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AKAFLEX® PENDF HT:

Coverlay films on a PEN- film basis for flexible printed circuits

Availability of AKAFLEX® PENDF HT

AKAFLEX PENDF HT is available from KREMPEL as

✓ **Coverlay films coated with adhesive on one side**

for covering etched circuits. The polyethylene-naphthalate film (PEN) is coated with a modified highly flexible epoxy resin and then covered by a protective paper. Because of the high-grade starting materials used, this coverlay film is characterised by **higher fatigue strength at elevated temperatures**. A modified epoxy system characterised by **very good temperature stability** has been developed for the HT product family. In combination with polyimid-film, the bonding system used here reaches a temperature index per UL 796 of 130 °C. PEN-film coverlay films of **higher dimensional stability (HT3)** are also available.

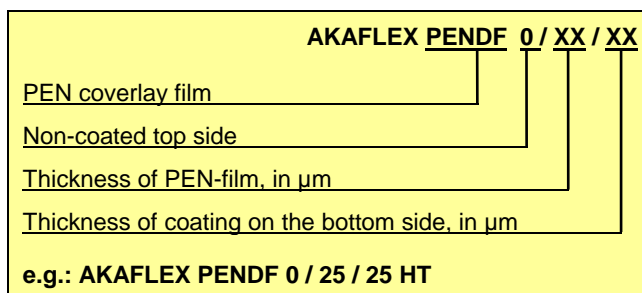


AKAFLEX PENDF HT is available both with different types of **PEN film and thickness grades** as well as with different thickness grades of **adhesive coatings**.

Standard types of AKAFLEX® PENDF HT

Standard-type designation	Thickness of PEN-film	Thickness of the coating
with PEN standard film		
PENDF 0 / 25 / 25 HT2 Regular dimensional stability (MD/TD ≤ 0.7%)	25 µm	25 µm
with PEN-film for higher dimensional stability		
PENDF 0 / 25 / 25 HT3 High dimensional stability (MD/TD ≤ 0.4%)	25 µm	25 µm

Designation for coverlay films



Other types on request

Processing AKAFLEX® PENDF HT

The following pressing cycle is recommended for processing AKAFLEX PENDF HT in heated-plate presses:

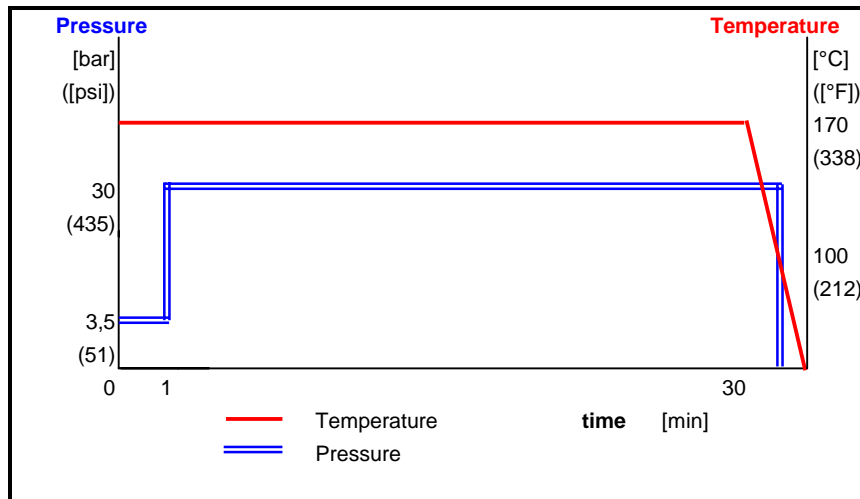


Plate temperature:

170 °C (338°F)

Contact pressure:

3.5 bar (51psi)(1 min)

Pressing pressure:

30 bar (435psi)

Pressing time:

30 minutes

Cooling:

< 100 °C (212°F)

under pressure

Conformal layer:

e.g. silicone rubber

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 PENDF HT, 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 4203/23. AKAFLEX PENDF HT types are approved according to UL 94V-0.

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Availability of AKAFLEX® PENDF HT

- ✓ **Standard reel width:**
610 mm or 305 mm;
other widths on request
- ✓ **Standard reel length:**
100 m; other lengths on request
- ✓ **Format:**
As requested by the customer
- ✓ **Packaging:**
Reels suspended in robust corrugated-cardboard cartons
- ✓ **Standard cores:**
Inside diameter 76 mm
- ✓ **Certificate:**
Test certificate according to EN 10 204 - 2.2.



Storage

Coverlay and bonding films have a limited shelf life because of their application-specific properties. The adhesive systems used here can be stored for at least 3 months in a dry environment at room temperature (+25 °C/77 °F).

4.3.2

All values stated are to be seen as typical values. We reserve the right to introduce changes within the framework of further technical development. We do not accept any obligations or liabilities in respect of this information. Status: 06/2007
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Technical data for AKAFLEX® PENDF 0/25/25 HT2 and HT3

25 µm PEN film/coated with 25 µm adhesive on one side

Laminate properties	Test method IPC-TM 650	IPC- 4203/23 May 2002	Typical values				Typical values			
			PENDF HT2				PENDF HT3			
Peel strength to shiny side of copper	2.4.9	≥ 0,61	> 1	N/mm	> 5.7	lb/in	> 1	N/mm	> 5.7	lb/in
Dimensional stability (after removing the release film)	Company- internal test	--	≤ 0.7	%	≤ 0.7	%	≤ 0.4	%	≤ 0.4	%
Dimensional stability (30 min. at 150°C/300°F)	2.2.4 Method A	≤ 1.0	≤ 0.7	%	≤ 0.7	%	≤ 0.4	%	≤ 0.4	%
Solder-bath stability (Reflow)	-	N/A	5 min at 250 °C		5 min at 480 °F		5 min at 250 °C		5 min at 480 °F	

Properties of the PEN film	Test method	Typical values		Typical values	
		HT2	HT3	HT2	HT3
Dimensional stability MD/TD (30 min. at 150°C/300°F)	ASTM D1204	0.5	0.1 %	0.5	0.1 %
Tensile strength MD	ASTM D882	> 140	N/mm ²	> 20.3x10 ³	psi
TD	ASTM D882	> 140	N/mm ²	> 20.3x10 ³	psi
Failure strain MD	ASTM D882	> 50	%	> 50	%
TD	ASTM D882	> 50	%	> 50	%
Volume resistivity	ASTM D257	10 ¹⁸	Ω · cm	10 ¹⁸	Ω · cm
Surface resistivity	ASTM D257	10 ¹⁷	Ω / □	10 ¹⁷	Ω / □
Breakdown voltage	ASTM D149	> 220	kV/mm	> 5600	V/mil
Dielectric constant (ε _r) (23°C/73°F; 1kHz)	ASTM D150	2.9	--	2.9	--
Dielectric loss factor (tan δ) (23°C/73°F; 1kHz)	ASTM D150	0.005	--	0.005	--
Melting point	-	266	°C	510	°F
Glass transition temperature	DSC	120	°C	248	°F
Coefficient of linear thermal ex- pansion (between 30°C/86°F and 50°C/122°F)	ASTM D696	1.3 x 10 ⁻⁵	1/K	1.3 x 10 ⁻⁵	1/K
Max. service temperature	UL 746B	160	°C	320	°F
Max. water absorption Immersion, 24 h at 23°C/73°F)	ASTM D570	0.4	%	0.4	%