

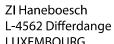
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SECTION GUIDE

TECHNICAL INFORMATION

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AIRTECH

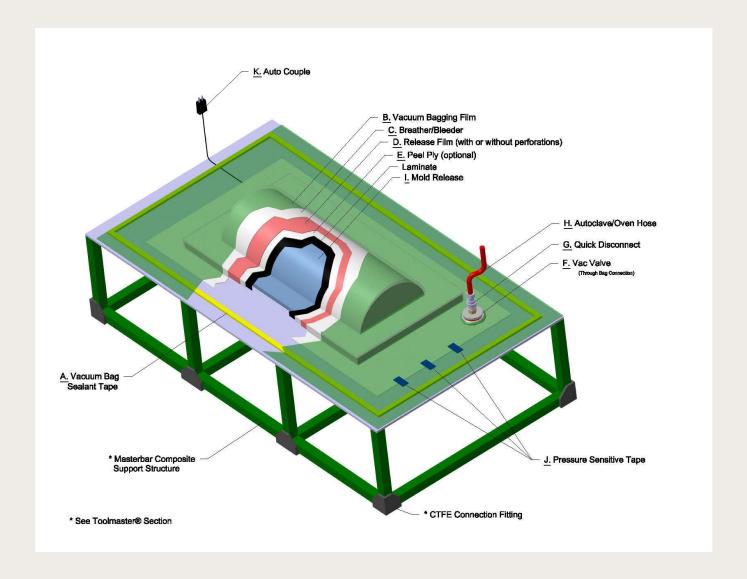


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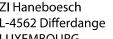
COMMON PRODUCT SELECTIONS

Phone: +352 58 22 82 1

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Last updated: 2018-09-13



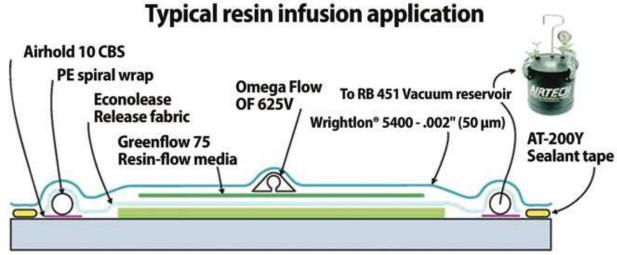
COMMON PRODUCT SELECTIONS

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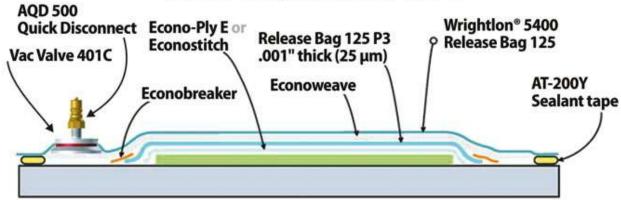
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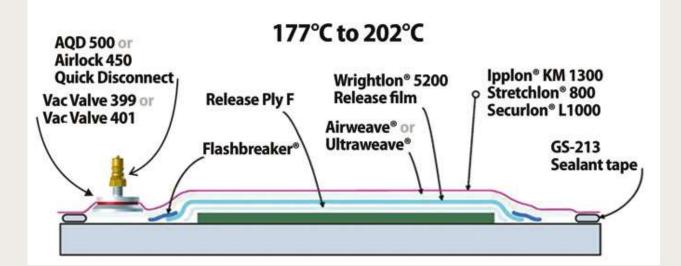
COMMON PRODUCT SELECTIONS < 202 °C

AIRTECH



Room Temperature to 135°C





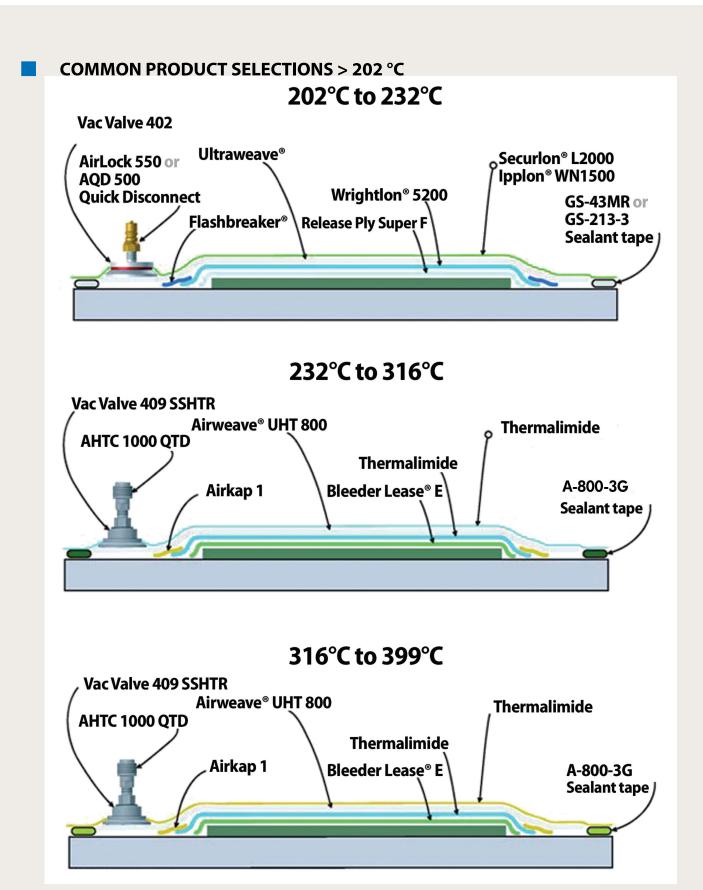
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COMMON PRODUCT SELECTIONS



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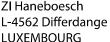
PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES

ROOM TEMPERATURE

Airtech catalogue section	Airtech products			
Bagging films	Econolon, Wrightlon® 5400, Dahlar® Release Bag 125, Stretchlon® 200, Securlon® L-1000, Big Blue L-100, Securlon® L-500Y			
Release Films	Wrightlon® 3900, Dahlar® Release Bag 125			
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1R, 2R, 5R, Flashbreaker® 2 CBS Flashbreaker® 1(HT), Flashbreaker® 2R(HT), Airhold 1CBS, Airhold 10CBS, Wrightlease 2R			
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® CA5, Tooltec® CS5			
Release fabrics	Econoply J, Econoply E, Econostitch®, Econolease, Econostitch® G Release Ply A, B, F, G			
Breathers and bleeders	All Airweave® and Econoweave® products			
Vacuum bag sealant tapes	Airseal 2, GS-95, GS-100, AT-199, AT-200Y			
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, Greenflow 75, Resinflow 60, Greenflow 185, Resinflow 90 HT, Knitflow 160, FlowLease 160-37P16, polyethylene tubing, polyethylene spiral tubing, NTF-nylon barb "T" fittings, NEF-nylon bar elbow fittings, NCF-nylon barb coupling fittings, Sil-Tube, RIA, RB451, OF 313, 500, 750, 1000, OF 625V and OF750V, resin line clamps, resin infusion connectors.			

≤ 121 °C

Airtech catalogue 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® 2 CBS Flashbreaker® 1(HT), Flashbreaker® 2R(HT), Wrightcast 8500 PS, Wrightlease 2, Toolwright 3&5
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® CA5, Tooltec® CS5
Release fabrics	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 and bleeders	All Airweave® and Econoweave® products
Vacuum bag sealant tapes	Airseal 2, AT-200Y, GS-100, GS-213, AT-199
Vacuum valves and hoses	Vac Valve 401 & 401C, Vac Valve 399, Vac Valve 402A, Airflow 65R hose, Econoflow 59 hose, AQD 500TF quick disconnect
Resin infusion products	Toolfusion® 1A/1B, Toolfusion® 3, Infusioncoat 1A/1B, Greenflow 75, Resinflow 60, Greenflow 185, Resinflow 90 HT, Knitflow 160, FlowLease 160-37P16, polyethylene tubing, polyethylene spiral tubing, NTF-nylon barb "T" fittings, NEF-nylon bar elbow fittings, NCF-nylon barb coupling fittings, Sil-Tube, RIA, RB451, OF 313, 500, 750, 1000, OF 625V and OF750V, resin line clamps, resin infusion connectors.



PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES

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≤ 177 °C

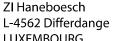
AIRTECH

Airtech catalogue 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 MR1/ MR2
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1R, 2R, 5R, Flashbreaker® 1(HT), Flashbreaker® 2R(HT), Wrightcast 8500 PS, Teflease MG2, Airhold 1 CBS, Flashbreaker® 2 CBS, Wrightlease 2, Toolwright 3&5
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, 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 & 401C, Vac Valve 399 or Vac Valve 402A, MV 407 Airflow 65R hose, AQD 500TF quick disconnect
Resin infusion products	Toolfusion® 1A/1B, Toolfusion® 3, Infusioncoat 1A/1B, Resinflow 90 HT, Knitflow 105 HT, NTF-nylon barb "T" fittings, NEF-nylon bar elbow fittings, NCF-nylon barb coupling fittings, Sil-Tube, RIA, resin line clamps.

≤ 199 °C

Airtech catalogue section	Airtech products		
Bagging films	Stretchlon® 800, Stretchlon® 850, Wrightlon® 7400, Ipplon® KM1300, Ipplon® DP1000, Securlon® L-1000, Securlon® L-2000		
Release Films	Wrightlon® 4600, Wrightlon® 5200, A4000, Airtech MR1/MR2		
Pressure sensitive tapes	Flashbreaker® 1, 2, 5, 1R, 2R, 5R, Flashbreaker® 2R(HT), Wrightcast 8500 PS, Teflease MG2, Airhold 1 CBS, Flashbreaker® 2 CBS, Wrightlease 2, Toolwright 3&5		
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, 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, MV 407, Airflow 65R, Airflow 100R hose, AQD 500TF or Airlock 450TF quick disconnect		
Resin infusion products	Toolfusion® 1A/1B, Knitflow 105 HT, Sil-Tube, RIA		

Last updated: 2018-08-10



PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES

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≤ 232 °C

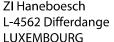
AIRTECH

Airtech catalogue section	Airtech products
Bagging films	Wrightlon® 8400, Ipplon® DPT1000 or Ipplon® WN1500
Release Films	Wrightlon® 5200, A4000, Airtech MR1/MR2
Pressure sensitive tapes	Teflease MG2, Airkap 1
Mold releases (non-liquid)	Filmcote 1524, Toolwright 3, Toolwright 5, Tooltec® A005, Tooltec® A007, Tooltec® CA5, Tooltec® CS5
Release fabrics	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, Vac Valve 402 & 402A, MV 407 Airflow 65R, Airflow 100R, Airflow 800 or BBH 1080 hose, AQD 500TF or Airlock 450TF quick disconnect
Resin infusion products	OF 313, 500, 750, 1000

≤ 288 °C

Airtech catalogue section	Airtech products	
Bagging films	Thermalimide E	
Release Films	Airtech MR1/ MR2	
Pressure sensitive tapes	Teflease MG2, Airkap 1	
Release fabrics	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 or BBH 1080 hose, Airlock 550TF quick disconnect	

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PRODUCT SELECTION GUIDE FOR DIFFERENT CURE TEMPERATURES

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≤ 343 °C

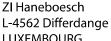
AIRTECH

Airtech catalogue section	Airtech products		
Bagging films	Thermalimide E		
Release Films	Thermalimide E RCBS		
Pressure sensitive tapes	Airkap 1		
Release fabrics	Bleeder Lease® C, E		
Breathers & Bleeders	Airweave® UHT 800		
Vacuum bag sealant tapes	A-800-3G (use with GS-43MR)		
Vacuum valves and hoses Vac Valve 409 SS HTR, Airflow 800 or BBH 1080 hose, AHTC 1000 QT disconnect			

≤ 399 °C

Airtech catalogue section	Airtech products	
Bagging films	Thermalimide E	
Release Films	Thermalimide E RCBS	
Pressure sensitive tapes	Airkap 1	
Release fabrics	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 or BBH 1080 hose, AHTC 1000 QTD quick disconnect	

Last updated: 2018-08-10



VACUUM BAGGING TECHNIQUES

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MOULD RELEASE

AIRTECH

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

ALTERNATIVE METHOD OF RELEASE

Another method to prevent a composite part from adhering to a mould 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 mould surface. Once in place, the Tooltec® A005 acts as a release layer between the mould and the composite part. In addition, Tooltec® A005 can often be used for several cure cycles before needing to be replaced.





LAY-UP

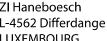
Prepreg/ fabric should be placed on the mould while ensuring complete contact to the mould surface. Each additional ply should have full curvilinear contact with the previous ply. Gaps that occur between plies or the mould surface are known as "bridging", and should be avoided as much as possible. (note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



Last updated: 2013-09-18



VACUUM BAGGING TECHNIQUES

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RELEASE FILMS

AIRTECH

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

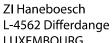
A strip of vacuum bag sealant tape is placed around the periphery of the mould. The paper backing should be left on the tape at this time so that the vacuum bag can be easily positioned (see photos). (GS-213-3 is shown in photo).

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

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POSITIONING THE VACUUM BAG

AIRTECH

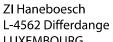
The vacuum bag sealant tape's paper backing is then peeled back in strategic locations and the bag is attached. This process will help to align the bag and place the excess vacuum bag material where it is required.

REMOVING THE PAPER AND ADHERING THE BAG

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



Last updated: 2013-09-18



VACUUM BAGGING TECHNIQUES

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VACUUM BAG PLEATS

AIRTECH

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 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.

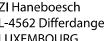
Cut a small "X"



Install the top piece and twist



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VACUUM BAGGING TECHNIQUES

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ALTERNATE VACUUM CONNECTION

AIRTECH

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.

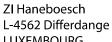
COMPLETED VACUUM BAG

Typically, full vacuum is then applied.





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VACUUM BAGGING TECHNIQUES

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VACUUM GAUGE

AIRTECH

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





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TOOLING PREPREG SELECTION GUIDE

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CEP PREPREG

IRTECH

CEP G3, CEP G12, CEP F7500, CEP F7544

Service temperature	Initial cure temperature	Resin type	Shelf Life at 22°C	Fabric styles
232℃	180°C (alternative 120°C)	Cynate epoxy	20 days	Carbon 3K & 12K twill Fibreglass 7500 & 7544

Benefits

- Excellent high temperature properties (High Tg. 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 labour cost.

BETA PREPREG

Beta G3, Beta G6, Beta G12

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

Benefits

- Outstanding toughness and high Tg.(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 25°C	Fabric Styles
218°C	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 tempe	rature Initi	al cure temperature	Resin type	Shelf Life at 22°C	Fabric styles
204°C		120°C	Ероху	40 days	Carbon 3K plain, 6K twill & 12K twill Fibreglass 7500 & 7544

- Toolmaster® composite moulds 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.

Last updated: 2019-02-26

TOOLING PREPREG SELECTION GUIDE

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LTC PREPREG

IRTECH

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

Service temperature	Initial cure temperature	Resin type	Shelf Life at 22°C	Fabric styles
180°C	60°C	Ероху	5-7 days	Carbon 3K twill & 12K twill Fibreglass 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 moulds.
- Good tack level & cut piece supply for fast ply lay-up and reduced manufacturing labour cost.

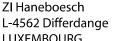
LTC3 CARBON PREPREG

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 20°C	Fabric Styles
200°C	55°C	Ероху	4-5 days	Carbon 3K twill, 12K twill, & 24K twill

Benefits

- Low initial cure temperature reduces thermal expansion of master model, improving mould accuracy.
- Lower cost, low temperature master model materials can be used.
- Good surface finish and low void content laminate for longer life moulds and good part quality.

Last updated: 2019-02-26



TOOLING RESIN PRODUCT SELECTION GUIDE

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TOOLFUSION® 3

Low viscosity high service temperature epoxy infusion resin

Service Temperature	Initial Cure Temperature	Resin Type	Pot Life at 22°C	Viscosity at 22°C
204°C	49°C	Ероху	300 minutes	450 cps

Benefits

- Nano technology delivers outstanding toughness & high Tg. (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 22°C	Viscosity at 22°C
191°C	22°C	Ероху	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.

TMR2001

Room temperature curing high service temperature laminating resin

Service Temperature	Initial Cure Temperature	Resin Type	Pot Life at 22°C	Viscosity at 22°C
204°C	22°C	Ероху	240 minutes	5,200 cps

Benefits

- Composite moulds 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.

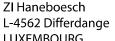
TOOL SURFACE COAT RESINS

Surface Coat Resin	Service Temperature	Applications	Composition
TMSF 5100	204°C	Toolmaster® & LTC	Mineral filled epoxy
TMSF 5001	204°C	TMR 2001 & Toolfusion®	Graphite filled epoxy
TMSF 5005	204°C	TMR 2001 & Toolfusion®	Silicon carbide filled epoxy
Infusioncoat	191°C	TMR 2001 & Toolfusion®	Graphite filled epoxy

Benefits

- Surface coat resins will eliminate mould 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.

Last updated: 2019-02-26



TOOLING RESIN PRODUCT SELECTION GUIDE

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CARBON AND FIBREGLASS FABRICS

AIRTECH

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	Fibreglass	Plain
TMFC 7544	Fibreglass	2 end plain

Last updated: 2019-02-26