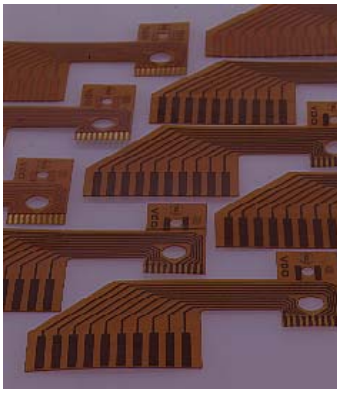
AKAFLEX® KDF HT:
Coverlay and bonding films on a polyimide film basis for flexible printed circuits

Availability of AKAFLEX® KDF HT



AKAFLEX KDF HT is available from KREMPEL as

- ✓ **Coverlay films coated with adhesive on one side**
  for covering etched circuits, and
- ✓ **Bonding films coated with adhesive on both sides**
  for producing high-grade multi-layers

The polyimide film (PI) is coated with a modified highly flexible epoxy resin and then covered by a protective paper. A modified epoxy system characterised by very good temperature stability has been developed for the HT product family. In combination with polyimide film, the bonding system used here reaches a temperature index per UL 796 of 130 °C.

Designation for coverlay films

AKAFLEX KDF 0 / XX / XX

- PI coverlay film
- Non-coated top side
- Thickness of polyimide film, in µm
- Thickness of coating on the bottom side, in µm

e.g.: AKAFLEX KDF 0 / 25 / 25 HT

Designation for bonding films

AKAFLEX KDF XX / XX / XX

- PI bonding film
- Thickness of coating on top side, in µm
- Thickness of the polyimide film, in µm
- Thickness of coating on the bottom side, in µm

e.g.: AKAFLEX KDF 35 / 50 / 35 HT

Standard types of AKAFLEX® KDF HT

Standard-type designation	Thickness of polyimide film	Thickness of the coating
with KAPTON® standard film		
KDF 0 / 12 / 10 HT	12 µm	10 µm
KDF 0 / 25 / 25 HT	25 µm	25 µm
KDF 0 / 25 / 35 HT	25 µm	35 µm
KDF 25 / 25 / 25 HT	25 µm	25 µm

Other types on request

8.2.1

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Processing AKAFLEX® KDF HT

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

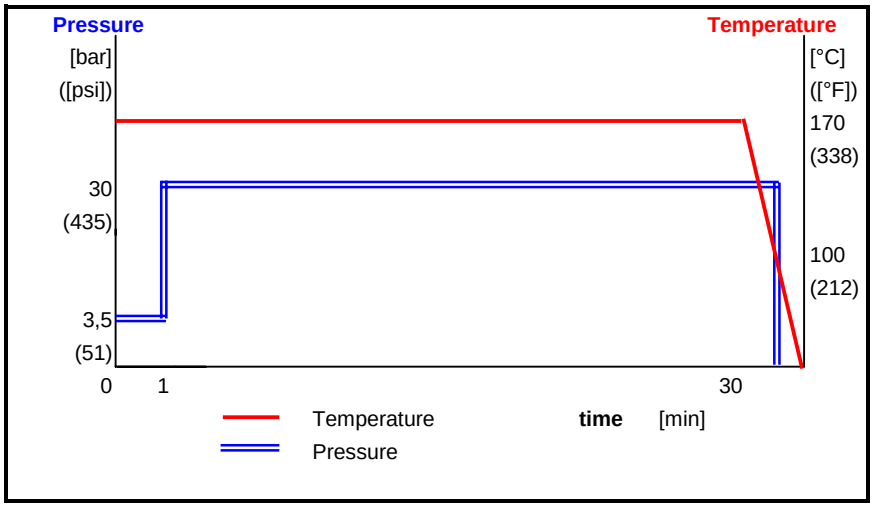

Plate temperature:
170 °C (338°F)

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

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 KDF 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 4203/2. AKAFLEX KDF types are approved according to UL 94V-0.

The AKAFLEX KDF HT types are approved according to UL 94V-0.

Availability of AKAFLEX® KDF 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).

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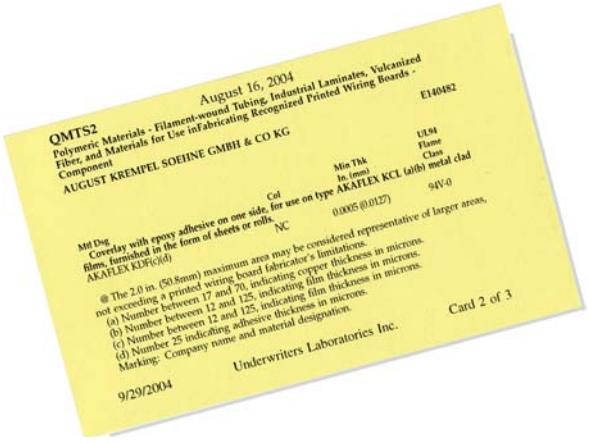
Technical data for AKAFLEX® KDF 0/12/10 HT

12 µm KAPTON® standard film / coated with 10 µm adhesive on one side

Coverlay-film properties	Test method IPC-TM 650	IPC-4203/2 May 2002	Typical values			
Peel strength						
- as delivered	2.4.9 B	> 0.7	> 0.7	N/mm	> 4.0	lb/in
- after solder dip	2.4.9 D	> 0.525	> 0.525	N/mm	> 3.0	lb/in
- after temperature cycling	2.4.9 F	> 0.7	> 0.7	N/mm	> 4.0	lb/in
Tensile strength of the Kapton-film	2.4.19	> 138	> 138	N/mm²	> 20.0x10³	psi
Failure strength of the Kapton-film	2.4.19	> 25	> 35	%	> 35	%
Initial tear strength of the Kapton-film	2.4.16	> 1	> 3	N	> 10.5	oz
Dimensional stability (after removing the release film)	Company-internal test	--	< 0.20	%	< 0.20	%
Dimensional stability (30 min. at 150 °C/300°F)	2.2.4 Method A	< 0.20	< 0.20	%	< 0.20	%
Solder-bath stability of the Kapton-film (at 288 °C)	2.4.13 B	> 10	> 180	sec	> 180	sec
Flow per 25 µm coating thickness	2.3.17.1	< 0.127	< 0.127	mm	< 5	mil
Temperature index	UL 796	DBD	130	°C	266	°F
Dissipation factor (at 1MHz)	ASTM D-150	< 0.04	< 0.03	--	< 0.03	--

DBD = Data Being Developed


August 16, 2004
QMTS2
Polymeric Materials - Filament-wound Tubing, Industrial Laminates, Vulcanized Fiber, and Materials for Use in Fabricating Recognized Printed Wiring Boards - Component
E140482
AUGUST KREMPEL SOEHNE GMBH & CO KG
Mtl Dsg
Coverlay with epoxy adhesive on one side, for use on type AKAFLEX KCL (a)(b) metal clad films, furnished in the form of sheets or rolls.
AKAFLEX KDF(c)(d)
Col
NC
Min Thk In. (mm)
0.0005 (0.0127)
UL94 Flame Class
94V-0
The 2.0 in. (50.8mm) maximum area may be considered representative of larger areas, not exceeding a printed wiring board fabricator's limitations.
(a) Number between 17 and 70, indicating copper thickness in microns.
(b) Number between 12 and 125, indicating film thickness in microns.
(c) Number between 12 and 125, indicating film thickness in microns.
(d) Number 25 indicating adhesive thickness in microns.
Marking: Company name and material designation.
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9/29/2004

8.2.3

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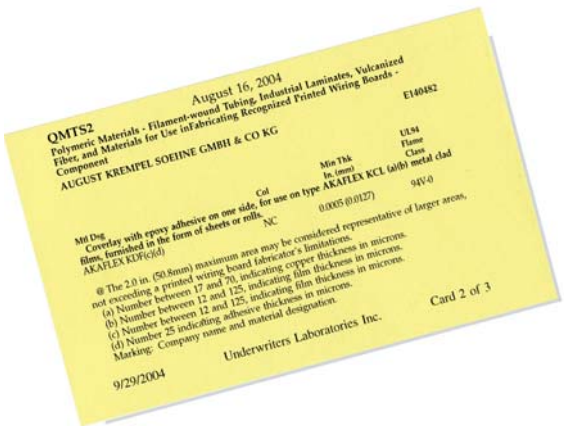
Technical data for AKAFLEX® KDF 0/25/25 HT

25 µm KAPTON® standard film / coated with 25 µm adhesive on one side

Coverlay-film properties	Test method IPC-TM 650	IPC-4203/2 May 2002	Typical values			
Peel strength						
- as delivered	2.4.9 B	> 1.4	> 1.4	N/mm	> 8.0	lb/in
- after solder dip	2.4.9 D	> 1.225	> 1.23	N/mm	> 7.0	lb/in
- after temperature cycling	2.4.9 F	> 1.4	> 1.4	N/mm	> 8.0	lb/in
Tensile strength of the Kapton-film	2.4.19	> 165	> 165	N/mm²	> 23.9x10³	psi
Failure strength of the Kapton-film	2.4.19	> 25	> 45	%	> 45	%
Initial tear strength of the Kapton-film	2.4.16	> 5	> 5	N	> 17.6	oz
Dimensional stability (after removing the release film)	Company-internal test	--	0.06	%	0.06	%
Dimensional stability (30 min. at 150 °C/300°F)	2.2.4 Method A	< 0.20	0.10	%	0.10	%
Solder-bath stability of the Kapton-film (at 288 °C)	2.4.13 B	> 10	> 180	sec	> 180	sec
Flow per 25 µm coating thickness	2.3.17.1	< 0.127	< 0.127	mm	< 5	mil
Temperature index	UL 796	DBD	130	°C	266	°F
Dissipation factor (at 1MHz)	ASTM D-150	< 0.04	< 0.03	--	< 0.03	--

DBD = Data Being Developed


August 16, 2004
QMTS2
Polymeric Materials - Filament-wound Tubing, Industrial Laminates, Vulcanized Fiber, and Materials for Use in Fabricating Recognized Printed Wiring Boards -
Component
E140482
AUGUST KREMPEL SOEHNE GMBH & CO KG
AKAFLEX KCL (a)/b) metal clad
Coverlay with epoxy adhesive on one side, for use on type
films, furnished in the form of sheets or rolls.
AKAFLEX KDF(c)(d)
Underwriters Laboratories Inc.
Card 2 of 3
9/29/2004

8.2.4

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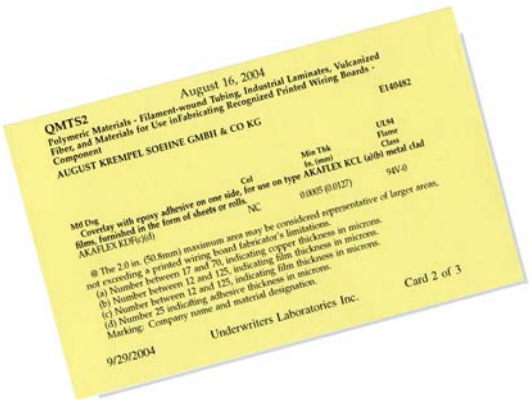
Technical data for AKAFLEX® KDF 0/25/35 HT

25 µm KAPTON® standard film / coated with 35 µm adhesive on one side

Coverlay-film properties	Test method IPC-TM 650	IPC-4203/2 May 2002	Typical values			
Peel strength						
- as delivered	2.4.9 B	> 1.4	> 1.4	N/mm	> 8.0	lb/in
- after solder dip	2.4.9 D	> 1.225	> 1.23	N/mm	> 7.0	lb/in
- after temperature cycling	2.4.9 F	> 1.4	> 1.4	N/mm	> 8.0	lb/in
Tensile strength of the Kapton-film	2.4.19	> 165	> 165	N/mm²	> 23.9x10³	psi
Failure strength of the Kapton-film	2.4.19	> 25	> 45	%	> 45	%
Initial tear strength of the Kapton-film	2.4.16	> 5	> 5	N	> 17.6	oz
Dimensional stability (after removing the release film)	Company-internal test	--	0.07	%	0.07	%
Dimensional stability (30 min. at 150 °C/300°F)	2.2.4 Method A	< 0.20	0.16	%	0.16	%
Solder-bath stability of the Kapton-film (at 288 °C)	2.4.13 B	> 10	> 180	sec	> 180	sec
Flow per 25 µm coating thickness	2.3.17.1	< 0.127	< 0.127	mm	< 5	mil
Temperature index	UL 796	DBD	130	°C	266	°F
Dissipation factor (at 1MHz)	ASTM D-150	< 0.04	< 0.03	--	< 0.03	--

DBD = Data Being Developed


August 16, 2004
QMTS2
Polymeric Materials - Filament-wound Tubing, Industrial Laminates, Vulcanized Fiber, and Materials for Use in Fabricating Recognized Printed Wiring Boards - Component
E140482
AUGUST KREMPEL SOEHNE GMBH & CO KG
AKAFLEX KCL (with) metal clad
Coverlay with epoxy adhesive on one side, for use on type films, furnished in the form of sheets or rolls.
AKAFLEX KDF(c)(d)
Underwriters Laboratories Inc.
Card 2 of 3
9/29/2004

8.2.5

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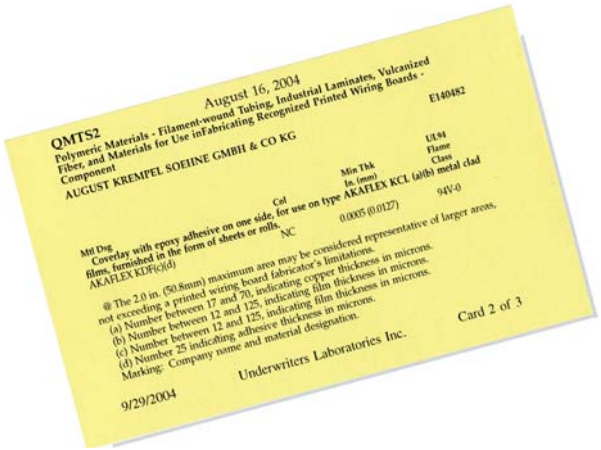
Technical data for AKAFLEX® KDF 25/25/25 HT

25 µm KAPTON® standard film / coated with 25 µm adhesive on both sides

Coverlay-film properties	Test method IPC-TM 650	IPC-4203/2 May 2002	Typical values			
Peel strength						
- as delivered	2.4.9 B	> 1.4	> 1.4	N/mm	> 8.0	lb/in
- after solder dip	2.4.9 D	> 1.225	> 1.23	N/mm	> 7.0	lb/in
- after temperature cycling	2.4.9 F	> 1.4	> 1.4	N/mm	> 8.0	lb/in
Tensile strength of the Kapton-film	2.4.19	> 165	> 165	N/mm²	> 23.9x10³	psi
Failure strength of the Kapton-film	2.4.19	> 25	> 45	%	> 45	%
Initial tear strength of the Kapton-film	2.4.16	> 5	> 5	N	> 17.6	oz
Dimensional stability (after removing the release film)	Company-internal test	--	0.10	%	0.10	%
Dimensional stability (30 min. at 150 °C/300°F)	2.2.4 Method A	< 0.20	0.10	%	0.10	%
Solder-bath stability of the Kapton-film (at 288 °C)	2.4.13 B	> 10	> 180	sec	> 180	sec
Flow per 25 µm coating thickness	2.3.17.1	< 0.127	< 0.127	mm	< 5	mil
Temperature index	UL 796	DBD	130	°C	266	°F
Dissipation factor (at 1MHz)	ASTM D-150	< 0.04	< 0.03	--	< 0.03	--

DBD = Data Being Developed


August 16, 2004
QMTS2
Polymeric Materials - Filament-wound Tubing, Industrial Laminates, Vulcanized Fiber, and Materials for Use inFabricating Recognized Printed Wiring Boards - Component
E140482
AUGUST KREMPEL SOEHNE GMBH & CO KG
Mtl Dsg
Coverlay with epoxy adhesive on one side, for use on type AKAFLEX KCL (a/b) metal clad films, furnished in the form of sheets or rolls.
AKAFLEX KDF(c)(d)
Col
NC
Min Thk In. (mm)
0.0005 (0.0127)
UL94 Flame Class
94V-0
@ The 2.0 in. (50.8mm) maximum area may be considered representative of larger areas, not exceeding a printed wiring board fabricator's limitations.
(a) Number between 17 and 70, indicating copper thickness in microns.
(b) Number between 12 and 125, indicating film thickness in microns.
(c) Number between 12 and 125, indicating film thickness in microns.
(d) Number 25 indicating adhesive thickness in microns.
Marking: Company name and material designation.
Card 2 of 3
9/29/2004
Underwriters Laboratories Inc.

8.2.6

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