AKAFLEX® PCL FW:
Copper laminates on a polyester-film backing for flexible printed circuits

The AKAFLEX® PCL FW programme

AKAFLEX® PCL FW is available from KREMPEL as

✓ **two-layer laminates** and
✓ **three-layer laminates**.

A low-shrinkage polyester film (PET) is used as the backing material for the copper. This is laminated on one or both sides with electrolytic (ED) copper foil. AKAFLEX® PCL FW is characterised by the **high resistance to hydrolysis** as required by automotive applications in particular. Modifying the multi-component bonding system imparts **high flexibility and good bending properties** to the laminate. Also available are laminates with PET film for higher dimensional stability (FW3 types) or with special copper foils.

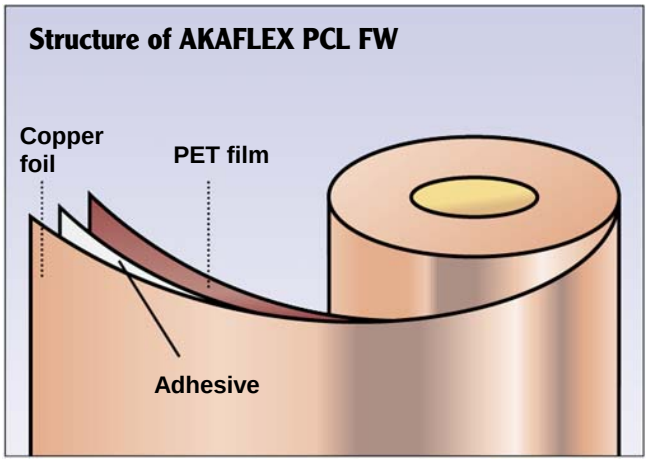
AKAFLEX® PCL FW is manufactured from polyester film and copper foil of differing thickness grades. The various types are identified in the product designation by letters and combinations of numbers.

Designation for a two-layer laminate

AKAFLEX® PCL 2 -xx / xx FW 3

- PCL 2: Two-layer laminate with PET film
- xx (first): Thickness of copper foil, in µm
- xx (second): Thickness of the PET film, in µm
- FW: FW bonding system resistant to hydrolysis
- 3: High dimensional stability (class 3)

z.B.: AKAFLEX PCL 2 - 35 / 75 FW 3



Standard types of AKAFLEX® PCL FW

Standard-type designation	Thickness of copper foil	Thickness of PET film
Standard PET film		
PCL 2-35/75 FW 1 **PCL 2-70/50 FW 1** Regular dimensional stability (MD/TD ≤ 1,2 %)	**35 µm** **70 µm**	**75 µm** **50 µm**
PET film of high dimensional stability		
PCL 2-35/50 FW 2* **PCL 2-35/75 FW 2** Higher dimensional stability (MD/TD ≤ 0,7 %)	**35 µm** **35 µm**	**50 µm,** **75 µm**
PET film of high dimensional stability		
PCL 2-35/100 FW 3* High dimensional stability (MD/TD ≤ 0,4 %)	**35 µm**	**100 µm**

Datasheets being developed

Other types on request

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Processing AKAFLEX® PCL FW

AKAFLEX PCL FW can be processed **»reel to reel«** by screen-printing or photolithography and the standard etching and cleaning techniques. The technical advantages in manufacturing are assured in this way.

A comprehensive range of **coverlays** for mechanical protection of the etched circuits is available from KREMPEL.

The special type, **AKAFLEX PCL FW psa**, has a self-adhesive coating on the polyester-film side for permanent fixation of the formats on suitable surfaces.

Quality assurance

All AKAFLEX products are subject to the procedures of on-going quality control as defined in the Quality Assurance Handbook of August Krempel Soehne. This quality assurance system is certified as meeting the requirements of ISO 9001 and ISO/TS 16949. For AKAFLEX PCL FW, testing is performed on the master reels according to the methods given in IPC-TM 650. The test results are evaluated in accordance with IPC-4204.

Availability of AKAFLEX® PCL FW

- ✓ **Standard reel width:**
  1350 mm, 1100 mm or 1000 mm;
  Special type AKAFLEX PCL FW psa:
  610 mm;
  other widths on request
- ✓ **Standard reel length:**
  100 m;
  other lengths on request
- ✓ **Format:**
  As requested by the customer
- ✓ **Packaging:**
  Reels packed suspended in robust corrugated-cardboard cartons
- ✓ **Standard cores:**
  Inside diameter 76 mm
- ✓ **Certificate:**
  Test certificate according to EN 10 204 - 2.2.


Test report - EN 10 204 - 2.2

KREMPEL

Purchaser
Specification
Terms of delivery
Commercial product name
Name and address of manufacturer
Order No.
Quantity supplied
Roll No.
Remarks
Remarks

August Krempel Soehne, D-76456 Kuppenheim
Krempel order No.
Date supplied
Batch No.

Property	Unit	Test procedure	Required value	Test result*

* test results from current factory run

We certify hereby, that the material complies with the terms of the order contract.

Date

Qualitätssicherungsabteilung
AUGUST KREMPEL SOEHNE

Signature

elektroisolierstoffe · verbundwerkstoffe · basislaminate · electrical insulations · composites · base laminates

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Technical data for AKAFLEX® PCL 2-35/75 FW2 and FW1

35 µm copper foil / 75 µm polyester film

Laminate properties	Dimension	Test method IPC-TM 650	IPC-4204 May 2002	Typical values	
				FW 2	FW 1
Peel strength					
- as delivered	N/mm	2.4.9 B	> 0.88	> 0.88	> 0.88
- after solder dip	N/mm	2.4.9 D	N/A	N/A	N/A
- after temperature cycling	N/mm	2.4.9 F	> 0.7	> 0.7	> 0.89
Tensile strength	N/mm²	2.4.19	> 138	> 140	> 140
Failure strenght	%	2.4.19	> 70	> 90	> 90
Initial tear strength	N	2.4.16	> 8	> 8	> 8
Flexural strength	Cycles	2.4.3 Equipment: 2.4.3.1 Test mandrel: 2 mm	N/A	> 150	> 150
Dimensional stability (after etching and 30 min. at 150 °C)	%	2.2.4 Method C	**FW 1 ≤ 1,2*** **FW 2 ≤ 0,7***	- 0.4	0.9 -
Solder-bath stability	sec	2.4.13	N/A	N/A	N/A
Dissipation factor (1MHz)	--	ASTM D-150	< 0.02	0.02	0.02

N/A = Not Applicable (nicht anwendbar)
*** = classification class 1 to 3 acc. to Krempel specification**

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Technical data for AKAFLEX® PCL 2-70/50 FW2 and FW1

70 µm copper foil / 50 µm polyester film

Laminate properties	Dimension	Test method IPC-TM 650	IPC-4204 May 2002	Typical values	
				FW 2	FW 1
Peel strength					
- as delivered	N/mm	2.4.9 B	> 0.88	> 1.0	> 1.0
- after solder dip	N/mm	2.4.9 D	N/A	N/A	N/A
- after temperature cycling	N/mm	2.4.9 F	> 0.7	> 0.7	> 0.89
Tensile strength	N/mm²	2.4.19	> 138	> 140	> 140
Failure strenght	%	2.4.19	> 70	> 90	> 90
Initial tear strength	N	2.4.16	> 8	> 8	> 8
Flexural strength	Cycles	2.4.3 Equipment: 2.4.3.1 Test mandrel: 2 mm	N/A	> 150	> 150
Dimensional stability (after etching and 30 min. at 150 °C)	%	2.2.4 Method C	**FW 1 ≤ 1,2*** **FW 2 ≤ 0,7***	- < 0.7	0.9 -
Solder-bath stability	sec	2.4.13	N/A	N/A	N/A
Dissipation factor (1MHz)	--	ASTM D-150	< 0.02	0.02	0.02

N/A = Not Applicable (nicht anwendbar)
*** = classification class 1 to 3 acc. to Krempel specification**

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