Flexible base laminates AKAFLEX®.

AKAFLEX from KREMPEL offers you have a decisive advantage: a wide selection. Because AKAFLEX stands for a complete programme of flexible and semi-flexible base laminates. Whether the metal foils are made of electrolytic copper, rolled copper, aluminium or resistance material. Whether laminated on one or both sides. Whether the carrier is made of polyester, polyimide or glass fabric. Whether epoxy or acrylic adhesives are used. Whether series-produced products or special developments are involved. Whether the product is supplied on standard-size or narrow rolls. AKAFLEX offers the right material for every application - with processing and working qualities guaranteed to conform to UL and ISO 9002 standards.

Standard types and practical advantages of "Flexible and semi-flexible base laminates AKAFLEX".

Material	Carrier type	Copper foil type	Adhesive type	Practical advantage
* PCL	Low-shrink polyester film	EDHD copper foil	Epoxy	Good electrical values, low-cost, favourable EMV values as screening film
PCL RA	Low-shrink polyester film	RA copper foil	Epoxy	Higher stress failure level
PENCL	PEN film	EDHD copper foil	Epoxy	Higher long-term thermal resistance
KCL	Polyimide film KAPTON® VN	EDHD copper foil	Modif. epoxy	Solderable, higher resistance to peeling, extremely good directional stability, good resistance to chemicals
KCL RA	Polyimide film KAPTON® VN	RA copper foil	Modif. epoxy	Higher stress failure level
KCL MT	Polyimide film KAPTON® MT	EDHD copper foil	Modif. epoxy	Increased thermal conductivity
KCL E	Polyimide film KAPTON® E	EDHD copper foil	Modif. epoxy	Greater rigidity, improved expansion characteristics
KCL FR	Polyimide film KAPTON® VN	EDHD copper foil	Modif. epoxy	Self-extinguishing, UL approved
ACL	Polyimide film	EDHD copper foil	Modif. epoxy	Special polyimide film
GHE	Glass fabric	EDHD copper foil	Modif. epoxy	Low-cost despite solderability, low water absorption, improved dimensional stability, higher component density

Standard combinations of "Flexible base laminates AKAFLEX".

Designation AKAFLEX PCL/ PENCL/KCL/ACL ...	Thickness of copper foil (µm)	Dielectric (µm)	Thickness of copper foil (µm)
2-5/75	0	75	5
2-17/12	0	12	17
2-17/25	0	25	17
2-17/50	0	50	17
2-35/25	0	25	35
2-35/50	0	50	35
2-35/75	0	75	35
2-35/100	0	100	35
2-35/125	0	125	35
2-70/50	0	50	70
2-70/75	0	75	70
3-17/25	17	25	17
3-17/50	17	50	17
3-17/75	17	75	17
3-35/25	35	25	35
3-35/50	35	50	35
3-35/75	35	75	35
3-70/50	70	50	70

* only available as polyester-copper laminate

The AKAFLEX combinations listed opposite are available as standard laminates; please ask about other combinations of materials.

Form of supply.
The following standard roll widths are supplied:
Polyester laminates: 1350mm/1100 mm/1000 mm
Polyimide laminates: 610 mm/305 mm
Other widths or cut sizes on request.

Processing.
Flexible base laminates are made into printed circuits via screen-printing or photographic techniques. The process corresponds to that used in rigid printed circuits, i.e. the usual etching and cleaning media can be used. AKAFLEX can be processed from "Roll to Roll", which guarantees manufacturing advantages.

Semi-flexible base laminate AKAFLEX® GHE.

The semi-flexible base laminate AKAFLEX GHE is the economical alternative for many fields of application. It is no problem to solder and fold. Its outstanding features are its improved rigidity and increased dimensional stability. The standard combinations listed opposite are available.

Standard combinations of "AKAFLEX GHE".

Designation AKAFLEX GHE ...	Thickness of copper foil (µm)	Dielectric (µm)	Thickness of copper foil (µm)
2-17/70	0	70	17
2-17/110	0	110	17
2-35/110	0	110	35
2-35/200	0	200	35
3-35/110	35	110	35

Form of supply.
Standard roll widths: 1000 mm/610 mm/305 mm
Other widths or cut sizes on request.

Processing.
Semi-flexible AKAFLEX GHE is processed in the same way as flexible base laminates.

Coverlay and bonding films AKAFLEX are ideal partners for base laminates. A wide range is available as protective covers for etched circuits or as adhesive films for the manufacture of high-quality multi-layers. The type of adhesive and thickness of the material are adapted to each individual application.

Standard types of "Coverlay and bonding films AKAFLEX".

Designation	Structure	Adhesive type	Pressing temperature
PTP 90 T	Polyester film with thermoplastic coating, transparent	Polyester	90 °C
PTP 90 B	Polyester film with thermoplastic coating, blue	Polyester	90 °C
PTP 130 T	Polyester film with thermoplastic coating, transparent	Polyester	130 °C
PDF	Polyester film with duroplastic coating	Epoxy	170 °C
KDF	Polyimide film with duroplastic coating	Epoxy	170 °C
KDA	Polyimide film with duroplastic coating	Acrylic	170 °C
CDF	Duroplastic adhesive film (cast film) without carrier	Epoxy	170 °C

The following types of coverlay and bonding films are available as standard, other adhesive thicknesses and types of film can be obtained on request.

Standard coatings
"Coverlay and bonding films AKAFLEX".

Designation AKAFLEX PTP/PDF KDF/KDA/CDF ...	Thickness of adhesive (µm)	Thickness of carrier film (µm)	Thickness of adhesive (µm)
As adhesive film:			
0/0/25	0	0	25
As coverlay films			
0/12/10	0	12	10
0/25/12	0	25	12
0/25/25	0	25	25
0/25/35	0	25	35
0/25/50	0	25	50
0/50/25	0	50	25
0/50/35	0	50	35
0/50/50	0	50	50
0/75/25	0	75	25
0/75/50	0	75	50
0/125/25	0	125	25
As bonding film:			
12/25/12	12	25	12
25/25/25	25	25	25
35/25/35	35	25	35
25/50/25	25	50	25
35/50/35	35	50	35
50/50/50	50	50	50
25/75/25	25	75	25
25/125/25	25	125	25

Form of supply.
The following standard roll widths are supplied:
Polyester films: 1350 mm/1100 mm/1000 mm
Polyimide films: 610 mm/305 mm
Adhesive films: approx. 610 mm
Other widths on request.

Storability.
Due to their typical application characteristics, coverlay and bonding films, together with cast films, can only be stored for limited periods, while polyester adhesive systems (PTP) can be stored for at least 1 year, and epoxy or acrylic adhesive systems (PDF, KDF, KDA, CDF) have a minimum storage life of 6 months in dry conditions at room temperature (+25 °C).

Processing.
Polyester coverlay and bonding films are pressed in heated parallel-plate presses in accordance with the following pressing cycle:

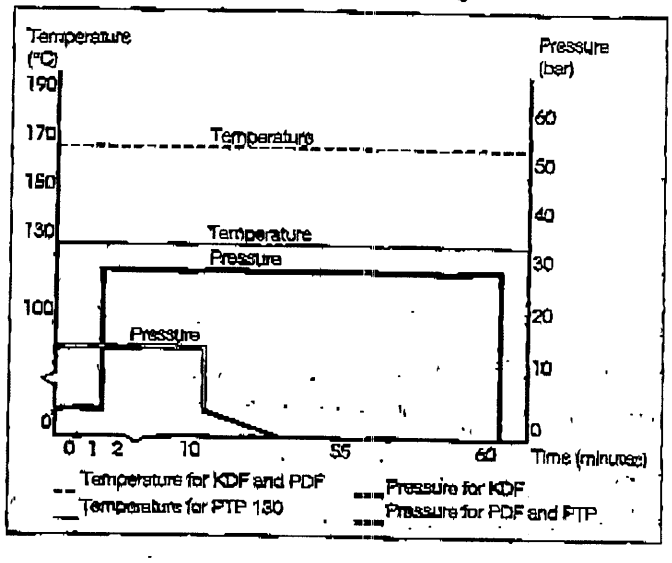
Plate temperature:	90 °C for AKAFLEX PTP 90 130 °C for AKAFLEX PTP 130 170 °C for AKAFLEX PDF
Specific pressure:	14 bar
Pressing time:	10 minutes
Cooling down:	to approx. 30 °C under pressure
Pressure pad:	TEDLAR®, soft PVC, silicone rubber

Polyimide coverlay and bonding films are pressed in heated parallel-plate presses in accordance with the following pressing cycle:

Plate temperature:	170 °C
Contact pressure:	3.5 bar
Pressing force:	30 bar
Pressing time:	60 minutes
Pressure pad:	silicone rubber

Adhesive films can be processed in accordance with the same parameters as adhesive prepregs.

Pressing cycles for coverlay and bonding films.



Adhesive prepregs AKAFLEX®.

Adhesive prepregs AKAFLEX are useful alternative to bonding films AKAFLEX. Glass fabric and special fleeces are processed with high-quality epoxy and acrylic resins into no-flow prepregs.

Types of adhesive prepregs.

Designation	Composition	Adhesive type
Prepreg GGAG 0510	Glass fabric (US Style 1080) impregnated with B-state reaction resin, duroplastic	Acrylic (amount of adhesive: 50 g/m²)
Prepreg GGUG 1108	Glass fabric (US Style 2116) impregnated with B-state reaction resin, duroplastic	Modif. epoxy (amount of adhesive: 90 g/m²)

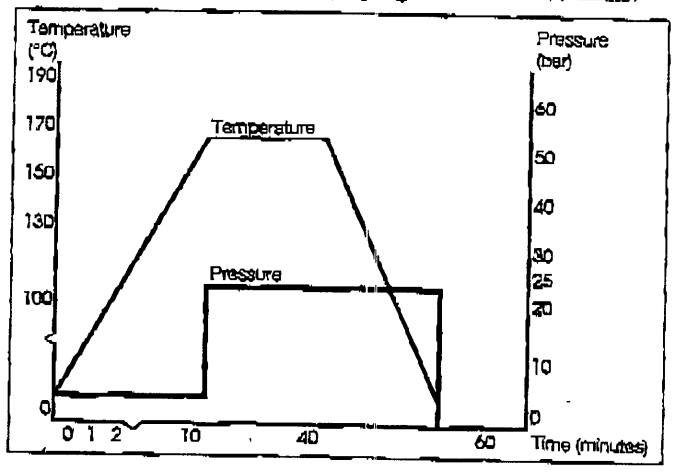
Form of supply.
Standard roll width for adhesive prepregs: 1100 mm.
Other widths on request.

Storability.
Due to their duroplastic characteristics, adhesive prepregs can only be stored for limited periods. The epoxy or acrylic adhesive systems can be stored for at least 6 months in dry conditions at room temperature (+25 °C).

Processing.
Adhesive prepregs and adhesive films are processed in accordance with the following pressing cycle:

Plate temperature:	170 °C
Contact pressure:	3.5 bar
Heating-up time:	10 minutes
Pressure:	25 bar
Dwell time:	at least 30 minutes
Cooling down:	to < 100 °C under pressure
Pressure pad:	silicone rubber etc.

Pressing cycle for adhesive prepregs and adhesive films.



Special laminates.

In addition to standard laminates, we also supply flexible special laminates to customers' specifications. The variations in the applications involved call for differing combinations and thicknesses of materials specially adapted to the requirements. In the case of metal foil laminates we process materials such as aluminium, cupro-nickel or Isotan resistance foils. For plastic film laminates we employ polyester films 12 - 125 µm thick, as well as various types of TEDLAR® film laminated with woven fabrics, fleeces or other surface materials. The adhesives used are carefully matched to each specific application.

Types of metal foil laminate.

Designation	Composition	Adhesive type
PCuNiL	Polyester-CuNi laminate	Epoxy
KCuNiL	Polyimide-CuNi laminate	Epoxy
PWL	Polyester-Isotan laminate	Epoxy
KWL	Polyimide-Isotan laminate	Epoxy
PAL	Polyester-Aluminium laminate	Epoxy
TAL	TEDLAR®-Aluminium laminate	Epoxy

Types of plastic film laminate.

Designation	Composition	Adhesive type
PET/PET	Polyester film laminate	e.g. Epoxy
PET/TEDLAR®	Polyester-TEDLAR® film laminate	e.g. Epoxy
PET "SK"	Polyester film with self-adhesive coating	e.g. Polyester
TEDLAR®/TEDLAR®	TEDLAR® film laminate with various types of TEDLAR®	e.g.Modif. epoxy

Form of supply.
The roll widths depend on the source materials.

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