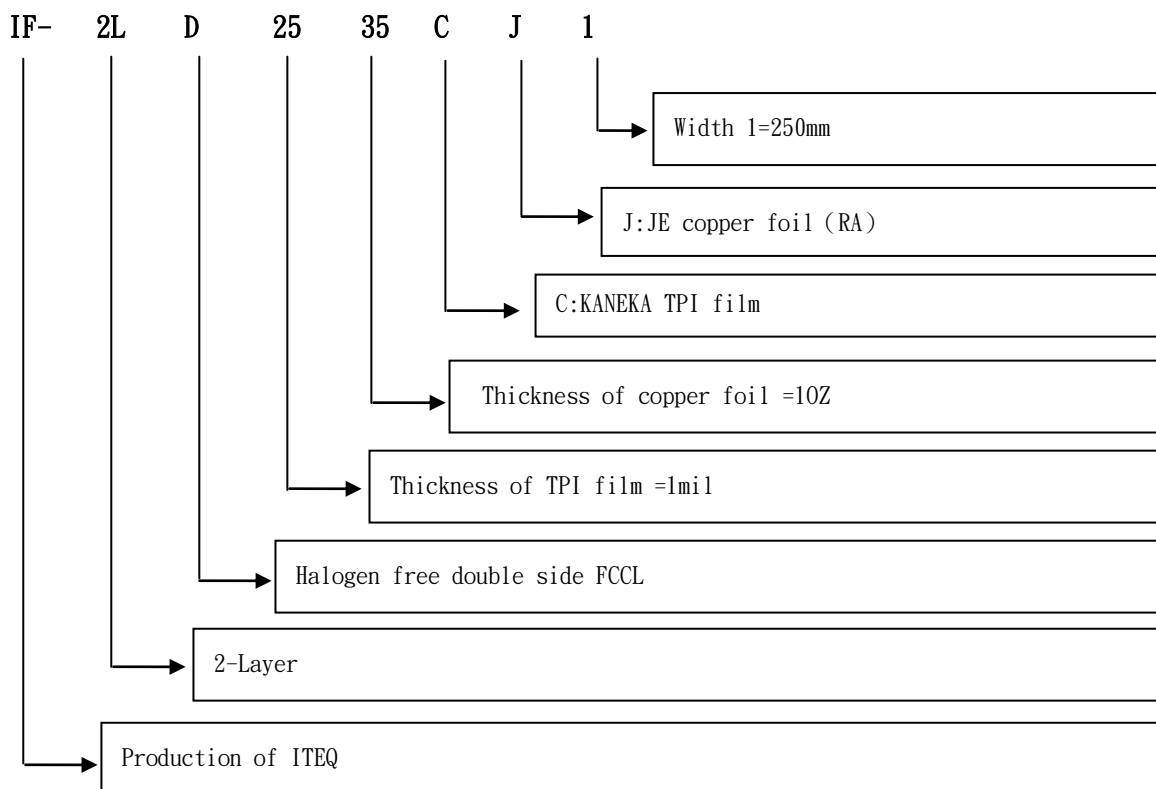
2.1 Construction



2.2 Composition

Material	Type	CAS. Number
TPI	C:KANEKA TPI film	62929-02-6
Copper foil	J:JE copper foil (RA)	7440-50-8

2.3 Definition of Product Spec



3 Specification

3.1 Appearance

No	Defect		Roll Material
1	Copper foil side	dents	There shall be no dents with the longest dimension greater than 0.50mm and the total point count shall be no more than five per clad side per 0.1 m ²
2		scratches	Scratches are not permitted where the depth is >20% of the nominal foil thickness
3		wrinkle	Have no influence when use
4		holes	No
5		creases	Have no influence when use
6		copper foil oxidation	shall be easily removed using diluted hydrochloric acid of 1 mol/dm, or other appropriate solvent.
7		copper foil colour non-uniformity	can not be found by eye with no any equipment
8		foreign substance on surface	shall be easily removed using diluted hydrochloric acid of 1 mol/dm, or other appropriate solvent.
9	Adhesive side(copper foil removed)	voids	The size of the voids shall not be >0.075mm in any direction
10		colour non-uniformity	can not be found by eye with no any equipment
11		striped pattern	can not be found by eye with no any equipment
12	In PI and Adhesive	inclusions	Non-conducting, the size of the inclusions shall not be >0.5mm in any direction, In the area of 25cm*25 cm, the number of 0.05-0.5mm inclusions shall be ≤6
13	Product	material joint	No
14		crack/tears	No
15		No adhesive	No
16		delamination	No

Remark :

1 Foreign substances on surface:Dust, copper particles, PI particles, adhesive, dirt, finger prints etc. on the material surface can be easily wiped off with a cloth.

2 Inclusions: Foreign particles, metallic or nonmetallic, that are entrapped (cannot be wiped off with a cloth) in the material and were not intended as part of the material formulation. The substance that can be intended as a part of the material formulation is not intended as an inclusion.

Longest Dimension of Dent · I	Dent Point Value
$0.10 \text{ mm} \leq I < 0.25 \text{ mm}$	1
$0.25 \text{ mm} \leq I < 0.50 \text{ mm}$	2
$0.50 \text{ mm} \leq I < 0.75 \text{ mm}$	4

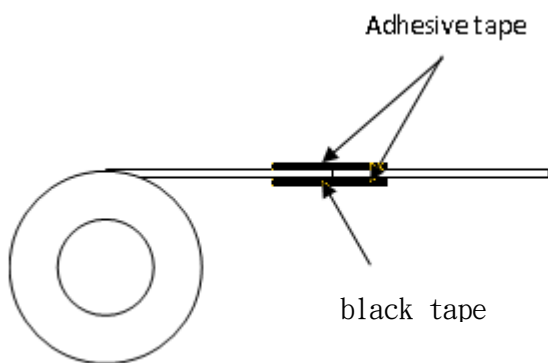
3.2 joints

3.2.1 Permissible number of joints

Length per roll(m)	Permissible number of joints
50	≤ 3

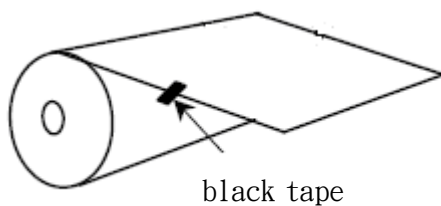
3.2.2 Splicing method

Two part FCCL shall be taped with PI adhesive tape on both PI and copper side, and more about 10mm PI adhesive tape shall be as joint mark. (As below Figure)



3.2.3 Defect marking

The defective area shall be indicated by a black tape at the edge of the FCCL. (As below Figure)



3.2.4 Extra length

0.5m of extra length shall be added for each defected part or splicing part.

3.3 Dimension

Item	Thickness (μm)	Width(mm)	Length(m)
IF-2LD2535CJ1	95 \pm 10%	250 \pm 0.5	50 -0 +1.0

3.4 properties

Item	unit	Test conditions	Quality standards	Test method	
Peel strength	kgf/cm(90°)	Normal State	≥1.4	4.1	
Dimension Stability	%	Method B	TD	0±0.08	4.2
			MD	0±0.08	
Soldering Resistance	---	300°C/10sec	No blister, delamination	4.3	
Chemical Resistance (fall rate)	%	NaOH	Peel strength fall rate≤20	4.4	
	%	HCL			
	%	IPA			
Volume resistance	Ω · cm	C-96/23/65	≥10 ¹³	4.5	
Surface resistance	Ω	C-96/23/65	≥10 ¹²		
Dielectric constant (2GHz)	---	C-24/23/50	≤4.0	4.6	
Loss tangent (2GHz)	---	C-24/23/50	≤0.04		
Absorbing water rate	%	D-24/23	≤1.2	4.7	
Acid resistance	---	Normal State	Line edge no erosion phenomenon	4.8	

4 Test Method

4.1 Peel strength

Prepare the test specimen by etching; Conductors are 3.175mm wide * ≥150mm long.

Attach the specimen to the free wheeling rotary drum test fixture.

Peel the conductor ,with a peel angle of 90° ,

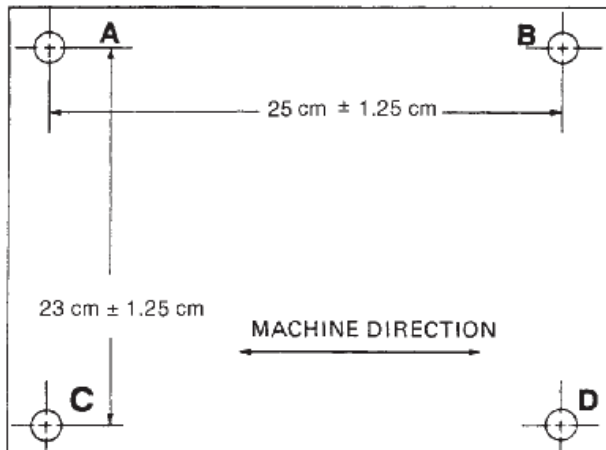
test speed of 50mm/min and at least distance 70mm.

Peel strength (Kgf/cm) = reading (Kgf) / conductor width(cm)

4.2 Dimension Stability

Specimen: 28 cm × 25 cm,

Specimen shall be stamped as shown in below Figure .



Measure the distance between hole centers A-B and C-D, also A-C and B-D. (I)

Method B: Then etch the specimen, wash the specimen with water completely, dry .

Then remeasure the distance between hole centers A-B and C-D, also A-C and B-D. (F1)

Calculate the dimensional changes as formula 1.

$$M.D. = \frac{\frac{(A-B)_{F1} - (A-B)_I}{(A-B)_I} + \frac{(C-D)_{F1} - (C-D)_I}{(C-D)_I}}{2} \times 100$$

$$T.D. = \frac{\frac{(A-C)_{F1} - (A-C)_I}{(A-C)_I} + \frac{(B-D)_{F1} - (B-D)_I}{(B-D)_I}}{2} \times 100$$

Formulal

Where:

M.D.=% change in machine dimension

T.D.=% change in transverse dimension

I=Initial Reading

F1=Final Reading

4.3 Soldering Resistance :

Firstly, the sample should be baked in the oven with 1 hour at 120°C.

The sample cutting into 5 x5cm size,

Float the specimen on molten solder at 300±5°C for 10sec with film surface upward .

And then check the surface of the specimen.

4.4 Chemical Resistance(fall rate)

Test three specimens in accordance with section 4.1

Immerse other three specimens for 10±0.5min in each chemical, then rinse these specimens in water for 1 min, dry. Test these specimens in accordance with section 4.1

Peel strength calculation rate:

Drop rate=(normal peel strength-immersed peel strength)/normal peel strength x 100%

4.5 Volume resistance and Surface resistance

Specimen: 10cm × 10 cm, Prepare the specimen by etching the cooper foil completely , then clean by water, then dry in oven at 105°C for 10 minutes, then stabilize the specimen at 23°C and 65%RH for 96hours.

Then test the specimen by High Resistance Meter , at the condition: 1KV DC, depressing time 60 seconds.

4.6 Dielectric constant and Loss tangent

Specimen:7cm ×14cm,

Prepare the specimen by etching the cooper foil completely, then stabilize the specimen at 23°C and 50%RH for 24hours. Then test the specimen by High frequency Impedance Analyzer at 2GHz.

4.7 Absorbing water rate

A sample of copper foil completely etching away.

After washing dry, cutting 5 x5cm samples, in 105 °C oven drying within 1 h.

Take out specimens in dryer, cooling 10 min.

Try piece of weighing W1, need to be accurate to 0.1 mg.

Will weigh the sample, 23°C in all the distilled water or pure water for 24 +/-0.5 h.

With blotting paper wiping clean, immediately weighing W2, accurate to 0.1 mg.

Calculation bibulous rate = $(W2-W1) / W1 \times 100\%$

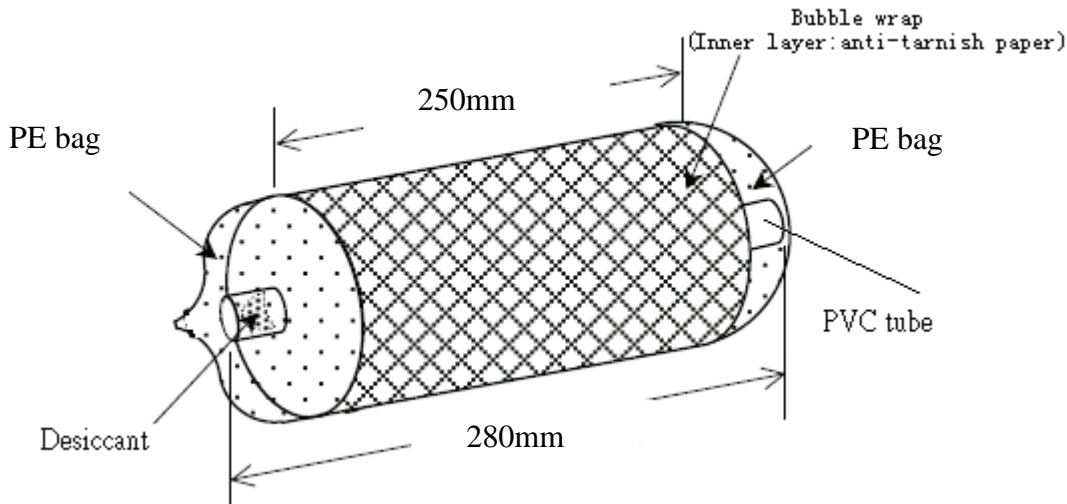
4.8 Acid resistance

Sample of the exposure, development, etching into wide, 0.3175 line spacing of 0.1cm, The diagram below:



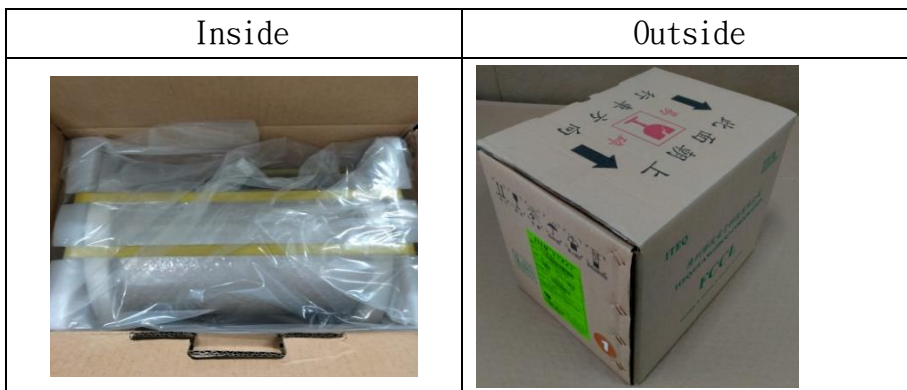
Samples after etching, wash with water, dry the water to soak the samples in 2.4mol/L HCL solution immerse 10min, dry. Presence of erosion as observation line edge

5 Packing and Label



5.1 Packing

PVC tube Spec: Inner diameter:6", Thickness :3.5mm, Length: 280mm



5.2 Label on Box

The label shall contain the following information.

Item	Example
(1) Manufacturer's name	ITEQ(GUANGZHOU)CORPORATION
(2) Product Spec	SPEC: IF-2LD2535CJ1
(3) Roll No	Roll No: G18102DA06A1
(4) Length	Length : 50m
(5) Width	Width : 250mm
(6) Splice	Splice: 0
(7) Stamp of approval	QC PASS
(8) MFG Date	MFG Date : 2018/01/02
(9) Expire Date	Expire Date : 2019/01/02
(10) RoHS2.0/HSF/HF Logo	RoHS2.0/HSF/HF

Outer packing container labeled examples are as follows:



5.3 Label on Inside of PVC Tube

The label shall contain the following information.

Item	Example
(1) Product Spec	SPEC: IF-2LD2535CJ1
(2) Width	Width : 250mm
(3) Length	Length : 50m
(4) Splice	Splice: 0
(5) Roll No	Roll No: G18102DA06A1
(6) RoHS2.0/HSF/HF Logo	RoHS2.0 HSF HF

Label Example:



5.4 Label on Outside of PVC Tube

The label shall indicate Roll No.

Label Example:



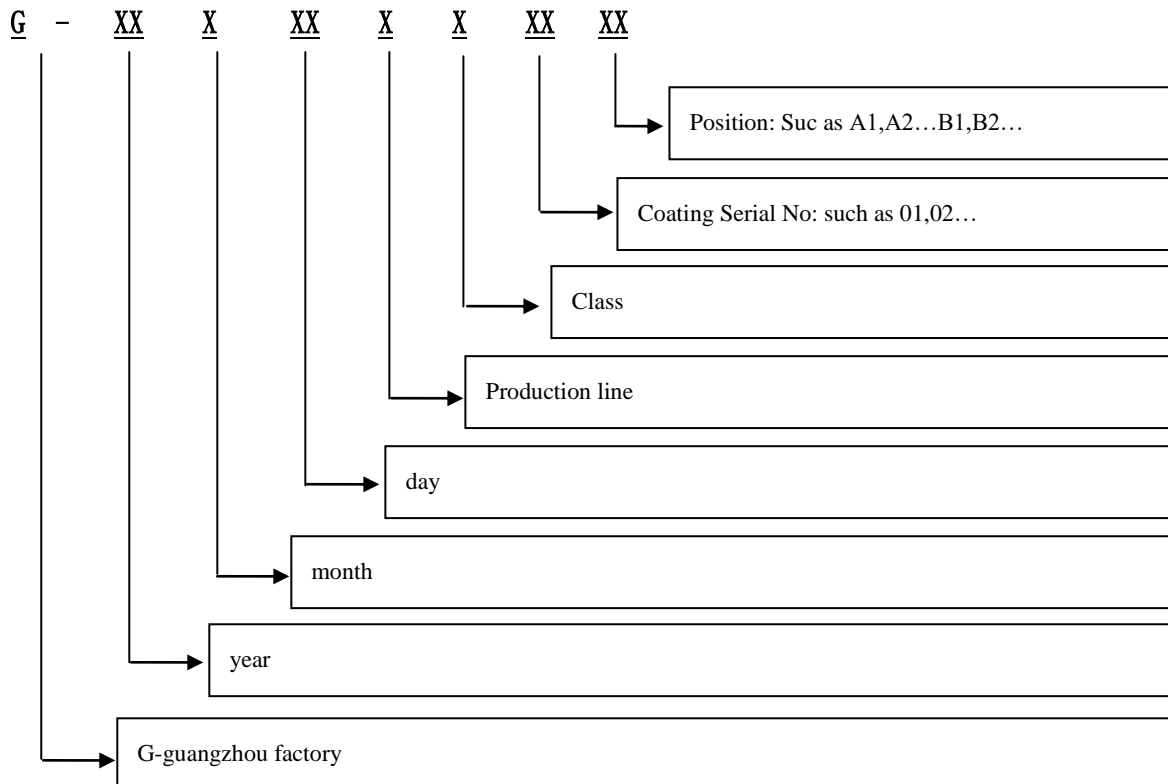
6 Guarantee Period and Storage Condition

The guarantee period of FCCL is 12 months from the MFG Date under the following condition.

Vacuum Packaging: max 30°C ;

Normal Packaging : max30°C 70%RH

7 Defination of Lot No



8 Test Report

Attachment: Test Report Form

品質檢驗報告

客戶 Customer					交貨日期 Delivery Date			
產品品名 Product Name					產品規格 Product Spec			
基膜標稱厚度 Unit:mil Base Film Nominal Thickness			粘劑標稱厚度 Unit: μ m Adhesive Nominal			銅箔標稱厚度 Unit:OZ Copper Foil Nominal		
檢驗項目 Test Item	剝離強度 Peel Strength		尺寸安定性 Dimension Stability		厚度 thickness	幅寬 width	焊錫耐熱性 solder float resistance 300°C/10sec	判定 Judgment
	A 面	B 面	Method B					
品質標準 Quality Spec			MD	TD				
檢驗方法 Test Method	IPC-TM-650 2.4.9 Unit:kgf/cm		IPC-TM-650 2.2.4		聯茂規範 Unit: μ m	聯茂規範 Unit:mm	IPC-TM-650 2.4.13	
批號 Lot No.								

審核(Approved by):

製作(Editor):

注：(1)保存條件：<30°C, <70%RH 保存一年 (Deadline of reserve is 1 year in less than 30°C,70%RH condition).

(2)以上測試項目僅供參考(Above test for reference only).

(3)本產品符合 RoHS 要求。This product is in compliance with RoHS.

(4)本產品為無鹵產品。This product is a halogen free product.

W-GQA-F022-05A