

SHADOW D - SERIES



CONSTRUCTION MANUAL
PROCESS SHEETS
SERIES D-D

BONDING WITH ARALDITE 2005

MIXING RATIO : BY WEIGHT

2005A	100
2005B	40

POT LIFE : 1 1/2 hours AT 25 C.

ALLOW 24 hours AT 21 C TO CURE

WARNING - Check that the shelf-life has not expired. Refer to CM101 - test samples which demonstrate how the finished item should be.

TECHNIQUES

The key word in bonding is CLEAN. Throughout the process from initial preparation through to final clean up after bonding, you will have to maintain absolute cleanliness in order to ensure acceptable bonds. This cannot be stressed enough - the presence of one fingerprint on a bond line can cause failure of the joint. FOLLOW THE PROCESS INSTRUCTIONS CAREFULLY.

REQUIRED ITEMS :

(Hand/skin care) Barrier cream
Plastic or cotton gloves
Detergent soap for washing

Sensitive scales
Paper cups (non waxed)
Grip paper - 180
Cotton wool
Acetone
Mixing sticks.

When a bond is completed and the epoxy is cured only a visual inspection can be effected. Such inspection should show evidence of preparation and general cleanliness. There should be a 'fillet', much like a welding fillet, around the edges of the bonded part.

ESSENTIALS FOR MAXIMUM BOND STRENGTH

- Resin and hardener must be correctly proportioned and thoroughly mixed together. Mix from bottom to top and scrape sides of cup.
- Joint surfaces must be degreased, abraded/keyed and pre-treated where necessary.
- Light pressure should be applied as evenly as possible over the whole bond area. Excessive pressure leaves joints starved of glue.

1.1 BONDING FIBRELAM

Careful preparation is necessary prior to bonding. Surfaces for bonding are to be degreased with acetone, abraded with grit paper and then degreased again with a clean cloth/paper towel. The area to be bonded should be abraded back 1/4" to 1/2" on each side of the bond and care must be taken not to contaminate the prepared surface by using either a previously used cloth or by accidentally wiping onto the prepared surface dust from the surrounding areas during the final degreasing.

IMPORTANT : When prepared DO NOT TOUCH surfaces to be bonded. Cotton disposable gloves are recommended for handling Fibrelam.

1.2 BONDING ALUMINIUM

Careful preparation is necessary prior to bonding. Surfaces for bonding are to be abraded with grit paper then degreased. Surfaces are to be clean and dust free. Surfaces to be bonded must now be treated with ACCOMET C solution as follows :

Apply a thin solution of the supplied diluted Accomet C solution with cotton wool, to all aluminium surfaces to be bonded. Dry in hot air and cure.

For Araldite adhesives cured at temperatures below 100°C, allow the film of Accomet C to cure for at least 20 seconds at 100 - 250 degrees C. Allow to cool before applying the adhesive.

Do not allow any re-oxidization to occur by time delays between the stages of surface preparation, applying Accomet C primer and bonding.

Care is needed to avoid build-up of over-thick coats of the primer. This is detrimental to bond strength.

WARNING : Accomet C contains hexavalent chromium compounds which can cause ulceration of cuts and abrasions or be hazardous by inhalation. Any splashes on the skin must be washed off immediately with water. Dust from dried-off Accomet C must not be inhaled.

IMPORTANT : One fingerprint can cause a bond failure. DO NOT TOUCH with fingers when handling prepared surfaces, cotton disposable gloves are recommended if handling is necessary.

1.3 BONDING STEEL (UNDERCARRIAGE)

Prior to bonding the surfaces must be degreased, lightly abraded and degreased again. Keep fingers from touching the prepared surfaces.

1.4 BONDING INSERT CM1 and CM2 into FIBRELAM

Prepare the Fibrelam for bonding.
Degrease the inserts and treat with Accomet C.
DO NOT allow the inserts to be handled without cotton disposable gloves.
It recommended to soak the inserts in the degreasing solution for the final degreasing and then to similarly soak them in the Accomet C after they have dried. Heat and cure the Accomet C.
Spread a thin layer of Araldite 2005 to the surfaces of the insert that contact the Fibrelam. Use a dolly (2lb steel block) and panel drive (hammer) the insert fully home on its DRIVE-FIT.

1.5 BONDING AEROLAM (FUEL TANK)

As for Fibrelam, 1.1.

1.6 BONDING PULTRUSION RODS

Prior to bonding the pultrusion rod is to be degreased with a clean cloth dampened with acetone. Lightly abrade the surface and degrease again. Keep fingers from toughing the prepared surface.
Coat with Araldite and place rod in position.

1.7 BONDING GLASS ANGLES

Degrease with acetone, lightly abrade and degrease again, DO NOT allow fingers to touch the prepared surfaces.

1.8 BONDING PLYWOOD AND TIMBER

Ensure that the surfaces are clean, free from dust or foreign matter.
No other preparation is required.

1.9 BONDING STYROFOAM

Ensure that the surfaces are clean, free from dust or foreign matter.
No other preparation is required.

POLYESTER FABRIC COVERING

The following assemblies are covered on both sides by polyester fabric covering - ARVILLE type FT75:

Main wing inner panels
Outer wing panels
Ailerons
Flaps
Horizontal tail surfaces
Elevator
Rudder and fin.

SURFACE PREPARATION

Surfaces to be covered are to be clean and free from dust. Aluminium is to be degreased with acetone. Any painted areas are to be cut back a layer with grit paper otherwise the adhesive will react with the paint and lift it. All burrs and sharp edges are to be removed.

ADHESIVE

BOSTIK No. 1 clear adhesive is to be used for cementing the fabric in place.

Using no more than a half pint container, add acetone (10%) to the adhesive and mix to a flow consistency. Using a brush, coat all surfaces to be covered with 2 layers of adhesive and allow to dry. Lay fabric over the structure, position correctly, then re-activate the adhesive beneath using a brush dipped in acetone. Lightly rub fabric to ensure adequate contact.

After trimming the covered surface allow at least 2 - 4 hours for the adhesive to attain full strength.

NOTE: Bostik No. 1 attacks styrofoam; where necessary apply a coat of resin (Safe-TII-Poxy) to the unprotected foam and allow the resin to cure before applying Bostik No. 1.

TENSIONING

Taughten the fabric by using a domestic iron set at slightly below 'synthetics' temperature. Iron surfaces all over but do not be over enthusiastic otherwise distortion of the framework will occur. Great tension in the fabric is not required.

DOPING

Seal the fabric surfaces with clear surfacer, Cellulose Nitro Dope (Neogene C664). Apply two coats to the fabric being careful not to allow the dope to pass through the fabric to the interior of the surface.

FIBREGLASSINGGLASS FIBRE

The glass fibre cloth used in construction is bi-directional mat (300g/sq.m) - BID and uni-directional mat - UND.

BID has half of the fibres woven parallel to the selvage edge of the cloth and the other half at right angles to the selvage, giving the cloth the same strength in both directions.

UND has 95% of the glass fibres woven parallel to their selvage edge, giving exceptional strength in that direction and very little at right angles to it.

RESIN

A low toxicity epoxy resin, SAFE-T11-POXY, is used to bond and wet-out the BID and UND glass to its backing (foam or plywood). The components of Resin A and Hardener B are mixed in the ratio of:

100 parts Resin to 44 parts Hardener by weight.

Mix the Safe-T11- Poxly for at least one minute using both circular and top to bottom mixing. Scrape edges of pot regularly and be certain of the correct mix ratio.

Apply resin to the foam or plywood first then add the glass. Leave 5 minutes to wet out then stipple brush lightly and only add extra resin to eliminate 'white' areas where the resin has not wetted-out.

Do not allow air bubbles to form.

PREPARATION

A thorough preparation of the foam areas to be glassed is essential. All foam edges must have a radius of 6mm maximum. This will minimise the possibility of air pockets and bubbles forming as the cloth mat is applied.

It is important to ensure that all glass mat is completely 'wetted-out' and that all white areas and specks are eliminated.

CURING

Lay-ups are to be left, ideally, for at least 24 hours with less than 55% humidity and an ambient temperature of 21 degrees C. The structure will only have reached its full strength in 7 days when curing is complete.

NOTE: Surplus resin does not increase strength, only weight.

LOCTITE

4.1 LOCTITE NUTLOC 242e

242e can be used on 'as received' threaded fasteners to maintain torque tension.

Degrease parts with acetone and apply enough product to fill join.

Assemble parts and allow time to cure:

- Handling strength in approximately 15 minutes.
- Functional strength in approximately 45 minutes.

Air space in bottle is required to keep the contents liquid.

USED ON: ROD ENDS CM43 and CM42
FORK ENDS CM44
ENGINE STUD NUTS M10 (included on engine studs)
SHOCK MOUNT NUTS 5E.

4.2 LOCTITE RETAINER 601

The surfaces for bonding are to be degreased, lightly abraded and degreased again. Ensure that this procedure is applied to both male and female fitting components.

Assemble parts and allow time to cure:

- Handling strength in approximately 15 minutes.
- Functional strength in approximately 3 hours.

Special personal care must be taken in using LOCTITE 601 as it is an IRRITANT.

USED ON: WING STRUT BUSHINGS W142.

REDUX 252 EPOXY FILLER (CM99)

The kit contains 250 gms RESIN (Blue) and 100gms HARDENER (Cream).

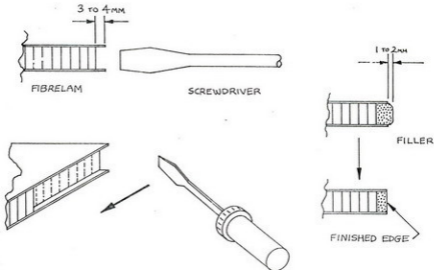
USED ON: filling the exposed edges of the Fibrelam on the monocoque and the fins.

MIXING RATIO: 5 RESIN : 2 HARDENER by weight.

PREPARATION

Wear plastic gloves when handling this epoxy. The Fibrelam edges to be filled have to be undercut. Press the honeycomb approximately 3.4mm below the edge with a screwdriver or similar.

We suggest you mix 100 gms of blue resin with 40 gms of hardener - any greater amount may cause the filler to exotherm (self-heat). Knead the two components to an even streak free putty and apply to the Fibrelam edges leaving 1 - 2mm excess for sanding down. Leave for 48 hours to cure at room temperature then finish with a sander to produce a smooth finish.



DO NOT BE UNNECESSARILY DELICATE
BUT REMEMBER FIBRELAM IS EXPENSIVE.