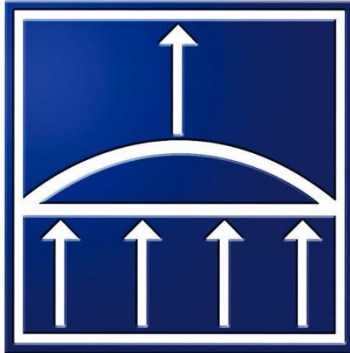


# AIRTECH

**INTERNATIONAL INC.**

Technical Information

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COMPLETE FACTORY SET-UP TURNKEY SOLUTIONS

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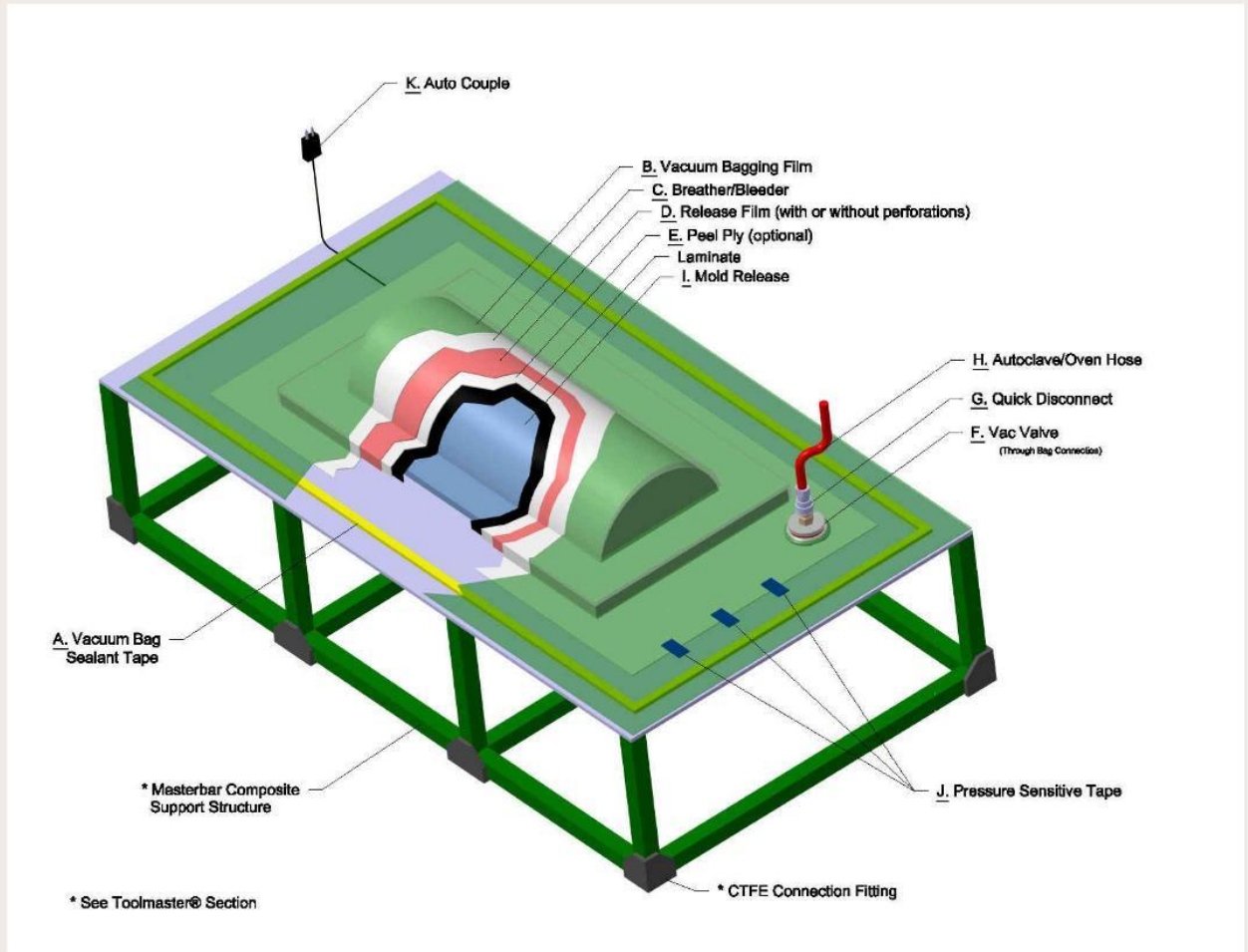


## Section Guide

## TECHNICAL INFORMATION

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## COMMON PRODUCT SELECTIONS



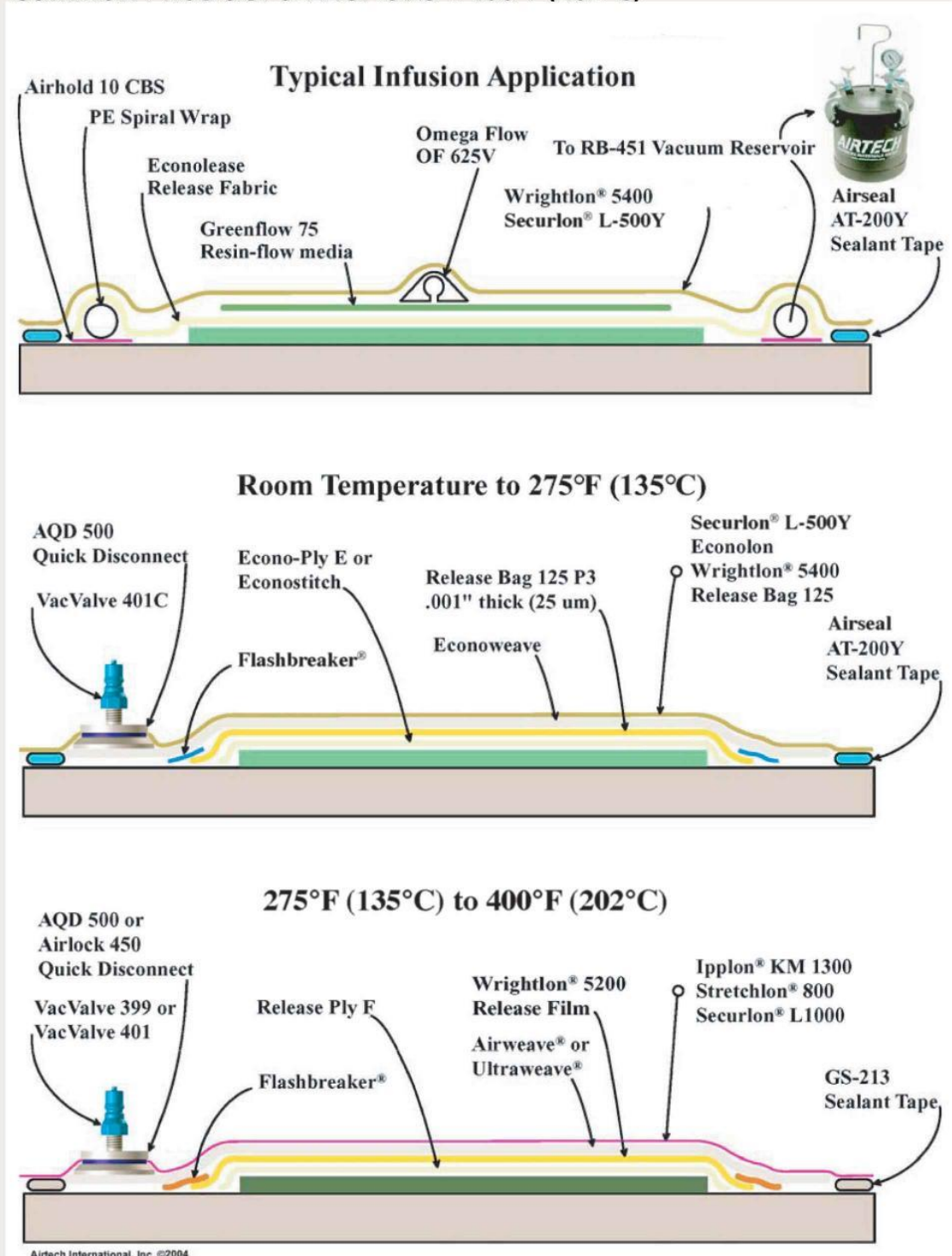
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## COMMON PRODUCT SELECTIONS

### COMMON PRODUCT SELECTIONS < 400°F (202°C)

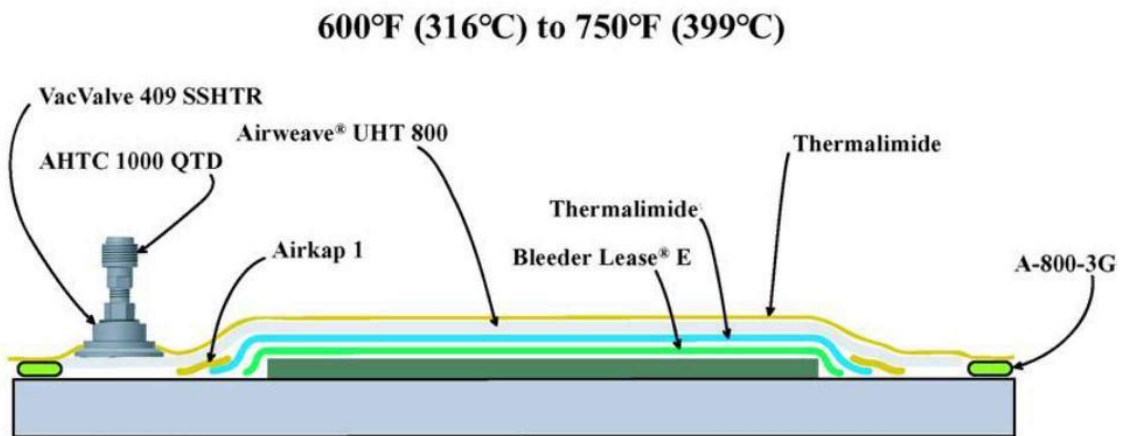
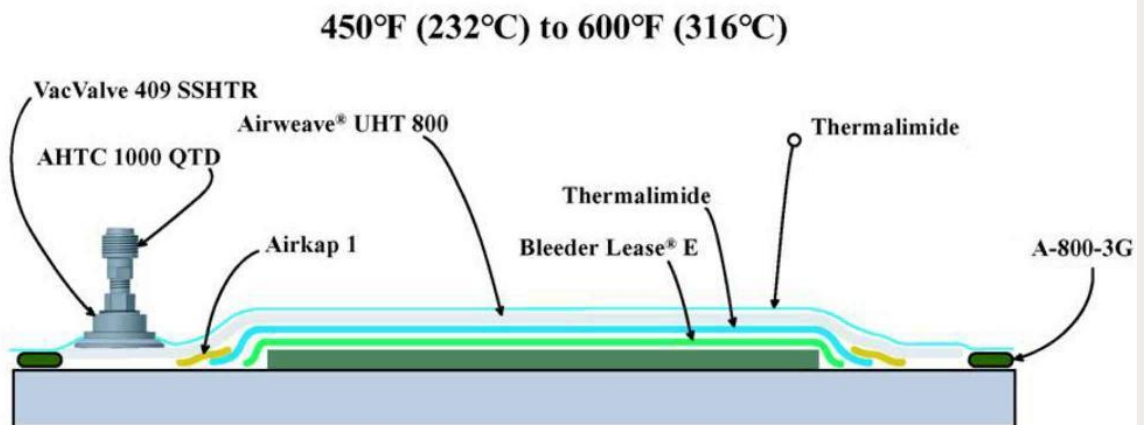
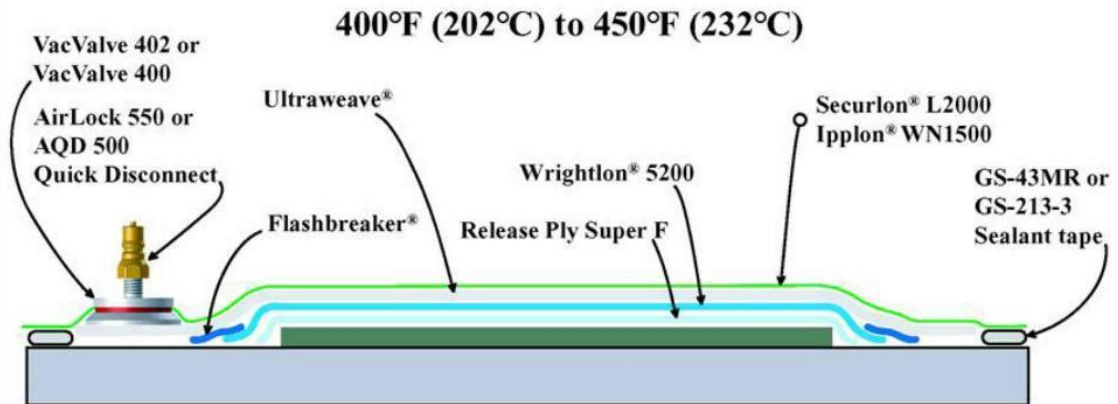


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## COMMON PRODUCT SELECTIONS

### COMMON PRODUCT SELECTIONS > 400°F (202°C)



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**PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES**
**ROOM TEMPERATURE**

Airtech catalog section	Airtech products
Bagging films	Econolon, Wrightlon® 5400, Dahlar® Release Bag 125, Stretchlon® 200, Securlon® L1000, Big Blue L-100, Securlon® L-500Y
Release films	Dahlar® Release Bag 125
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1(HT), 2R, 5R, Flashbreaker® 1R(HT), 2R(HT), Airhold 1 CBS, Airhold 10 CBS, Flashbreaker® 2 CBS, Wrightlease 2, Toolwright 3 & 5
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® A012, Tooltec® CA5, Tooltec® CS5
Release fabrics / Peel plies	Econoply J, Econoply E, Econostitch®, Econolease, Econostitch® G, Release Ply A, B, F, G
Resin infusion mesh	Resinflow 60
Breathers and bleeders	All Airweave® and Econoweave products
Vacuum bag sealant tapes	GS-95, GS-100, AT-199, AT-200Y, Airseal 2
Vacuum valves and hoses	Vac Valve 401C or Vac Valve 399, Econoflow 59R hose, AQD 500TF quick disconnect
Resin infusion products	Toolfusion® 1A/1B, Toolfusion® 3, Infusioncoat 1A/1B, Resinflow 60, Greenflow 75, Resinflow 90 HT, polyethylene tubing, polyethylene spiral tubing, NTF-nylon barb "T" fittings, NEF-nylon bar elbow fittings, NCF-nylon barb coupling fittings, RB451, OF 313, 500, 750, 1000, OF 625V and OF750V, resin line clamps, resin infusion connectors

**≤ 250°F (121°C)**

Airtech catalog section	Airtech products
Bagging films	Securlon® L-500Y, Big Blue L-100, Stretchlon® 200, Stretchlon® HT-350, Stretchlon® 700, Wrightlon® 5400, 6400, 7400, Dahlar® Release Bag 125
Release films	Wrightlon® 3900, Wrightlon® 4600, Wrightlon® 5200, Dahlar® Release Bag 125
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1R, 2R, 5R, Flashbreaker® 1R (HT), 2R(HT), Wrightcast 8500 PS, Flashbreaker® 2 CBS, Wrightlease 2, Toolwright 3 & 5
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® A012, Tooltec® CA5, Tooltec® CS5
Release fabrics / Peel plies	Econoply E, Econoply J, Econostitch®, Econolease, Econostitch® G, Release Ply A, B, C, F, G (structural bonding), Bleeder Lease® A, B, G (non-structural bonding)
Breathers & Bleeders	All Airweave® and Econoweave® products
Vacuum bag sealant tapes	AT-200Y, GS-100, GS-213, AT-199, Airseal 2
Vacuum valves and hoses	Vac Valve 401, 401A and 401C, Vac Valve 399, Vac Valve 402A, Airflow 65R hose, Econoflow 59 hose, AQD 500TF quick disconnect
Resin infusion products	Greenflow 75, Resinflow 90 HT, polyethylene tubing, polyethylene spiral tubing, Toolfusion® 1A/1B, Toolfusion® 3, Infusioncoat 1A/1B, NTF-nylon barb "T" fittings, NEF-nylon bar elbow fittings, NCF-nylon barb coupling fittings, RB451, OF 313, 500, 750, 1000, OF 625V and OF750V, resin line clamps, resin infusion connectors

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**PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES**
**■ ≤ 350°F (177°C)**

Airtech catalog section	Airtech products
Bagging films	Stretchlon® 700, Stretchlon® 800, Stretchlon® 850, Wrightlon® 5400, Wrightlon® 6400, Wrightlon® 7400, Ipplon® KM1300, Securlon® L-1000
Release films	Wrightlon® 4600, Wrightlon® 5200, A4000, Airtech MR 1
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1R, 2R, 5R, Flashbreaker® 1(HT), 2R(HT), Wrightcast 8500 PS, Teflease MG2, Airhold 1 CBS, Flashbreaker® 2 CBS
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® A012, Tooltec® CA5, Tooltec® CS5
Release fabrics / Peel plies	Release Ply A, B, C, F, G, Release Ply Super A, Super F (structural bonding), Bleeder Lease® A, B or G (non structural bonding), Release Ease® 234 TFP, Release Ease® 234 TFNP
Breathers & Bleeders	All Airweave® or Ultraweave® products
Vacuum bag sealant tapes	AT-200Y, GS-100, GS-213, GS-43MR
Vacuum valves and hoses	Vac Valve 401, 401A, and 401C, Vac Valve 399 or Vac Valve 402A, Airflow 65R hose, AQD 500TF quick disconnect
Resin infusion products	Toolfusion® 1, Resinflow 90 HT, NTF-nylon barb "T" fittings, NEF-nylon bar elbow fittings, NCF-nylon barb coupling fittings, resin line clamps, Toolfusion® 3

**■ ≤ 390°F (199°C)**

Airtech catalog section	Airtech products
Bagging films	Stretchlon® 800, Stretchlon® 850, Wrightlon® 7400, Ipplon® KM1300, Ipplon® DP1000, Securlon® L-1000, Securlon® L-2000, Airtech MR 1
Release films	Wrightlon® 4600, Wrightlon® 5200, A4000, Airtech MR 1
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1R, 2R, 5R, Flashbreaker® 2R(HT), Wrightcast 8500 PS, Teflease MG2, Airhold 1 CBS, Flashbreaker® 2CBS, Wrightlease 2, Toolwright 3 & 5
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® A012, Tooltec® CA5, Tooltec® CS5
Release fabrics / Peel plies	Release Ply A, B, C, F, G, Super A, Super F (structural bonding), Bleeder Lease® A, B or G (non structural bonding), Release Ease® 234 TFP, Release® Ease 234 TFNP
Breathers & Bleeders	All Airweave® or Ultraweave® products
Vacuum bag sealant tapes	AT-200Y, GS-213, GS-213-3 or GS-43MR
Vacuum valves and hoses	Vac Valve 401, Vac Valve 402 & 402A, Premium Multi-Valve 407 Airflow 65R, Airflow 100R hose, AQD 500TF or Airlock 450TF quick disconnect
Resin infusion products	Toolfusion® 3, Toolfusion® 1A/1B

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**PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES**
**■ ≤ 450°F (232°C)**

Airtech catalog section	Airtech products
Bagging films	Wrightlon® 8400, Ipplon® DPT1000 or Ipplon® WN1500
Release films	Wrightlon® 5200, A4000, Airtech MR 1
Pressure sensitive tapes	Teflease MG2, Airkap 1
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® A012, Tooltec® CA5, Tooltec® CS5
Release fabrics / Peel plies	Release Ply A, B, Super A (structural bonding), Bleeder Lease® A, B (non structural bonding), Release Ease® 234 TFP, Release Ease® 234 TFNP
Breathers & Bleeders	All Ultraweave® products
Vacuum bag sealant tapes	GS-213-3, GS-43MR
Vacuum valves and hoses	Vac Valve 401 & 401C, Vac Valve 402 & 402A, Airflow 65R, Airflow 100R or Airflow 800 hose, AQD 500TF or Airlock 450TF & 550TF quick disconnect
Resin infusion products	OF 313, 500, 750, 1000

**■ ≤ 550°F (288°C)**

Airtech catalog section	Airtech products
Bagging films	Thermalimide
Release films	Airtech MR1, Wrightlon® 5900
Pressure sensitive tapes	Teflease MG2, Airkap 1
Release fabrics / Peel plies	Bleeder Lease® C, E, Release Ease® 234 TFP, Release Ease® 234 TFNP
Breathers & Bleeders	Airweave® UHT 800
Vacuum bag sealant tapes	A-800-3G
Vacuum valves and hoses	Vac Valve 409 SS HTR, Airflow 800 hose, Airlock 550TF quick disconnect

**■ ≤ 650°F (343°C)**

Airtech catalog section	Airtech products
Bagging films	Thermalimide
Release films	Thermalimide coated with high temperature release agent
Pressure sensitive tapes	Airkap 1
Release fabrics / Peel plies	Bleeder Lease® C, E
Breathers & Bleeders	Airweave® UHT 800
Vacuum bag sealant tapes	A800-3G (use with GS-43MR)
Vacuum valves and hoses	Vac Valve 409 SS HTR, Airflow 800 hose, AHTC 1000 QTD quick disconnect

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 Catalog position : **Technical information**





**PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES**

■ ≤ 750°F (399°C)

Airtech catalog section	Airtech products
Bagging films	Thermalimide
Release films	Thermalimide coated with high temperature release agent
Pressure sensitive tapes	Airkap 1
Release fabrics / Peel plies	Bleeder Lease® C, E
Breathers & Bleeders	Airweave® UHT 800
Vacuum bag sealant tapes	A800-3G (use with GS-43MR)
Vacuum valves and hoses	Vac Valve 409 SS HTR, Airflow 800 hose, AHTC 1000 QTD quick disconnect

Last updated : 2018-09-13

Catalog position : **Technical information**

## VACUUM BAGGING TECHNIQUES

### ■ MOLD RELEASE

To prevent a composite part from adhering to a mold surface during cure, 2 to 3 light layers of a mold release is typically applied directly to the mold surface.

### ■ ALTERNATIVE METHOD OF RELEASE

Another method to prevent a composite part from adhering to a mold surface during cure is through the use of a release liner with a pressure sensitive adhesive backing such as Tooltec® A005 (shown in photo). Tooltec® A005 is a sheet of release film with a pressure sensitive adhesive that can be spread across a mold surface. Once in place, the Tooltec® A005 acts as a release layer between the mold and the composite part. In addition, Tooltec® A005 can often be used for several cure cycles before needing to be replaced.



### ■ LAY-UP

Prepreg/ fabric should be placed on the mold while ensuring complete contact to the mold surface. Each additional ply should have full curvilinear contact with the previous ply. Gaps that occur between plies or the mold surface are known as “bridging”, and should be avoided as much as possible. (note the contour contact of the prepreg in photo).

### ■ PEEL PLY

As with the prepreg/ fabric, the peel ply should be placed on the completed lay-up with full curvilinear contact. Areas that need to be cut can be butt spliced or have a small overlap of peel ply material. (Econostitch is shown in photo).



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## VACUUM BAGGING TECHNIQUES

### ■ RELEASE FILMS

Release films are typically extended beyond the part lay-up and held in place with pressure sensitive tape. (Flashbreaker® 2R(HT) tape, Wrightlon® 5200 release film shown).

### ■ BREATHER

A non-woven breather layer is then placed on top of the release film and can be held in place with pressure sensitive tape. (Flashbreaker® 2R(HT) tape is shown in photo. Airweave N10 is the breather shown).



### ■ VACUUM BAG SEALANT TAPE

A strip of vacuum bag sealant tape is placed around the periphery of the mold. The paper backing should be left on the tape at this time so that the vacuum bag can be easily positioned (see photos). (GS-213-3 is shown in photo).

### ■ VACUUM BAG APPLICATION

Choosing the right size vacuum bag is critical. Too small of a vacuum bag may cause the bag to stretch (also known as "bridging") which could cause a rupture during the cure. Allowing for approximately 30 % to 40 % excess vacuum bag is a good starting point for complex shapes.



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## VACUUM BAGGING TECHNIQUES

### ■ POSITIONING THE VACUUM BAG

The vacuum bag sealant tape's paper backing is then peeled back in strategic locations and the bag is attached. This process will help to align the bag and place the excess vacuum bag material where it is required.

### ■ REMOVING THE PAPER AND ADHERING THE BAG

The paper is removed as the vacuum bag is adhered to the sealant tape.



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## VACUUM BAGGING TECHNIQUES

### ■ VACUUM BAG PLEATS

The excess vacuum bag material will form pleats. The next step is to carefully place sealant tape inside the pleat to complete the seal. The process of making pleats will improve with practice.



### ■ INSTALLING A "THRU THE BAG" VACUUM CONNECTION (SEE VACUUM VALVES AND HOSES SECTION)

The female portion of vacuum valve is applied prior to completely close off bag with sealant tape. The important thing to remember is not to allow the film to twist / wrinkle when twisting the top half. Wrinkling the film under the top piece can cause a leak path. Pictured above and below is the Vac Valve 399 and the AQD 500TF quick disconnect fitting.

Cut a small "X"



Install the top piece and twist



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## VACUUM BAGGING TECHNIQUES

### ■ ALTERNATE VACUUM CONNECTION

Sometimes it is not possible to locate the vacuum valve directly above the tool surface. An "off the bag" connection is created so that there is no mark off on the part itself. A piece of breather is added to provide breather continuity.



### ■ APPLYING VACUUM

Connect the quick disconnect fitting and pull light vacuum so the film can be moved around and placed where excess is needed. The hoses pictured are Airflow 65R autoclave / oven hoses.

### ■ COMPLETED VACUUM BAG

Typically, full vacuum is then applied.



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## VACUUM BAGGING TECHNIQUES

### ■ VACUUM GAUGE

Vacuum gauge can detect if there are any leaks. If the gauge starts to drop, there is a leak (see Vacuum Valves and hoses section). Here is a Vac-Gauge 30, displaying the existing amount of vacuum.

### ■ LEAK DETECTION

Airtech offers ultrasonic leak detectors to assist in locating minor leaks (see miscellaneous section). To the right a VacLeak LEQ-70 is used to detect high pitch frequencies emitted from any vacuum leak paths that may be present.



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Catalog position : [Technical information](#)

## TOOLING PREPREG SELECTION GUIDE

### ■ CEP PREPREG

CEP G3, CEP G12, CEP F7500, CEP F7544

Service temperature	Initial cure temperature	Resin type	Shelf Life at 72°F (22°C)	Fabric styles
450°F (232°C)	355°F (alternative 250°F) or 180°C (alternative 120°C)	Cynate epoxy	20 days	Carbon 3K twill & 12K twill Fiberglass 7500 & 7544

#### Benefits

- Excellent high temperature properties (High Tg. 500°F or 260°C) for long tool life & reduced tooling cost.
- Lower temperature cure than BMI reduces dimensional deviation due to thermal expansion.
- Excellent tack level for fast ply lay-up and ease of processing for reduced labor cost.

### ■ BETA PREPREG

Beta G3, Beta G6, Beta G12

Service temperature	Initial cure temperature	Resin type	Shelf Life at 72°F (22°C)	Fabric styles
425°F (218°C)	355°F (180°C)	Benzoxazine	6 months	Carbon 3K twill, 6K twill, & 12K twill

#### Benefits

- Outstanding toughness and high Tg.(485°F or 251°C) ensures long term tool life & reduced life cycle cost.
- Exceptionally low shrinkage for low residual stresses, low spring back & excellent post machining.
- Exceptionally long out-life for greatly increased work flexibility, good tack for ease of laminating.

### ■ BETA TX670 DISCO PREPREG

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 77°F (25°C)	Fabric Styles
425°F (218°C)	355°F (180°C)	Benzoxazine	6 months	Carbon 24K triaxial

#### Benefits

- Discontinuous sheets reduce layup effort and improve conformability.
- Quasi-isotropic within each ply, providing simpler and faster layup.
- Will produce consistent laminate thickness for even heat-up and meeting design targets.

### ■ TOOLMASTER PREPREG

TMFP3100, TMFP3200, TMGP4000, TMGP4100, TMGP4200

Service temperature	Initial cure temperature	Resin type	Shelf Life at 72°F (22°C)	Fabric styles
400°F (204°C)	250°F (120°C)	Epoxy	40 days	Carbon 3K plain, 6K twill & 12K twill Fiberglass 7500 & 7544

#### Benefits

- Toolmaster® composite molds are lighter weight than metal tools for easier manual handling.
- Lower thermal mass than metal tools allows faster heat up, shorter cures & greater productivity.
- Toolmaster's low volatile content & excellent adhesion enables Airpad rubber caul reinforcement.

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## TOOLING PREPREG SELECTION GUIDE

### ■ LTC PREPREG

LTC-F5500, LTC-F5600, LTC-G1400, LTC-G1600

Service temperature	Initial cure temperature	Resin type	Shelf Life at 72°F (22°C)	Fabric styles
355°F (180°C)	140°F (60°C)	Epoxy	5-7 days	Carbon 3K twill & 12K twill Fiberglass 7500 & 7544

#### **Benefits**

- Low initial cure temperature allows use of lower temperature master model materials.
- Dimensional deviation due to thermal expansion is minimized for more accurate molds.
- Good tack level & cut piece supply for fast ply lay-up and reduced manufacturing labor cost.

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## TOOLING RESIN PRODUCT SELECTION GUIDE

### TOOLFUSION® 3

Low viscosity high service temperature epoxy infusion resin

Service temperature	Initial cure temperature	Resin type	Pot life at 72°F (22°C)	Viscosity at 72°F (22°C)
400°F (204°C)	120°F (49°C)	Epoxy	300 minutes	450 cps

#### Benefits

- Nano technology delivers outstanding toughness & high Tg. (425°F or 218°C) for long tool life.
- Low initial cure temperature for low thermal expansion and low cost master models.
- Low viscosity allows infusion of thicker and more complex laminates with fewer resin feed lines.
- Resin infusion process for high quality laminates at low cost, no freezer storage, no autoclave cure.

### TOOLFUSION® 1

Room temperature curing epoxy infusion resin

Service temperature	Initial cure temperature	Resin type	Pot life at 72°F (22°C)	Viscosity at 72°F (22°C)
375°F (191°C)	72°F (22°C)	Epoxy	75 minutes	600 cps

#### Benefits

- Resin infusion process for high quality laminates at low cost, no freezer storage, no autoclave cure.
- Room temperature curing avoids any thermal expansion and dimensional deviation.
- Room temperature curing allows use of low temperature & low cost master mode.

### TMR 2001

Room temperature curing high service temperature laminating resin

Service temperature	Initial cure temperature	Resin type	Pot life at 72°F (22°C)	Viscosity at 72°F (22°C)
400°F (204°C)	72°F (22°C)	Epoxy	240 minutes	5,200 cps

#### Benefits

- Composite molds are lighter weight than metal tools for easier manual handling.
- Room temperature curing allows use of low temperature & low cost master model materials.
- Room temperature curing avoids any thermal expansion and dimensional deviation.

### TOOL SURFACE COAT RESINS

Surface coat resin	Service temperature	Applications	Composition
TMSF 5100	400°F (204°C)	Toolmaster® & LTC	Mineral filled epoxy
TMSF 5001	400°F (204°C)	TMR 2001 & Toolfusion®	Graphite filled epoxy
TMSF 5005	400°F (204°C)	TMR 2001 & Toolfusion®	Silicon carbide filled epoxy
Infusioncoat	375°F (191°C)	TMR 2001 & Toolfusion®	Graphite filled epoxy

#### Benefits

- Surface coat resins will eliminate mold surface pitting, ensuring good part surface finish.
- The protective surface layer will prevent fibre damage and extend tool life, reducing tooling costs.
- Surface coat provides a tacky layer which aids first ply positioning during Toolfusion® builds.

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Catalog position : [Technical information](#)



## TOOLING RESIN PRODUCT SELECTION GUIDE

### ■ CARBON AND FIBERGLASS FABRICS

Fabrics for resin infusion and standard laminate tooling

Product Name	Yarn Type	Weaving Style
TMGC 6000	3K Carbon	Plain
TMGC 6002T	3K Carbon	2x2 twill
TMGC 6001	6K Carbon	2x2 twill
TMGC 6003	12K Carbon	2x2 twill
TMFC 7500	Fiberglass	Plain
TMFC 7544	Fiberglass	2 end plain

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