

Small Repairs of Composite Material Parts

A35-10SMRE, Rev. 5

STEMME Aircraft
Series S10 and TSA-M

Issued: August 2012

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0.1. Record of Revisions

Any revision to the present guideline must be recorded in the following table.

The newly changed text in the revised page will be indicated by a black vertical line in the right-hand margin, and the Revision Date will be shown in the right footer section of the page.

Rev. No.	Date	Pages affected	Reason for Revision	Signature
---	Dec. 01, 1991	all	Initial issue	---
1	Oct. 13, 1997	i, ii, iii, iv, 3.2, 3.2a, 3.3, 4.2, 4.3, 4.4, 4.5	Amendment for acrylic paint	---
2	Aug. 27, 2003	ii, iii, 3.2a, 4.3, 4.4, 4.5	Amendment for acrylic paint	---
3	Nov. 27, 2003	ii, iii, 3.2a, 4.4, 4.5	Amendment for filler	---
4	Jan. 22, 2004	ii, iii, iv, 3.2a, 4.4, 4.5, 4.6	Amendment for acrylic paint	---
5	Aug. 29, 2012	all	All new issue respective S10 and TSA-M Series	---

0.2. List of Effective Pages

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1. General Remarks on the Repair

The purpose of this repair guideline is to provide basic repair instructions for minor damage to the GFRP and CFRP structure of the powered glider types (Glass and Carbon Fibre Reinforced Plastics). Detailed information regarding all the processing of GFRP and CFRP is not given in this guideline since it is assumed that all repair work will only be carried out by people with practical experience in the use of these materials. Further information can be found in MIL-HDBK-23, Part 1, U.S. Government Printing Office, Washington 25 D.C., USA.

The repair of gliders should not be used to learn FRP laminating techniques.

Before beginning any repair work carefully determine what materials, tools, jigs and repair methods are to be used. The required information can be found partly in this guideline. To ensure that the performance of the aircraft is maintained, the surface finish of repair work should be of the same quality as the original finish.

If there are any doubts as to whether the damage can be repaired, contact the STEMME factory for further information.

The information in this guideline refers only to repairs of minor damage like holes in the underside of the fuselage, or damage from hangar accidents etc.

Repairs according to this classification can be considered as minor repairs.

Major repairs which are outside the scope of this guideline must be repaired by a certified repair workshop authorised to carry out composite aircraft structure work in accordance to a maintenance instruction approved by the design organization EASA.21J.250 of the STEMME Company.

For the conversion of technical data the following factors have been used:

1 in.	25.4 mm
1 oz.	28.3 g
1 sq ft	0.0929 m ²

The translation and conversion of the technical data have been performed to our best knowledge and judgement. The original version in German is authoritative.

2. Definition of damages

2.1. Minor damages

Only the damages listed below can be considered as small damages and repaired by qualified personnel:

- a) Any damages limited to varnish or filler
- b) Permissible dimensions of holes, dents and cracks are listed in the following table:

RFP Parts	Average Hole or Dent Diameter		Crack Length
	[in.]	[mm]	[in.]
Front fuselage (cockpit)	2	50	3
Tail boom (rear fuselage)	1	25	2
Wing	3.2	80	4.8
Flap, Aileron	1	25	1.6
Rudder, Elevator	1	25	2
Horizontal Tail/Fin	1.2	30	2

The parts above should not be damaged in force intersection or reinforced areas (i.e. spars, ribs).

If a repair on a control surface is necessary, also refer to the Maintenance Manual (S10 series: chapter 6.4, TSA-M series: chapter 06-10-00).

NOTE: All control surfaces have to be checked for weight and control surface moment after repair!

2.2. Additional Restrictions

In general, all repair work on force intersection and reinforced areas must be carried out by a certified repair station for composite aircraft structure work. An overview of the main critical areas is shown in **Fig. 1.1 for S10 series** and **Fig.1.2 for TSA-M series**.

If there are any doubts, please contact the manufacturer.

WARNING: Damages in the marked areas shown in Figures 1.1 and 1.2 are to be considered as major damages!

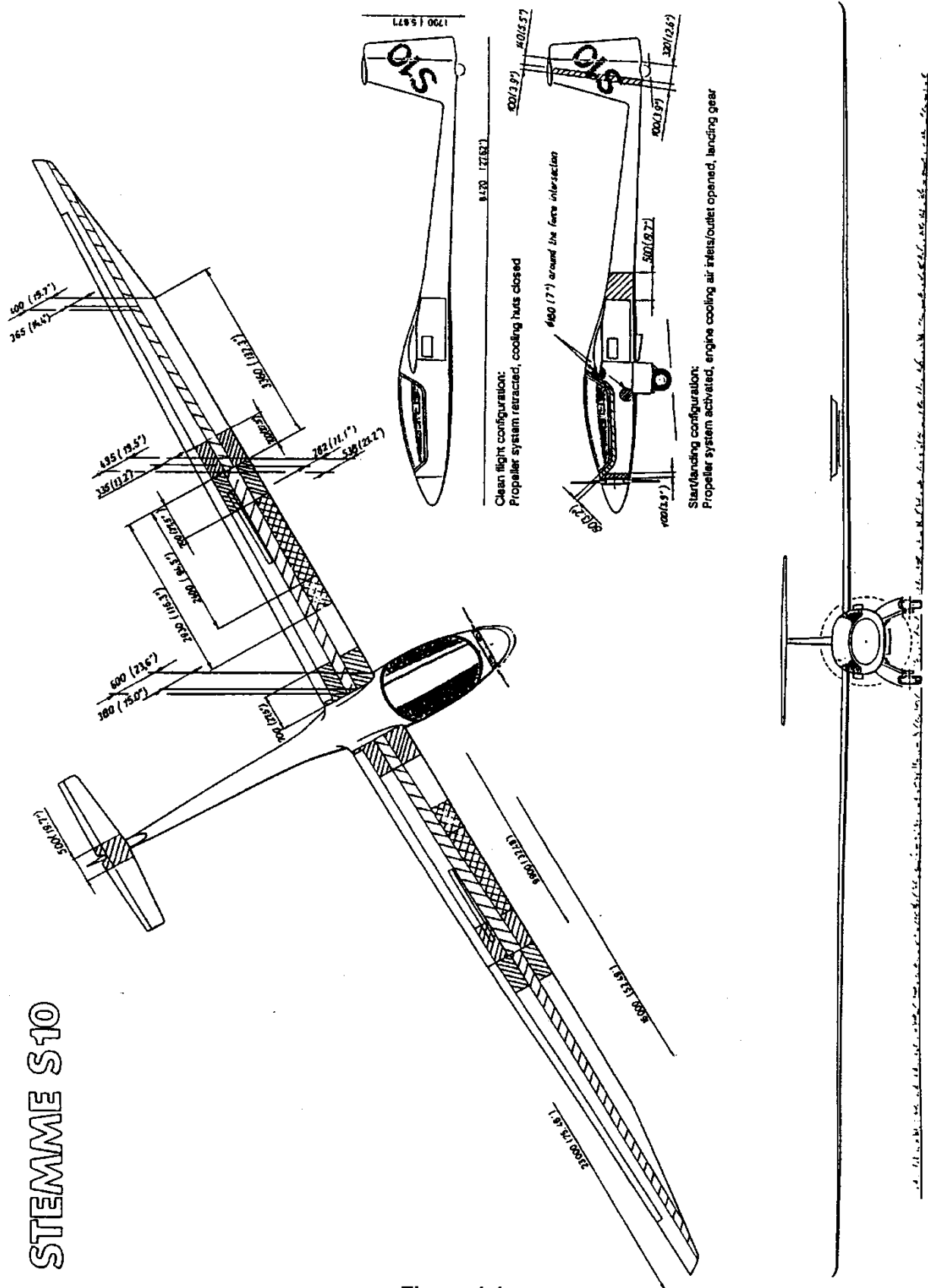


Figure 1.1
Major damage areas for S10 series

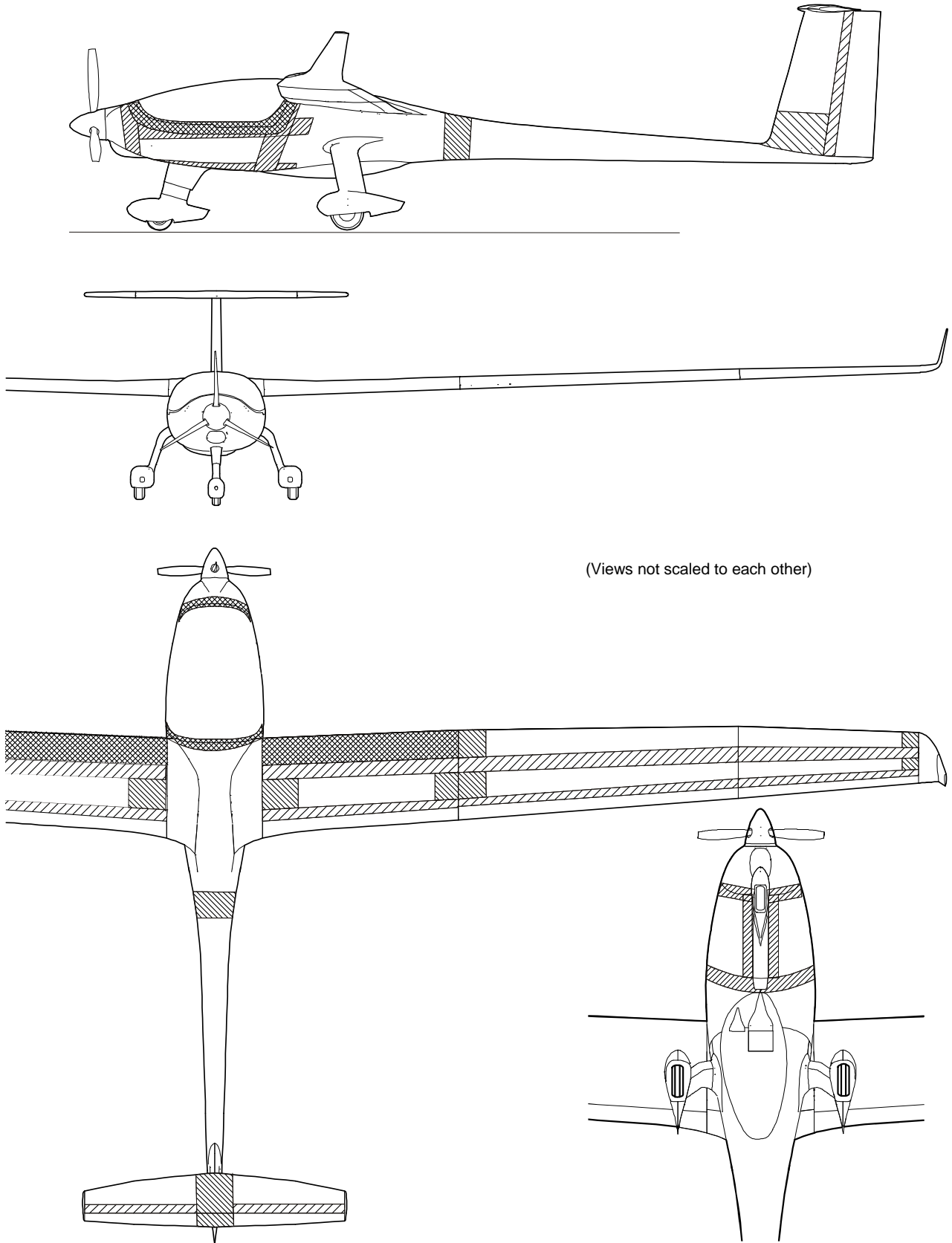


Figure 1.2
Major damage areas for TSA-M series

3. Material list for FRP Repairs

3.1. Material for all Stemme aircraft

3.1.1. Types of composite fiber materials and their overlap dimensions

Glass fabrics

INTERGLAS No.	WLB-No. LN 9169	Weight		Weave Pattern	Overlap
		[oz/sq ft]	[g/m ²]		[in.]
90070	8.4505.60	0.26	80	plain	0.5
92110	8.4548.60	0.54	163	twill 2/2	0.8
92125	8.4551.60	0.92	280	twill 2/2	1.2
92140	8.4554.60	1.28	390	twill 2/2	1.6

For all glass fabrics: Finish I 550

Manufacturer: INTERGLAS AG
Benzstraße 14
D-89155 Erbach
Tel.: ++49 (0) 7305-955 444

Carbon fabrics

INTERGLAS No.	WLB-No. LN 9169	Weight		Weave Pattern	Overlap
		[oz/sqft]	[g/m ²]		[in.]
98140	8.3509.80	0.66	200	plain	1.2

Manufacturer: INTERGLAS AG
Address see: Manufacturer Glass Fabrics

UD- Carbon fabrics

Repairs of damages on the primary structure including carbon tapes are considered as major repairs and must be performed by a certified repair station rated for composite aircraft structure work.

Kevlar fabrics

INTERGLAS No.	WLB-No. LN 9169	Weight		Weave Pattern	Overlap
		[oz/sq ft]	[g/m ²]		[in.]
98612	5.2237.30	0.55	170	twill 2/2	0.6

Manufacturer: INTERGLAS AG

Address see: Manufacturer Glass Fabrics

3.1.2. Rovings

Repairs of damages on the primary structure including glass or carbon rovings are considered as major repairs and must be performed by a certified repair workshop authorised to carry out composite aircraft structure work.

3.1.3. Resin and hardener

Manufacturer: Martin G. Scheufler GmbH (MGS Kunstharzprodukte GmbH)
Am Ostkai 21/22
D- 70327 Stuttgart
Germany
Tel: ++49 (0) 711-323081

Laminating resin: Scheufler L285

Hardener: Scheufler 285, 286 or 287

Mixture ratio: 100:40 parts by weight
100:50 parts by volume

Processing temperature: 60 – 86°F (15 – 30°C)

Setting: 24h/68 – 77 °F (24h/20 – 25°C)

Heat treatment (tempering): 15h/122 – 131°F (15h/50 – 55°C)

3.1.4. Foam

Manufacturer: Divinycell International GmbH
Max-von-Laue-Straße 7
D-30966 Hemmingen
Germany
Tel: ++49 (0) 511-20340

Type: Divinycell H60

Thickness		Application
[in.]	[mm]	
0.118	3	Rudder
0.157	4	Wing flaps, Aileron, Outer wing
0.315	8	Inner wing, Vertical Fin, Horizontal Fin, Centre Fuselage Cowling

3.1.5. Paint

UP- Gelcoat

Manufacturer: Martin G. Scheufler GmbH (MGS Kunstharzprodukte GmbH)
Address see Section 3.1.3.

Type: UP Gelcoat T35

Hardener: SF 2

Mixing ratio: 100 : 2 parts by weight

Thinner: SF (add up to 10 %)

Pot life approx.: 15- 20 min. at 68 °F (20°C)

Gelling time approx.: 60 min., depending on temperature and layer thickness

Non tacky after approx.: 1-2 h at 68-77 °F (20-25 °C)

Full strength after approx.: 10-12 h at 68-77 °F (20-25 °C)

Acrylic Paint

	Filler Type A	Filler Type B	Paint Type A	Paint Type B
Manufacturer:	Lesonal Sieglesstraße 29 P.O. box 30 07 09 D-70469 Stuttgart Germany	Lesonal Sieglesstraße 29 P.O. box 30 07 09 D-70469 Stuttgart Germany	Lesonal Sieglesstraße 29 P.O. box 30 07 09 D-70469 Stuttgart Germany	Akzo Nobel Car Refinishes bv Rijksstraatweg 31 NL-21AJ Sassenheim Netherlands
Type:	F21 EP- filler, white	Lesonal 2k Epoxy Filler	Kl. 53 Carcoat BT	Mason Super Thane 2K S80 Topcoat
Recipe N ^o :	02 - 69012	---	53 - ..., RAL 9016 (for S/N 11-002 to 11005 and 11-008 to 11-028) BT-300 (for others S/N)	mixed by: Mason Super Thane 2K S80 Binder and Mason Super Thane 2K S80 Mixcolour 01 part by volume 60:40
Hardener:	Z21	Hardener for Lesonal 2k Epoxy Filler	Z53	Mason Super Thane 2K S80 H5 Standard
Recipe N ^o :	07 - 21020	---	07 - 20102	---
Thinner:	V 85	Lesonal Multi Thinner HT	V 53	Mason Super Thane 2K S80 T5 Standard
Recipe N ^o :	06 – 30052	---	06 – 30097	---
	---	---	V 85 B	---
	---	---	06 - 10025	---
Mixing ratio:	4:1:1 parts by volume	2:1:0,8 parts by volume	4:1:1 parts by volume	2:1: up to max. 0,15 parts by volume
Pot life:	8 h at 68°F (20°C)	6h at 68°F (20°C)	2,5 h at 68°F (20°C)	8 h at 68°F (20°C)
Non tacky after approx.:	---	30 min at 68°F (20°C)	2 h at 68°F (20°C) or 40 min at 104 °F (40 °C)	10-15 min at 68°F (20°C)
Full strength after approx.:	12 h at 68°F (20°C)	8h min at 68°F (20°C)	12 h at 68 °F (20 °C) or 2 h at 104 °F (40 °C)	6- 8 h at 68°F (20°C)

Polyurethane Enamel

Manufacturer: Du Pont de Nemours (Deutschland) GmbH
Horbeller Str. 15
D- 50858 Köln
Tel.: ++49 (0) 60191620

Type: Imron 700
Binder: Polyurethane Binder AU170
Hardener: Polyurethane Activator AU270
Thinner: Polyurethane Thinner AU370
Mixing ratio: 4:1: 0.5 up to 1
Pot life approx.: 4 h at 68 °F (20°C)
Non tacky after approx.: 0.5 h at 68 °F (20°C)
Full strength after approx.: 12 h at 68 °F (20 °C)

Filler for Polyurethane Enamel

Manufacturer:	Du Pont de Nemours (Deutschland) GmbH Horbeller Str. 15 D- 50858 Köln Tel.: ++49 (0) 60191620
Type:	2K- Acrylic- Primer DuPont LE2001
Binder:	LE2001 Primer (White)
Hardener:	DuPont AK260
Thinner:	DuPont XB383
Mixing ratio:	5:1: up to 0.25
Grindable after approx.:	4 h at 68 °F (20°C)

Fire Resisting Paint

The Fire Resisting Paint covers inside surfaces of composite parts situated around the engine compartment (e.g. cowlings) and covers also composite parts situated in the exhaust plume.

The Fire Resisting Paint is a coating system by two components. First the Fire Resisting Paint as base coat and second the Clear Coat for covering the Fire Resisting Paint.

Manufacturer:	Courtaulds Aerospace
Supplier:	Röder Präzision GmbH Flugplatz D- 63329 Egelsbach
Type:	N56582/T508
Hardener:	---
Thinner:	water
Mixing ratio:	pure for painting, 9:1 for spraying
Pot life:	---
Non tacky after approx.:	2h at 68°F (20°C)
Full strength after approx.:	8 h at 68°F (20°C)

Clear Coat for Fire Resisting Paint

	Clear Coat for Fire Resisting Paint	
	Type A	Type B
Manufacturer:	Courtaulds Aerospace	Spieß- Hecker GmbH Horbeller Str. 17 D- 50858 Köln
Supplier:	Röder Präzision GmbH Flugplatz 63329 Egelsbach	DuPont Performance Coatings Logistikcenter Berlin Motzener Str. 19 D-12277 Berlin
Type:	Clear Coat 4232-0303	Permasolid HS Clear Coat 8035
Hardener:	N39/ 1327 or N50/2509	Permasolid HS 3310
Thinner:	N39/ 3091	Permacron Thinner 3380
Mixing ratio:	4:2:1,5	2:1 :0,75
Pot life:	2 h at 68°F (20°C)	1h at 68°F (20°C)
Non tacky after approx.:	---	30 min at 68°F (20°C)
Full strength after approx.:	24 h at 68°F (20°C)	24h at 68°F (20°C)

3.1.6. Filler

Chopped Cotton Fibre

Manufacturer: Schwarzwälder Textilfabrik
Austr. 3
D-77773 Schenkenzell
Germany
Tel: ++49 (0) 7836-570

Type: FB1/035 (white)

Microballoon

Manufacturer: Brenntag AG
Postfach 100 352
D-45403 Mülheim (Ruhr)
Germany
Tel: ++49 (0) 208-494-0

Type: BJ0-0930 (brown)

Polyester Filler

Manufacturer: VOSS Chemie GmbH
Esinger Steinweg 50
D-25436 Uetersen
Germany
Tel: ++49 (0) 4122-717-0

Filler: Ferro-Elastic-Weiß (FEW)
Hardener: BPO farblos (colourless)
Mixture ratio: 100:1 to 3 parts by weight
Pot life: approx. 4 min

Thixotropic Agents

Manufacturer: VOSS Chemie GmbH
Esinger Steinweg 50
D-25436 Uetersen
Germany
Tel: ++49 (0) 4122-717-0

Type: Aerosil

Manufacturer: CABOT GmbH

Supplier: Lange + Ritter GmbH
Dieselstraße 25
D-70839 Gerlingen
Germany
Tel.: ++49 715620060

Type: CAB-O-SIL M5

3.1.7. Polish

Polish for UP- Gelcoat

Distributor: Matzerna- Werk GmbH KG
Industriestr. 25
D-76470 Ötigheim
Germany
Tel.: ++49 (0) 7222-91 57 0

Type: Polish PO 25/2
Glanzwachs 16

Polish for Acrylic Paint

Manufacturer: Farecla Products Ltd.
Broadmeads, Ware, Herts. SG12 9HS, England
Tel.: ++44 (0) 920 485 548

Type:

- a) Rubbing compound „Rapid Grade G6“ (STEMME part no. A301)
- b) Superfinish rubbing compound „Regular Grade G3“ (STEMME part no. A302)
- c) Superfinish liquid compound „Extra Fine Grade G10“ (STEMME part no. A303)
- d) Superfinish Compound Applicator „G-Mop M14“ (STEMME part no. A304)

Polish for Polyurethane Enamel

Manufacturer: 3M Deutschland GmbH
Carl- Schurz- Straße 1
D- 41453 Neuss
Germany
Tel.: ++49 (9) 2131- 0

Type:

- a) Rubbing compound “3M Perfect-it III 51052 Fast Cut XL” (STEMME part no. A324)
- b) Polish “3M Perfect-it III 9376” (STEMME part no. A325)

3.2. Material for S10 series only

3.2.1. Types of composite fibre materials and their overlap dimensions

Glass Fabrics

INTERGLAS No.	WLB-No. LN 9169	Weight		Weave Pattern	Overlap
		[oz/sq ft]	[g/m ²]		[in.]
92145	8.4520.60	0.72	220	unidirectional	2.0

For all glass fabrics: Finish I 550

Manufacturer: INTERGLAS AG

Address see: Section 3.1.1

Carbon fabrics

INTERGLAS No.	WLB-No. LN 9169	Weight		Weave Pattern	Overlap
		[oz/sqft]	[g/m ²]		[in.]
98340	-	0.56	170	unidirectional	2.0

Manufacturer: INTERGLAS AG

Address see: Section 3.1.1

3.3. Material for TSA-M series only

3.3.1. Types of composite fibre materials and their overlap dimensions

Carbon fabrics

INTERGLAS No.	WLB- No. LN 9169	Weight		Weave Pattern	Overlap
		[oz/sqft]	[g/m ²]		[in.]
98141	8.3520.80	0.66	200	2 x 2 twill	1.2
98130	8.3508.80	0,53	163	plain	1.2
98110	8.3520.80	0,30	93	plain	0.6

Manufacturer: INTERGLAS AG

Address see: Section 3.1.1

3.3.2. Foam

Manufacturer: Divinycell International GmbH
 Max- von- Laue- Straße 7
 D-30966 Hemmingen
 Germany
 Tel: ++49 (0) 511-20340

Type: Divinycell H60

Thickness		Application
[in.]	[mm]	
0.236	6	elevator, cockpit
0.472	12	wing

4. Instructions for FRP Repairs

4.1. General

To ensure optimal working conditions, the room temperature during repair work and at least 12 hours later should be maintained between 68-77°F (20-25°C). After setting, the parts can be tempered. It may be necessary to make a tempering tent using a plastic foil or styrofoam panels.

The humidity should not be greater than 50%.

Repairs should be carried out so that the bonding is wet over dry. The outline of the repair hole must be round. For plain and twill 2/2 woven fabrics the sanded slope should be 1:50 and for unidirectional fabrics it should be 1:100 relating to the depth of the repair. The component weight of resin and fabric must be equal (50:50).



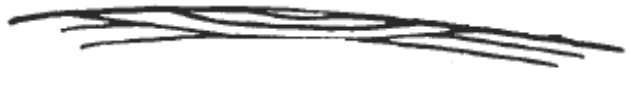
Specific details concerning the handling and use of fibre reinforced plastics can be obtained from various publications i.e. „Petite Plane Patch Primer“.

Note: - Only materials listed in Section 3 must be used.






- This guideline is applicable only for minor damages as defined in Section 2.1.

Is the layer setup unclear contact the manufacturer or order the documentation for manufacturing.

4.2. Repairing on a FRP Shell

<p>(1) Cut out the damaged area and roughen the surrounding area for the required overlap (see Section 3.1.1/ 3.2.1/ 3.3.1). Sand the shell so that the individual layers of fabrics can be seen like plywood layers. Roughen the coating (25 mm) around the repair.</p>	
<p>(2) Lay up the repair plies according the existing layer direction. If the layer orientation is not clear please contact Stemme AG.</p>	
<p>(3) After the resin has cured use the sandpaper to get the old contour. Finish the repaired area by using the Acrylic Paint or Polyurethane Enamel (see Section 3.1.5. and 4.5).</p>	

4.3. Repairing the Outer Skin of a Sandwich Panel

<p>(1) Cut out the damaged area and roughen the surrounding area with 80 grit sandpaper.</p>	
<p>(2) Fill the damaged foam area with resin thickened by microballoons and let it harden.</p>	
<p>(3) Sand the area down and laminate the new fabrics onto the repair.</p>	
<p>(4) Lay up the repair plies according the existing layer direction. Note the orientation. If the layer orientation is not clear please contact Stemme AG.</p>	
<p>(5) Sand the area down to the old contour. Finish the repaired area by using the Acrylic Paint or Polyurethane Enamel (see Section 3.1.5 and 4.5).</p>	

4.4. Repairing the Outer and Inner Skin of a Sandwich Panel

For the first step see Section 4.3. Additionally remove as much foam as necessary so that the entire damage to the inner skin plus enough undamaged inner skin as is required for overlapping can be seen. Remove the damaged inner skin. If the inner skin remains strong enough to provide a basis for laminating, ensure a gap of 0.04 - 0.02 in. (1-2 mm) for glueing the foam. Sand properly and laminate the new fabrics over it. Insert a suitably cut piece of foam and glue it with resin thickened by microballoons.

If the inner skin is damaged to such an extent that the above procedure cannot be used, the inner skin fabrics should be applied to the foam first and, after hardening, glued with resin thickened by a small amount of chopped cotton fibres.

For laminating on the foam, a thin layer resin thickened by microballoons should be applied to the foam to avoid air bubbles.

4.5. Outer Skin Finish

Depending on the wishes of the customer, the material for the outer skin finish of all composite parts, except the propeller, is either UP- Gelcoat, Acrylic Paint or Polyurethane Enamel. The propeller is painted with UP- Gelcoat.

4.5.1. UP- Gelcoat

The repair should be such that the repaired area is exactly level or only slightly higher than the surrounding skin surface.

Sand the tempered repair surface with dry 80 to 120 grade sandpaper. Fill with Polyester Filler, leave to dry and sand again with dry sandpaper. When the surface is smooth, sand the repair area and at least 1 in. (25 mm) of the surrounding gelcoat with wet sandpaper grade 400. Spray the repair area with 2 coats of Gelcoat T35.

After the Gelcoat has hardened, sand with 600 and 800 grade and wet sandpaper until the surface is smooth. Polish with a power angle sander (electric drill or similar with cloth polish wheel). Apply a wax to the rotating polishing wheel and then polish the repaired area. Do not polish in only one direction and do not polish one spot for too long so that overheating occurs.

For further information contact the manufacturer (refer to 3.1.3., internet: www.mgs-online.com) or STEMME company.

4.5.2. Acrylic Paint

Before the acrylic paint „Kl. 53 Carcoat BT“ or “Mason Super Thane 2K S80” can be sprayed, the surface must be coated with a thin layer of “F21 EP- Filler, white” or “Lesonal 2k Epoxy Filler”. Filler and paint are a system and therefore do not try to spray acrylic paint on surfaces without EP- filler. If the layer of filler is still intact, steps 1 and 2 can be omitted.

(1) Preparations for EP- Filler

- Sand the repair area until its surface is smooth and without holes. Use wet sandpaper, grade 800, for the last step.
- Clean the surface with fresh water and dry it. If necessary, use compressed air to rid the surface of dust and particles.
- A dust-free room is required for spraying.

(2) Filler

(2.1) F21 EP- Filler, white

- Mix the components thoroughly before spraying: 4 parts Lesonal F21 EP-filler, 1 part Lesonal Z21 hardener, 1 part Lesonal V85 thinner (all parts by volume; the pot life is 8 hours at 68°F (20°C))
- Spray 3 to 4 thin layers of filler so that the layers melt into each other.
- Let the filler harden for 12 hours at 68°F (20°C). **Attention!** EP-Filler does not harden below 59°F (15°C) !
- Sand the filler with wet sandpaper, grade 800, until everything is smooth and without holes again

(2.2) Lesonal 2k Epoxy Filler

- 2“Hardener for Lesonal 2k Epoxy Filler” and 0,8 parts “Lesonal Multi Thinner HT” (all parts by volume; the pot life is 6 hours at 68°F (20°C)).
- Spray 2 to 3 thin layers of filler so that the layers melt into each other.
- Let the filler harden for 8 hours at 68°F (20°C).
- Sand the filler with wet sandpaper, grade 800, until everything is smooth and without holes again.

(3) Preparations for Acrylic Paint

- Sand the surface with wet sandpaper, grade 1200, within approximately 400 mm around the repair area.
- Clean the surface with fresh water and dry it. If necessary, use compressed air to rid the surface of dust and particles.
- A dust-free room is required for spraying.
- Before spraying the repair area, make sure that the colour of the acrylic paint exactly matches the colour of the motor glider’s surface. Make a test specimen, for example a test spraying, to verify this. Compare the colour of the hardened paint with the colour of the motor glider.

(4) Acrylic Paintings

(4.1) Acrylic Paint “Kl. 53 Carcoat BT”

- Mix the components thoroughly before spraying: 4 parts Lesonal Kl. 53 Carcoat BT, 1 part Lesonal Z53 Carcoat BT hardener, 1 part Lesonal V53 Carcoat BT thinner (all parts by volume; the pot life is 2.5 h at 68°F (20°C)).
- Spray the prepared area. Spray up to 4 thin layers of acrylic paint so that the layers melt into each other. Wait for about 10 minutes before applying the next layer. Add 1.5 to 2 parts (by volume) of V53-thinner to the paint for the last layer.
- Wait for about 1 to 2 minutes after the last layer of paint has been sprayed, pour the rest of the paint out of the spray gun, add a small amount of Lesonal V85 B thinner, and spray the thinner in a thin haze on the prepared area (i.e. the whole sanded area).
- Let the acrylic paint harden for 48 hours at 68°F (20°C), or 16 hours at 104°F (40°C) respectively.
- Sand the painted area carefully by use of wet sandpaper, grade 1200.

(4.2) Acrylic Paint “Mason Super Thane 2K S80”

- Mix the components thoroughly before spraying:
2 parts Mason Super Thane 2K S80 Topcoat, 1 part Mason Super Thane 2K S80 Hardener H5 Standard and up to 0.15 parts Mason Super Thane 2K S80 Thinner T5 Standard. (all parts by volume; the pot life is 8 h at 68°F (20°C)).
- Spray the prepared area. Spray up to 3 layers of acrylic paint so that the layers melt each into the other. Wait for about 10 minutes before applying the next layer.
- Let the acrylic paint harden for 6-8 h at 68°F (20°C).
- Sand the painted area carefully by use of wet sandpaper, grade 1200.

(5) Polish

- Clean the surface with a sponge and fresh water, then dry it again.
- Spread a very small amount of polish type „Rapid Grade G6“ and some fresh water over the surface, then polish the surface using a water-soaked Superfinish Compound Applicator „G-Mop M14“ at about 1,500 rpm.
- After the scratches caused by the sandpaper have disappeared, clean the surface and the compound applicator with fresh water, then continue with polish type „Regular Grade G3“.
- fresh water again, then continue with polish type „Extra Fine Grade G10“.
- Clean the surface with a sponge, fresh water, and if necessary some acetone, then dry it again.

After the completion of the polish, the surface must not be dull. If this is the case, start the polish again from the beginning.

4.5.3. Polyurethane Enamel

Before the Polyurethane Enamel can be sprayed, the surface must be coated with a thin layer of Filler DuPont LE2001. Filler and paint are a system and therefore do not try to spray Polyurethane Enamel on surfaces without filler. If the layer of filler is still intact, steps 1 and 2 can be omitted.

(1) Preparations for Filler DuPont LE2001

- Sand the repair area until its surface is smooth and without holes. Use sandpaper grade 280 first and sand with grade 500 wet, for the last step.
- Clean the surface:
 - blow with compressed air (free from oil) or aspirate by vacuum cleaner
 - clean with Isopropanol (10 min ventilating time)
 - final cleaning with tack rag (e.g. DuPont Sontara SPS Primary Tack Cloth, green)
- A dust- free room is required for spraying.

(2) Filler for Polyurethane Enamel

- Mix the components thoroughly before spraying: 5 parts “Filler DuPont LE2001”, 1 part “Hardener DuPont AK260” and up to 0.25 parts “Thinner DuPont XB383” (all parts by volume; the pot life is 2 hours at 68°F (20°C)).
- Spray 2 layers of filler with 5 min airing time between.
- Let the filler harden 4 hours at 68°F (20°C).

(3) Preparation for Polyurethane Enamel

- Slightly sand the repair area with sandpaper grade 360.
- Than Sand wet with sandpaper grade 800.
- Clean the surface:
 - Blow with compressed air (free from oil) or aspirate by vacuum cleaner
 - Clean with water and soap and dry with a clean cloth
 - Clean with Isopropanol (10 min ventilating time)
 - Final cleaning with tack rag (e.g. DuPont Sontara SPS Primary Tack Cloth, green)

(4) Polyurethane Enamel Coating

- Mix the components thoroughly before spraying:
4 parts DuPont Polyurethane Binder AU170, 1 part DuPont Polyurethane Hardener AU270 and up to 1 parts DuPont Polyurethane Thinner AU370.
(All parts by volume; the pot life is 4h at 68°F (20°C)).
- Spray the prepared area. Spray 2 layers of Polyurethane Enamel Coating so that the layers melt each into the other. Wait for about 10 minutes before applying the next layer.
- Let the Polyurethane Enamel harden 12h at 68°F (20°C).

Further methods for repair spraying described in Technical Specification A26-B071.

(5) Polish

- Sand wet the repair area by fine sanding disc Grade 1500 (e.g. 3M Trizact P1500)
- Clean with sponge and water and dry the surface with clean polish cloth.
- Polish the area by rubbing compound 3M Perfect-it III Fast Cut plus XL 51052 (Stemme part number A324, Handling e.g. with 3M Perfect-it III polishing foam green 50487)
- After polishing clean the area with sponge and water. Dry and polish with polish cloth (e.g. DuPont Sontara SPS- Poliertücher)

After the completion of the polish, the surface must not be dull. If this is the case, start the polish again from the beginning.

High Performance Polish

- If needed for special high performance Surface the area is to polish with 3M perfect-it III 9376 (Stemme part number A325; Handling e.g. with 3M Perfect-it III polishing foam yellow 50088)
- After polishing clean the area with sponge and water. Dry and polish with polish cloth (e.g. DuPont Sontara SPS- Poliertücher)

After the completion of the polish, the surface must not be dull. If this is the case, start the polish again from the beginning.

4.6. Repairs on Canopy Glass

All small repairs on canopy glass can be carried out by an authorized mechanic familiar with work on PMMA (Polymethylmethacrylate) parts.