

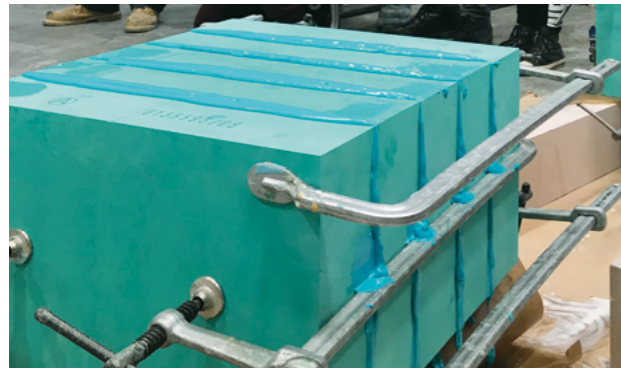


INSTRUKCJA PRACY

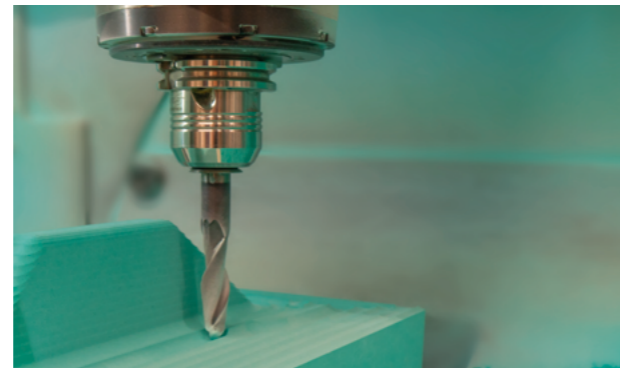
LAB 973 / 975 New Płyta epoksydowa

H 8973 Dopasowany klej

PRZEWODNIK DOTYCZĄCY WYKONANIA FORMY PRE-PREG LUB BEZPOŚREDNIEJ CZĘŚCI Z WYKORZYSTANIEM PŁYTY EPOKSYDOWEJ LAB 973/975 NEW



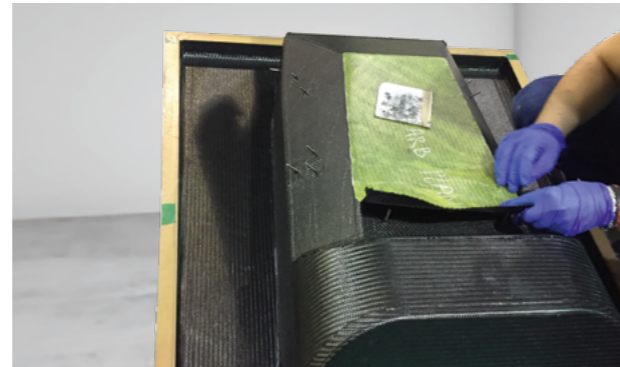
1 M



2 \ #V#



3 h



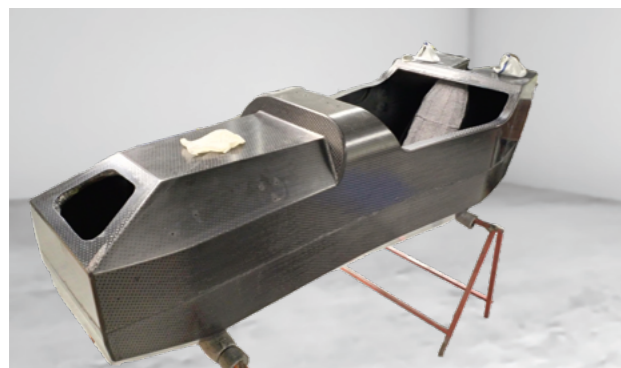
4 Obróbka prepregu Lay-up



5 Worki próżniowe do cyklu utwardzania w autoklawie



6 Forma z prepregu



7 Zmontowane części prepregowo



Źródło: Oxford Brookes Racing, FIS Berlin i Sika TS

WYKORZYSTANIE KOMPOZYTÓW WZMACNIANYCH WŁÓKNEM

od wielu lat rośnie w dwucyfrowym tempie w wielu branżach i przewiduje się, że będzie się to utrzymywać. Wśród różnych technologii produkcji, części kompozytowe wykonane z technologii prepreg są wykorzystywane w kilku branżach, takich jak lotnictwo, motoryzacja, łopaty wirników wiatrowych, przemysł morski itp. Obecnie technologia prepreg zapewnia najwyższą jakość części kompozytowych o niezrównanym stosunku premium - redukcja wydajności i wagi.

Sika Advanced Resins jest światowym liderem z wieloletnim doświadczeniem w dostarczaniu pakietów miękkich narzędzi do produkcji narzędzi lub części z prepregów. Oprócz wydajności naszych epoksydowych płyt narzędziowych i dopasowanego kleju z danymi dostępnymi w naszej karcie produktu (PDS), naszym celem jest wspieranie profesjonalistów poprzez doradzanie najlepszych praktyk przetwarzania, aby zapewnić pełną satysfakcję.

Ten przewodnik po przetwarzaniu pozwoli w szczególności nowym użytkownikom postępować zgodnie z naszymi zaleceniami na każdym etapie ich projektu. Od cięcia i klejenia płyty po hartowanie, frezowanie i wykańczanie powierzchni, ten przewodnik zawiera przydatne zalecenia dotyczące uzyskania idealnej matrycy lub formy bezpośredniej. Na koniec doradzamy, jaki cykl termiczny jest wymagany do zastosowania w przypadku prepregów do oprzyrządowania niskotemperaturowego na płycie głównej lub prepregów do części na jednorazowym oprzyrządowaniu bezpośrednim.

DOSTĘPNE ROZMIARY PŁYT

LAB 975 New
1500 x 500 x 50 mm
1500 x 500 x 75 mm
1500 x 500 x 100 mm
1500 x 500 x 150 mm
1500 x 500 x 200 mm

Możliwe większe wymiary płyt oraz bloki surowe odlewane masowo.

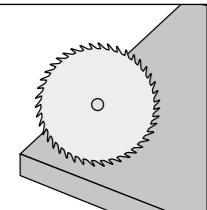
LAB 973
1500 x 500 x 50 mm
1500 x 500 x 75 mm
1500 x 500 x 100 mm

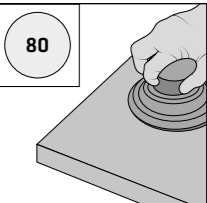
Możliwe większe wymiary płyt oraz bloki surowe odlewane masowo.

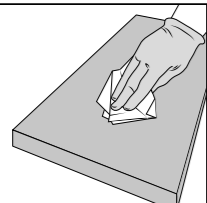
MATCHED ADHESIVE

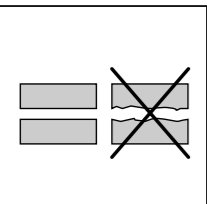
H 8973
wym. 2 x 6 x 0,43 kg
Utwardzacz: 12 x 0,061 kg

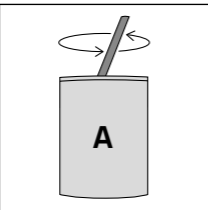
PROCESSING LAB 973/975 NEW AND THE ADHESIVE H 8973 STEP BY STEP

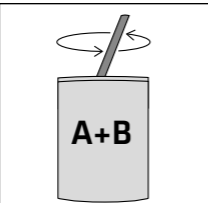
1  ■ Cut the board with a bimetal band saw blade or a hard metal circular saw blade.

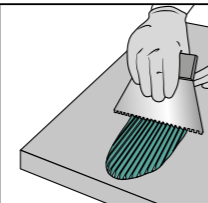
2  ■ Sand the boards with 80 grit sandpaper.
■ Remove the dust with a vacuum cleaner.

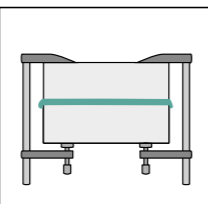
3  ■ Clean with **Adekit Cleaner** or Iso Propyl Alcohol and allow 15 minutes to evaporate.

4  ■ Surfaces to be bonded should be flat and parallel to each other.

5  ■ Open **H 8973** resin can and stir to ensure a homogenous aspect before adding the H 8973 hardener.

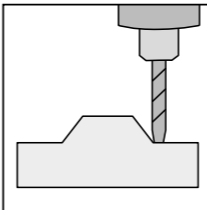
6  ■ Add the **H 8973** hardener according to the mixing ratio 100 (resin) : 14 (hardener) by weight.
■ Homogenize the mixture thoroughly.
■ The use of a kit (0.491 g) will cover almost 1 m².

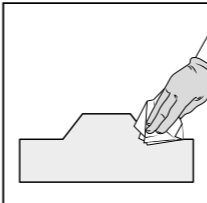
7  ■ Apply the mixture with a notched metal spatula (3 mm) on each side of the board to bond.
■ Manually adjust the positioning of the boards together by sliding them on top of each other.

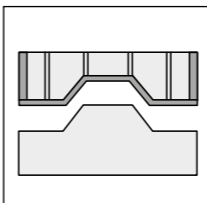
8  ■ Fix the assembly with sufficient clamps, a press or a vacuum bag.
■ Remove excess mixture squeezing out from the bonding lines between the boards.
■ Remove the clamps or the vacuum bag after 16 hours at room temperature (20–25 °C).

ACCORDING TO THE USAGE PLEASE FOLLOW INSTRUCTION A) OR B):

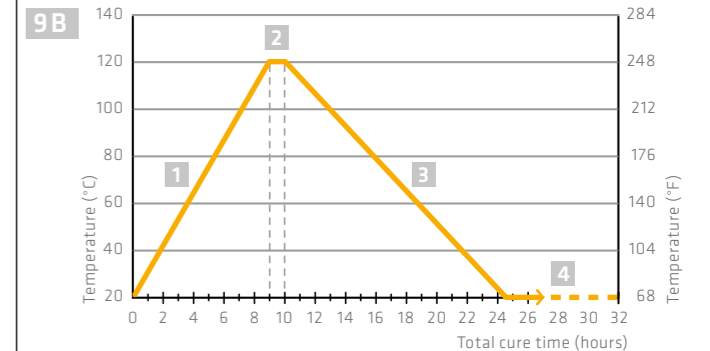
A) MASTER MODEL FOR LOW TEMPERATURE TOOLING PREPREGS

9A  ■ Mill the bonded boards with a CNC milling machine.
■ See milling parameters on page 7.

10A  ■ Final manual sanding with 800 grit or higher to remove milling steps.
■ Remove dust prior applying a sealer on the board with a clean and soft cotton cloth or a foam brush or by spraying method.
■ Please follow the instructions from ChemTrend L.P. (for example Chemlease® MPP 712 EZ) or Marbocote Ltd. (for example HP2002).

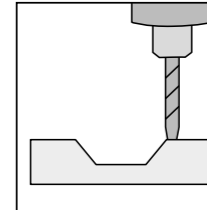
11A  ■ Master model for tooling prepregs.

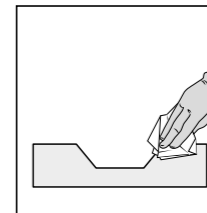
B) DIRECT MOULD TO PRODUCE PREPREG PARTS UP TO 120 °C

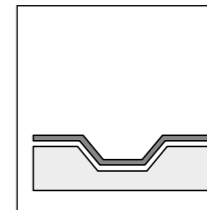


Temper the assembled boards free standing:

- 1 Ramp up to 120 °C (+11°/h).
- 2 Hold on for 1 hour.
- 3 Ramp down to 20–25 °C (–7°/h).
- 4 Allow to cool down up to 12 hours for a 200 mm blockup.

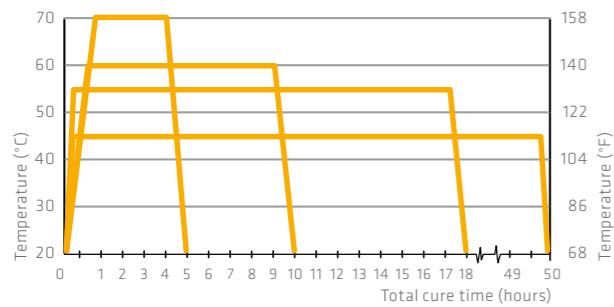
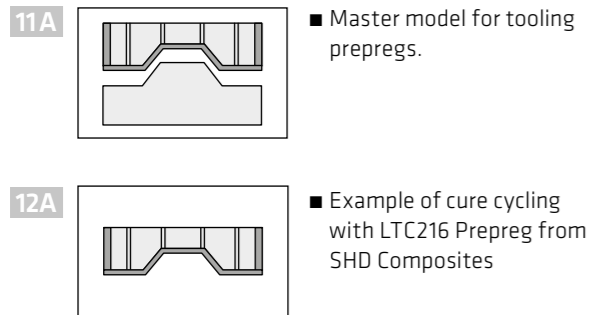
10B  ■ Mill the assembled boards with a CNC milling machine.
■ See milling parameters on page 7.

11B  ■ Final manual sanding with 800 grit or higher to remove milling steps.
■ Remove dust prior applying a sealer on the board with a clean and soft cotton cloth or a foam brush or by spraying method.
■ Please follow the instructions from ChemTrend L.P. (for example Chemlease® MPP 712 EZ) or Marbocote Ltd. (for example HP2002).

12B  ■ Please turn to page 6 for further process to produce parts.

PREPREG CURING CYCLES

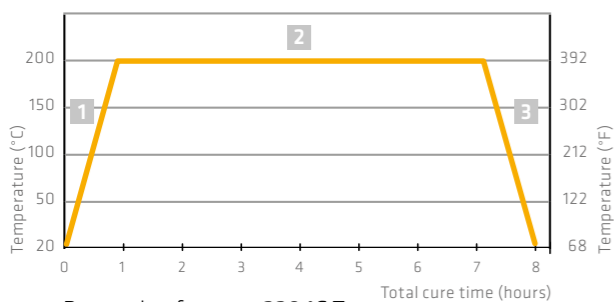
A) PRODUCING OF LOW TEMPERATURE TOOLING PREPEGS



Temperature	Ramp up	Hold	Ramp down
45 °C	> 25 min	40-50 h	> 25 min
55 °C	> 35 min	16-18 h	> 35 min
60 °C	> 40 min	10 h	> 40 min
70 °C	> 50 min	5 h	> 50 min

Please refer to SHD Composites PDS for detailed instructions.

13A Postcuring LTC216 after demolding from master model

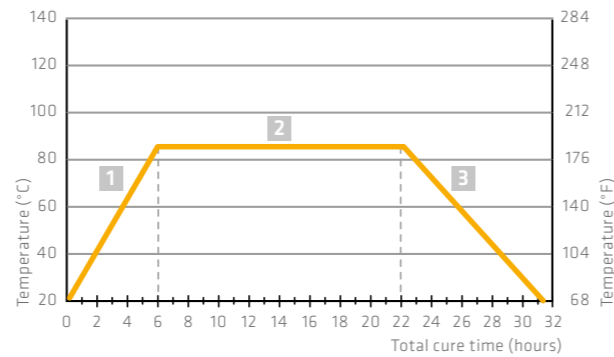
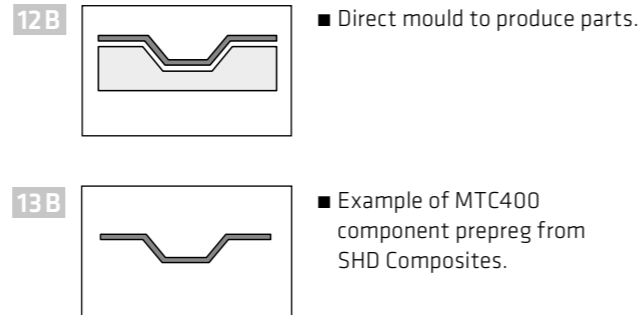


Postcuring for max. 220 °C T_g:

- Ramp up to 200 °C (18°/h).
- Hold on for 8 hours.
- Ramp down to 200 °C (-18°/h).

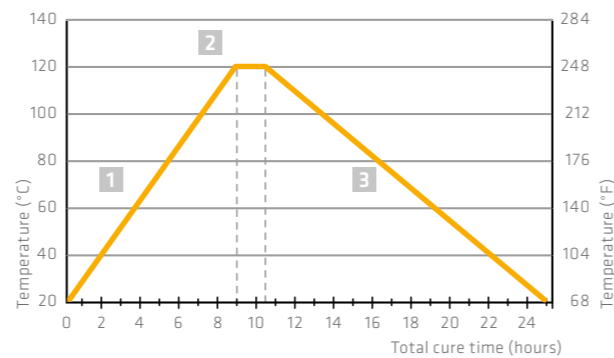
Please refer to SHD Composites PDS for detailed instructions.

B) PRODUCING PARTS UP TO 120 °C



85 °C Cure cycle for 90 °C T_g

- Ramp up to 85 °C (11°/h).
- Hold on for 16 hours.
- Ramp down to 20 °C (-7°/h).



120 °C Cure cycle for 135 °C T_g

- Ramp up to 120 °C (11°/h).
- Hold on for 1 h 30 min.
- Ramp down to 20 °C (-7°/h).

14B Please refer to SHD Composites PDS for detailed instructions to obtain higher T_g up to 225 °C.

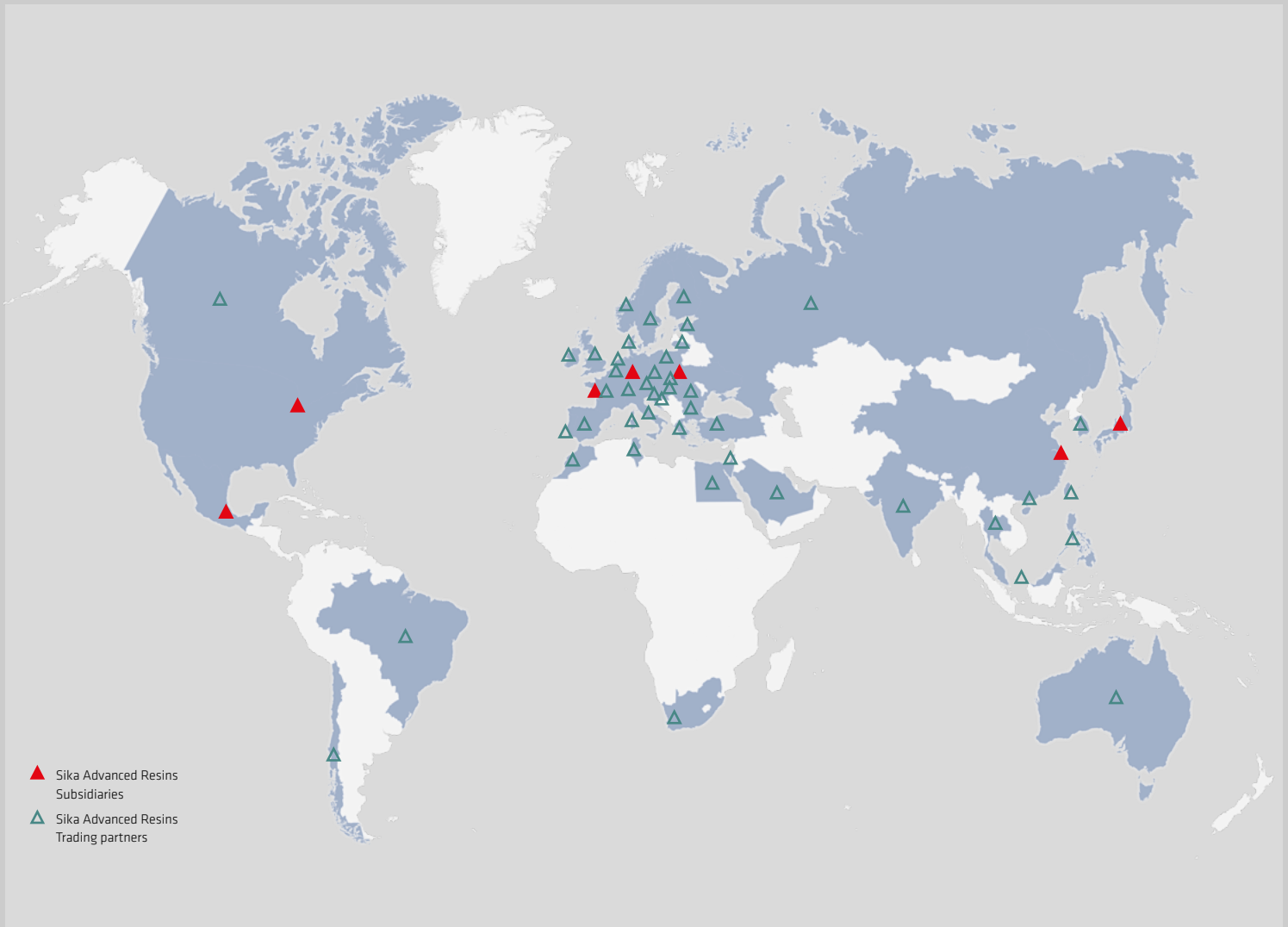
CNC MILLING PARAMETERS FOR LAB 973/975 NEW

MILLING PARAMETERS							
Milling steps	1	2	3	4	5	6	7
Strategy	Roughing Z-constant	Rest material Z-constant	Rest material Z-constant	Rest material Z-constant	Finishing flat areas	Finishing Z-constant	Finishing rest material shapes
Milling tool	Torus cutter	Torus copying cutter	Ball nose copying cutter	Ball nose copying cutter	Torus copying cutter	Ball nose copying cutter	Solid carbide ball nose cutter
Diameter [mm]	42	20	12	6	8	8	4
Number of teeth	3	2	2	2	2	2	2
Radius [mm]	3	4	6	3	1	4	2
Cutting speed (Vc) [m/min]	540	500	600	300	400	400	200
Revolutions [1/min]	4,100	7,957	16,000	16,000	16,000	16,000	16,000
Feedrate per tooth [mm]	0.6	0.5	0.2	0.18	0.13	0.13	0.13
Feed rate (Vf) [mm/min]	7,380	7,957	6,366	5,760	4,160	4,160	4,160
Cutting depth (ap) [mm]	3	2	1	0.3	0.3	0.15	0.1
Cutting Width / Line spacing (ae) [mm]	30	10	2	0.5	4	0.3	0.1



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