FastelFilm™

High Performance Temperature Engineered Thermal Bonding Adhesive Films

Fastelfilm Adhesive is a specially formulated thermal bonding film available in a range of temperature phase-change (melt points) and free standing film thicknesses. Fastelfilm is designed to adhere strongly to a wide range of substrates which makes it an ideal solution for many industries including electronics assembly, automotive, industrial, alternative energy as well as medical device application.

As a dry-to-the-touch free standing adhesive film, Fastelfilm can be die cut to match a wide range of mounting and sealing application areas. Applications can vary from bonding and/or sealing fasteners or contacts, components, adhering materials for lamination, case sealing or difficult areas of general device assembly where liquid adhesives can run-out. As a die cut adhesive pad, Fastelfilm allows for quick and clean "drop-in-place" installation/setup and instantly ready to be heat cured above its phase-change temperature using a wide range of thermal induction methods. Once allowed to cool below phase-change, the adhesive is cured.

Product Features

Uniform bond line adhesion/sealing
Multiple phase-change temperatures
Various film thicknesses
Die-cut, sheets, rolls

Excellent adhesion to substrates
Controlled flow
Re-workable after first cure
Quick installation and fixturing

Low cost adhesive solution
Indefinite shelf life
Solvent free / acid free
Short lead times

Standard FastelFilm Temperature Formulations

Fastelfilm 15066……..150°F / 66°C
Fastelfilm 16071……..160°F / 71°C
Fastelfilm 20093……..200°F / 93°C
Fastelfilm 230110……230°F / 110°C
Fastelfilm 250120……250°F / 120°C
Note: custom formulations available

Standard Fastelfilm Adhesive Thickness

* 1 MIL (0.001") (0.03mm)
* 3 MIL (0.003") (0.08mm)
* 5 MIL (0.005") (0.13mm)
* 10 MIL (0.010") (0.25mm)
* 15 MIL (0.015") (0.38mm)
* 30 MIL (0.030") (0.76mm)

Note: custom adhesive film thicknesses available.

PSA Lamination Options

* LT = low tack PSA 1 side (0.0005" thick), repositionable
* HT1 = high tack PSA 1 side (0.001" thick)
* HT2 = high tack PSA 1 side (0.002" thick)

For a free standing adhesive film that has "built in" surface tack on both sides of the film for substrate fixturing, inquire about our FastelFilm HPB version.

Adhesive Delivery Options

* Log Rolls, Slit Rolls, Sheets, Die Cuts

Product Film / Coating Options

* Free standing adhesive film
* Fastel Supplied or Customer Supplied Substrates (Foils, PET Films, Polyimide, PE, Fabric, Etc.)

Color Options

* Translucent / yellow tint (standard)
* Black or Gray
* Custom colors available

Other Information

* Manufactured to ISO 9001:2008 Standards
* RoHs Compliant Material
* 100% Waterproof

Fastelfilm is an EVA based solvent free (environmentally friendly) adhesive film that is designed to provide uniform adhesion and sealing across a desired material interface. The ability to manufacture Fastelfilm in a variety of phase-change temperatures, film thicknesses, rolls, sheet and pre-form die-cuts allows us to meet a wide range of requirements within multiple industries. Fastelfilm's inherent flexibility from manufacturing to installation makes it an ideal solution for applications ranging from low volume (even prototypes) and/or high volume environments. Fastelfilm is manufactured to superior quality guidelines set forth by our ISO 9001:2008 Quality Standards and offers a quick turnkey solution from design to production.

Heat Curing Application Methods

All Fastelfilm phase-change formulations can be heated using commercially available heating devices. When cycled past its phase-change (melt) temperature, Fastelfilm will begin its controlled flow filling in any microscopic surface conditions that may exist on your mounting surface as well as adjust for any flatness conditions.

Recommended heating devices include a curing oven, heated press, hydraulic press, heated roller(s), heated flat plate, heat tunnel, heat gun or custom fixture/heating device.

Fastelfilm Type	Optimal Heating Temp	Heat Cycle Time (min)	Set Time (onset of temp drop)	Cure (Cool) Time
15066	160°F to 180°F	2 ~ 3 seconds	3 ~ 5 seconds	10 ~ 15 seconds
16071	170°F to 200°F	2 ~ 3 seconds	3 ~ 5 seconds	10 ~ 15 seconds
20093	205°F to 230°F	2 ~ 3 seconds	5 ~ 7 seconds	15 ~ 25 seconds
230110	240°F to 260°F	2 ~ 3 seconds	5 ~ 7 seconds	20 ~ 30 seconds
250120	260°F to 280°F	2 ~ 3 seconds	5 ~ 7 seconds	40 ~ 60 seconds

Note: make sure all applications surfaces are clean and free of debris before applying adhesive

The data presented in the above table is based upon 5 mil thick Fastelfilm within all phase-change temperatures using a heat press. Testing within the scope of your application, materials being bonded or sealed and heating device should be performed at multiple cycling temperatures in order to determine your optimal setup and heat cycling procedure. All Fastelfilm Adhesive Products, once bonded, should be allowed to cool before applying any stress.

The amount of pressure being applied to your substrate during setup should be determined beforehand in order to minimize the effects of the adhesive flowing into unwanted areas outside the desired mounting or sealing interface during heating and high pressures. Bond line temperatures that greatly exceed the FastelFilm melt points will decrease viscosity of the material allowing the adhesive to have greater flow characteristics.

Want to cure Fastelfilm alongside other heat curing materials?
Not a problem with FastelFilm. Fastelfilm Adhesive can be cycled higher that its recommended application temperatures for long periods of time if being cured alongside other heat required materials/adhesives that require longer cycling times in a curing oven.

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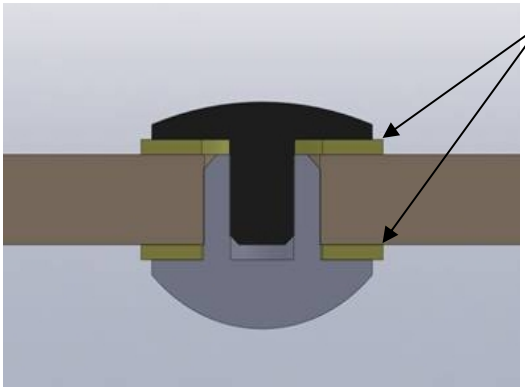
Fastelfilm Customer / Application Benefits

* Uniform adhesion strength resulting from Fastelfilm's consistent adhesive thickness
* High performance uniform bond strength
* Assembly line flexibility, ease-of-use—from pick and place to hand placement assembly
* Inherent low cost due to minimal capital expenditure requirement
* Minimal waste — die-cut pads are matched to customer specific mounting outlines
* Reduced scrap for further installation savings - Fastelfilm is re-workable after it has cured
* No clean up or OSHA concerns — No "Run Out" with controlled thickness film or die-cut
* More assembly line flexibility, scrap reduction—repositionable twice, before and after assembly

What problems can Fastelfilm Solve?

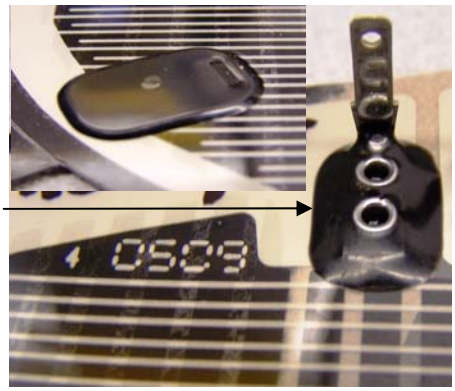
* Uneven adhesive application along mounting interface
* Long periods for setup / installation
* Adhesive in unwanted application areas
* Long cure times
* Adhesive waste
* Inability to re-work after curing
* Short term storage conditions

Popular Fastelfilm Applications



Fastener Plug Sealing: In this application, 10 mil Fastelfilm 20093 die cut into a washer is being used to bond and seal 2 fastener plugs holding together 2 mating circuit boards for an electronic device.

Contact Sealing: Fastelfilm 230110 black is being placed over an L shape contact and being allowed to drape in a controlled flow over contact base when heated in order to provide a bond and seal to a flexible heating circuit for automotive mirrors.



Electronics Application
Fastener / contact bonding and sealing
Component / surface mounting
Frame assembly
Display assembly
Case bonding and sealing
Fixture / assembly setup
Membrane switch assembly

Automotive Application
Fastener / contact bonding and sealing
Plastic Lens bonding/sealing
Fabric / interior assembly
Component mounting
Membrane switch assembly
Fixture / assembly setup
Glass Bonding

Alternative Energy Application
Photovoltaic cell bonding/sealing
Fastener / contact bonding and sealing
Surface mount
Component mounting
Solar device assembly
Fixture / assembly setup
Glass Bonding

Laminations
Flooring / wood laminating
Plastic film laminating
Foil layer laminating
Paper layer laminating
Fabric layer laminating
Glass Bonding

Medical Device
Fastener / contact bonding and sealing
Component mounting
Display mounting / sealing
Fixture / assembly setup

Fabric layer laminating

Packaging Application
Package bonding and sealing
Labeling
Fixture / assembly setup
Heat seal foils available (FastelFoil)

Substrate Options

Need Fastelfilm coated at a specific thickness onto one or both sides of a substrate?

All Fastelfilm formulations have the ability to be coated on a wide range of substrate types designed to meet a specific application requirement.

Masking Options: Fastelfilm adhesive masking options is a process in which the substrate is masked before applying the adhesive coating. The masking can then be removed to allow for exposed areas of the substrate. Popular for copper substrates where exposure of substrate in predetermined areas is desired for electrical contact or soldering.

Foils	Aluminum 1100 1235	Copper 110 101	Stainless 304 321	Brass	Inconel
Plastics & Rubber	PET Film	Heat Stabilized PET	Polyimide HN And MT Films	Foams (Various Durometers)	Rubber (Various Types)
Other	Fabrics	Paper	Synthetics	Laminates	Customer Defined Substrate

Custom coated substrates available. For more information, contact toll free 1-888-989-3832 (US only) +1-949-369-7676 (international) or e-mail info@fasteladhesives.com

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Fastelfilm Typical Properties (free standing film)

Characteristic	Fastelfilm Adhesive
Base Formulation	Thermoplastic
Adhesive Thickness Tolerances	+/- 10% of target thickness
Die Cut Pad Dimensional Tolerances	0.010” (0.25mm) Typical
Liner Thickness	0.003” (0.08mm) Paper (standard) or Clear Polyester Liner
Solids	100% Solids
Color	Translucent / Yellow Tint (standard)
Available Formats	Log Rolls, Slit Rolls, Sheets, Die Cuts
Standard Roll Widths	12.00” (30.5cm), 16.00” (40.6cm), 24.00” (61.0cm)
Standard Roll Lengths	100ft (30.5m), 250ft (76.0m), 500ft (152m)
Die Cut Methods	Steel Rule Die, Flexible Die, Rotary Die Cutting

Ball Softening Range	Temperature
Fastelfilm 15066	*145°F to 155°F*
Fastelfilm 16071	*155°F to 165°F*
FastelFilm 20093	*195°F to 205°F*
FastelFilm 230110	*220°F to 240°F*
FastelFilm 250120	*240°F to 260°F*

Recommended Tacking	Temperature
Fastelfilm 15066	*90°F to 100°F @ 1 to 2 seconds dwell time (3 to 10 psi)*
Fastelfilm 16071	*100°F to 110°F @ 1 to 2 seconds dwell time (3 to 10 psi)*
Fastelfilm 20093	*100°F to 110°F @ 1 to 2 seconds dwell time (3 to 10 psi)*
Fastelfilm 230110	*110°F to 130°F @ 1 to 2 seconds dwell time (3 to 10 psi)*
Fastelfilm 250120	*130°F to 150°F @ 1 to 2 seconds dwell time (3 to 10 psi)*

Note: if using paper release liner during tacking process, remove liner by peeling back after tacking to expose Fastelfilm Adhesive.

Recommended Bonding Conditions	Temperature
Fastelfilm 15066	*160°F to 180°F @ 2 to 10 seconds dwell time (5 to 20 psi)*
Fastelfilm 16071	*170°F to 200°F @ 2 to 10 seconds dwell time (5 to 20 psi)*
Fastelfilm 20093	*205°F to 230°F @ 2 to 10 seconds dwell time (5 to 20 psi)*
Fastelfilm 230110	*240°F to 260°F @ 2 to 10 seconds dwell time (5to 20 psi)*
FastelFilm 250120	*260°F to 280°F @ 2 to 10 seconds dwell time (5to 20 psi)*

Note: User testing should be performed to determine setup, heating temperature, pressure, materials being bonded and heating time to yield best installation and adhesion results within the scope of your application requirements. All information provided above is for reference only and to be used as a starting point for optimal application setup.
All data presented above is based upon Fastelfilm Free Standing Film without the introduction of substrates. The introduction of a substrate coated product may vary recommended setup and application temperatures.

Fastelfilm Typical Properties Continued (free standing film)

Substrate	Observation	Result
Aluminum	Excellent	925 psi
Copper	Excellent	925 psi
Stainless Steel	Good	825 psi
Titanium	Excellent	925 psi
Brass	Good	825 psi
Polycarbonate	Excellent	900 psi
PCB Materials	Excellent	900 psi
Glass	Excellent	950 psi
Plastics (ABS, PVC)	Excellent	900 psi
Ceramics	Good	825 psi
Painted Surfaces	Excellent	900 psi
Wood	Excellent	915 psi

Note: lap shear strength test (ASTM C-961-06) using 10 mil thick Fastelfilm 16071 with a bonding area of 2" x 2". Substrate samples prepared using Fastelfilm 16071 in a curing oven at 180F for 20 minutes. Samples tested in lap shear tester 24 hours after adhesive was heated and cured.

Hardness & Viscosity	Result
Hardness (Shore A)(Durometer)(2 Hour Cure at RT)	80 to 90
Viscosity (liquid) at 85°C, cps	12,150 to 14,850

Note: Hardness testing performed per ASTM D-2240-05, Manual Method, using Fastelfilm formulation ID 16071. Viscosity testing performed per ASTM D-3236-88 using Fastelfilm formulation ID 16071.

Thermal Outgassing	Result
Total Mass Loss, % TML	0.138
Collectible Volatile, Condensable Matter, % CVC	0.130
Water Vapor Gain, % WVR	0.021

Note: Thermal outgassing test performed per ASTM E595-93 using Fastelfilm formulation ID 16071. Due to no outgassing, Fastelfilm is suitable for aerospace application.

Storage & Shelf Life	Result
Storage Condition and Temperature	Cool Dry Location at or below 95°F / 35°C
Shelf Life	Indefinite if stored per storage conditions above

Application Re-Work / De-Bonding

A unique characteristic of Fastelfilm Adhesive is in its ability to be easily re-worked. Simply heat the adhesive past its phase-change temperature and pull apart your substrates. Depending on the amount of adhesive left on your application surface, introduction of new Fastelfilm material may be required when re-assembling. Fastelfilm Adhesive can be heated past its phase-change temperature numerous times allowing for multiple re-works if necessary. Adhesive residue in unwanted areas can be cleaned up using mineral spirits solvent and a cloth towel. Other clean up methods includes heating the adhesive close to its phase-change temperature and gently wiping away softened unwanted adhesive.

Note: For best results, make sure all application surfaces are clean and free of debris.

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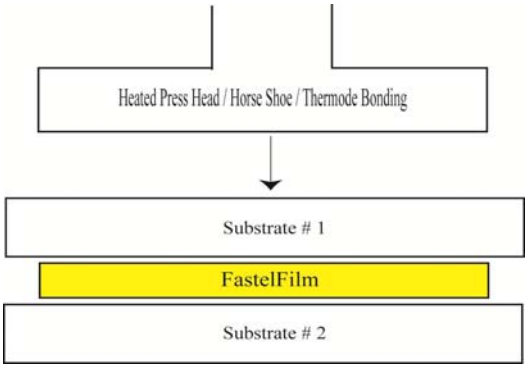
Fastelfilm Typical Application Methods

The following diagrams illustrate basic setups using various commercially available heating methods. Fastelfilm Adhesive can be applied, heated and cured using common thermal induction methods including a curing oven, heated press, hydraulic press, heat tunnel, heated lamination rollers, heat gun or custom built fixture/heating device. Determining your optimal setup and heating method should be tested beforehand and is dependent on your substrates, setup pressure, heating device, heating time as well as Fastelfilm formulation and thickness being used. ***With all setups, carrier liner should be removed first before applying.***

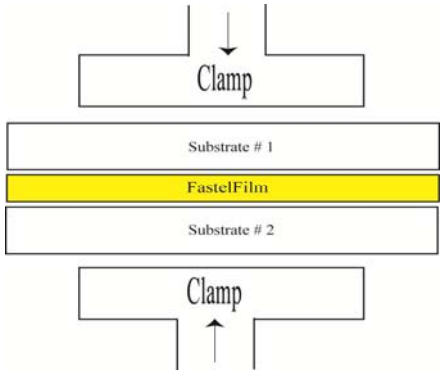
Apply heat using a heated press / horse shoe / thermode bonding method. Heat transfer through substrate # 1

Good for setups, tacking, small surface areas or low to mid volume applications



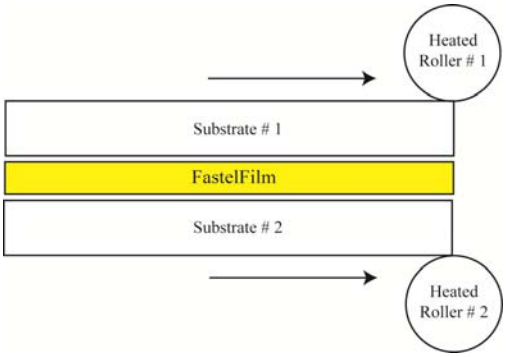
Clamp entire assembly together. Apply heat using multiple methods of heating including curing oven, heat tunnel or heat gun

Good for small or large surface areas as well as low, mid and high volume applications



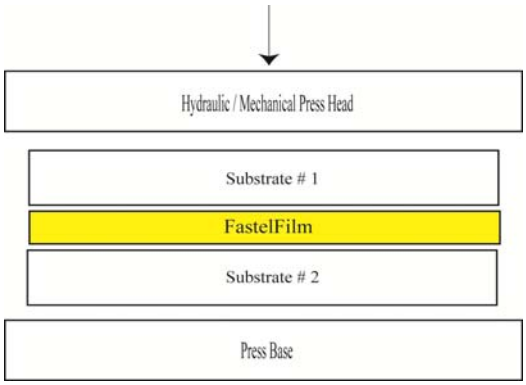
Process through top and bottom (or single) heated rollers. Heat will transfer through substrates.

Good for large or continuous surface areas for a mid to high volume application environment



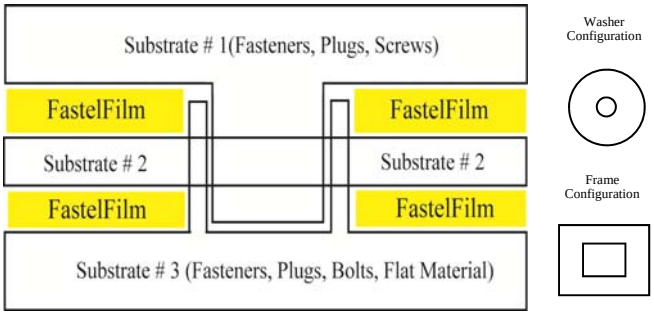
Apply heat using a hydraulic/mechanical press. Heat transfer through substrate # 1

Good for large surface areas or mid to high volume applications



General setup for bonding and sealing heads of mechanical fasteners / plugs / screws. Apply heat using a curing oven, heat tunnel, heat gun, hydraulic or mechanical press.

Good for small area high volume applications when wanting to bond and seal formed fasteners



Fastelfilm Adhesive Testing & Sampling

Adhesive material evaluation is always critical when designing in a new material or developing a new product. Sheet samples of Fastelfilm Adhesive are available for preliminary testing to determine the optimal Fastelfilm formulation, thickness, setup and heating method within the scope of your application requirements.

Want to test samples per your required die cut part? Our razor plotter sampling machine allows us to provide customers Fastelfilm already cut to their required outline for testing. Plotter formed samples provide our customers the ability to test not only the adhesive, but their required outline as well without incurring the expense of production tooling.

Contact Fastel Adhesive Products at 1-888-989-3832 (US Only) +1-949-369-7676 (International) or e-mail info@fasteladhesives.com to request sample sheets or plotter formed samples for testing.