

Design 055 – WEST™ Fact Sheet

#105 Resin

#105 Resin is the base material of the WEST system family of products on which all the possible compounds are built. The resin is available in four sizes of container:

A-pack	1 kg
B-pack	5 kg
C-pack	25 kg
E-pack	225 kg

For most purposes B-pack or C-pack is the most suitable size to order

#205 Fast Hardener

Mixed with #105 resin in the ratio of 5 parts by weight of resin to 1 part by weight of hardener. Use the 310 mini-pumps to obtain an accurate mix straight from the containers. A 100g mass will have a pot life of 10 to 15 minutes at 21°C. This will be extended if the #105/#205 mix is spread thinner (i.e. in a roller tray, or on the timber itself) rather than kept in a mixing pot. The #105/#205 mix will cure in 5 to 7 hours at 21°C and reach full strength in seven days.

The hardener is available in four sizes of container:

A-pack	0.2 kg
B-pack	1 kg
C-pack	5 kg
E-pack	45 kg

These match the resin packs (being one-fifth of the weight size for size).

#206 Slow Hardener

Mixed 5:1 as for #205, pot life is extended to 25 to 30 minutes and cure time to 9+ hours. Otherwise the #105/#206 mix has similar properties as a #105/#205 mix. We have seldom found it necessary to use #206 hardener in UK conditions.

#207 Special Coating Hardener

Use this hardener when a clear finish is required as it flows out better and gives less problems under humid and/or low temperature conditions. Under these conditions, using #205 hardener can produce whitish discolouration of the cured resin that is very difficult to remove. #207 can be used for bonding applications, but it is more expensive and slower curing than #205. Note that #207 mixes in a 3:1 ratio and requires 303 Special-ratio Mini Pumps.

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209 Special Tropical Hardener

A hardener formulated for extremely warm and/or very humid conditions, providing useful pot life up to 43°C. Not usually required in the UK, unless very extended cure times are required - for instance in a very large and complex lamination. #209 uses the 3:1 mix ratio.

#301 Mini-pumps

These screw directly into the resin and hardener containers (you need to order the correct mini-pump for the container size - A,B or C packs). These pumps give the correct 5:1 ratio mix.

#303 Mini-pumps

These are similar to the #301 pumps, but give a 3:1 mix ratio.

From now on “resin” will refer to a mix of #105 resin with #205 hardener. #105 resin by itself is never used for any purpose. Always mix the resin/hardener together before adding other materials.

#403 Microfibres

These cellulose fibres are mixed with the resin to produce a thickened mix for all general bonding or gluing applications (we tend to use the words “bonding” and “gluing” interchangeably). Mix about 7% to 10% by weight of #403 with the resin - though after a little practice you will tend to judge the amount by consistency rather than weight.
Colour: off-white.

Where end grain or absorbent materials (including any bare timber) are to be bonded, wet out the surfaces with unmodified resin and leave for about 15 minutes before applying the resin/#403 mix and bringing the parts together.

Parts to be bonded may be bare wood or wood that has previously been coated with WEST. For pre-coated wood, sand the resin coating well before bonding.

#404 High Density Filler

A high strength filler additive used when bonding hardware where high cyclic loads are expected. can also be used for gap-filling and filleting. Add to the resin from 20% to 30% by weight. Colour: off-white.

#405 Filleting Blend

Used for mixing with the resin for filleting applications. Add 25% to 30% by weight. Colour can be adjusted by the addition of alcohol or water based stains. Colour: tan.

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#406 Colloidal Silica

A general purpose additive, often used in conjunction with other fillers to control the characteristics of the mix. It adds strength, abrasion resistance and smoothness. Add 2% to 10% by weight. Colour: off-white

#407 Low Density Filler

A micro-ballon based filler used to make fairing putties which are easy to sand and still reasonably strong. Add 20% to 25% by weight. Colour: dark reddish-brown.

#410 Microlight

A light, easily worked fairing compound that sands well and holds a feather edge. Add 10% to 15% by weight. Should not be overcoated with dark coloured paints.

#420 Aluminium Powder

Gives protection against UV and can act as a base for other coatings. Add 5% to 10% by volume.

#421 Fire Retardant

Use in engine rooms and other areas with a fire risk. Add 1 to 1 by weight - can only be trowelled or squeegeed on to a surface.

#422 Barrier Coat Additive

Improves even more the moisture exclusion properties of WEST and also increases the abrasion resistance. Add 25% by weight.

#423 Graphite Powder

Can be added to the resin to produce a low-friction exterior coating with increased scuff and mar resistance. Commonly used on rudders and centreboards. Also used in the seams of a WEST system teak deck. Add 10% by volume.

#425 Copper Compound

Can be used to provide a base coat for conventional bottom paints. Improves moisture exclusion and abrasion resistance. Add at a rate of 80% by volume.

#501 - #506 Pigments

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Add to the coating resins to provide a base colour for final finish system. Only add to the final coat of a system as it does impair the penetration abilities of the resin. Add 3% to 5% by weight.

#850 Solvent

An alternative to acetone (though re-processed acetone is usually much cheaper). Pay attention to fire and health risks with solvents.

Episize glass fabric and tape

Woven glass cloth can be beneficial if incorporated in the WEST coating system as it provides additional abrasion resistance. When thoroughly wetted out, the thinner cloths will become transparent, so can be used where a clear finish is required. Use 200g/m² or 220g/m². Tapes are useful for reinforcing corners (like chines).

Tools

A range of useful tools are available, designed for use with WEST system materials:

- #800/#800B Rollers (75mm or 180mm)
- #801/#801B Roller Frames
- #802 Roller Tray
- #803 Brushes
- #804 Mixing sticks
- #805/#806 Mixing pots (500ml & 1 litre)
- #807/#807B Syringes (10ml & 50ml)
- #808 Squeegees
- #811 Paddle rollers

There is also a range of protective clothing, disposable gloves, masks, resin removing cream, barrier cream etc., available.

For coating large areas the rollers are reasonably good, squeegees very good. For coating small areas and applying glue, brushes are better. We usually cut about half the length of the brushes off to make spreading the glue or resin easier. You don't really need to buy mixing sticks. 500ml mixing pots are useful, and can be re-used many times - but empty cleaned milk, ice-cream etc. cartons all make good mixing pots. Paddle rollers are only required if glass cloth is to be incorporated.

Safety precautions to be observed when using WEST system materials are printed on the containers, or on leaflets accompanying them.

Timber to be used with WEST system materials should be at a maximum of 12% moisture content.

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The workshop needs to be able to be kept warm and dry (humidity about 50% maximum if possible). A minimum temperature of 10°C should be maintained - preferably 15°C. A good flow of air through the workshop will help to reduce humidity. Don't use flueless paraffin or gas heaters to warm the workshop as these put too much moisture into the atmosphere.

Buy kiln-dried timber wherever possible. Store timber with sticks (thin lathes of timber) in between the boards so that there is a good air flow through. This applies equally to plywood, whether stored vertically or horizontally. Make the sticks out of softwood so that they don't discolour the timber.

When buying timber, tell your merchant that it is for boatbuilding. Timber needs to be straight grained, clear of the heart and free from defects (shakes, knots etc.). Small sizes are best quarter sawn if possible or sawn so that the grain is reasonably vertical the short way when viewed end on - if you were looking end on at a piece of 25 x 50 timber, the grain would run substantially vertically the 25mm way.

Keep the WEST resin and hardener warm all the time - make a box with a light bulb under it and holes in the top and stand the containers in use on this if you do not keep the workshop warm all the time.

Bonding

Bonding with WEST is very straightforward. If the components to be bonded have not previously been WEST coated, then they should be coated with WEST #105 resin/#205 hardener mix about 15 minutes before they are to be bonded together. This is known as "wetting out". This process allows WEST to penetrate the timber prior to bonding and a maximum strength bond will be obtained this way.

If the components have previously been WEST coated, then the areas to be bonded need to be thoroughly sanded to provide a smooth matt surface, free from amines or other contaminants. Glossy WESTed surfaces should not be bonded without sanding.

For the majority of bonding applications the WEST resin/hardener mix has #403 microfibres added to it to produce a thicker glue-like material. The WEST/#403 can be applied to one or both of the surfaces to be bonded.

Whenever items are bonded or glued together in the build instructions this means wetting out (or sanding if pre-WESTed) followed by WEST/#403 bonding. If another additive or process is to be used, then this will be detailed specifically in the instructions.

Coating

It is vital for the integrity and longevity of the vessel that a minimum of three coats be applied inside and out to all structures.

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Coating can sometimes produce problems. Mix the resin and hardener and pour it out into a roller tray (whether rolling or brushing). This will give you extended working time.

The coats should be flowed on rather than brushed out - work quickly using more rather than less resin. Try not to get runs down edges as these are very difficult to clean off when cured - go round the item after you have finished coating and get rid of any runs down edges. Also try not to get too much of a build up in corners etc. If brushing on, cut the hairs of the brush off to about 25mm long. You can keep your WEST brushes quite a long time by have a large screw-top jar part filled with acetone - enough to immerse the brushes in. The jar needs to be big enough to be able to screw the top back on with the brushes in the jar.

The first coat will probably bubble considerably - this is the resin displacing the air in the cells of the timber. As the resin cures, sometimes a greasy surface forms on it. This can be a substantial nuisance and is usually caused by cold, damp conditions. So try to keep conditions as warm as possible once the coating has been applied. If necessary arrange a cover over the coated material with local heating beneath - tubular black heaters are ideal for this.

Sanding the first coat can be difficult if a greasy amine sweat has formed as the abrasive paper clogs up almost immediately. The amine sweat can be washed off with fresh water, or washing with #855 cleaner then fresh water. Scraping can also be a good solution. An ordinary triangular scraper is not very good - a scarsten scraper is better. The best tool of all is one that is not available commercially, but if you can get one made up it is invaluable. It is made from a short length (approx. 50mm) of worn-up mechanical planer blade (high speed steel, not tungsten tipped) brazed on to a scraper handle. This can be sharpened on a grindstone and then on an oil stone. This tool will take off very fine shavings (of wood or WEST) and is excellent for cleaning up a WEST coated surface.

So wash and/or scrape the surface and then sand it. Aluminium oxide paper is usually the best - about 60 or 80 grit at this stage. Mechanical sanding will work - but use an vibrating orbital sander (preferably with extraction holes punched in the paper) - not a belt sander or a plain revolving disc sander.

Sanding is also easier once the resin has cured for a day or two. If you can dent the surface with a fingernail, it is not ready to sand.

Wipe the sanded surface over with a rag damped with #850 solvent and flow a really good second coat on. There should be much less bubbling this time. Try to keep conditions warm so as not to get a greasy surface finish.

Let this coat cure for a day or two and then scrape lightly (you can get rid of runs this way too). Sand the surface using 100 to 80 grit.

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Touch up any areas that have been sanded or scraped thin of WEST and allow to cure.

Sand lightly if required. Wipe over and apply the third coat. This should only need minimal sanding before the application of varnish or paint.

The secret of getting a good finish when coating is really working in warm dry conditions. #207 coating hardener does make things easier to get a good finish in the third coat

For large surfaces, applying WEST with a squeegee usually produces a much better finish than either brush or roller.

If all three coats can be applied in the same day (i.e. before the previous coat has cured to sanding hardness - try the fingernail test), then no sanding between coats is required. The only problem with this is that the first coat often produces quite a rough finish, so sanding is really required or else the finish just gets worse with successive coats.

For plywood and sometimes large pieces of solid timber, flo-coating is worthwhile. In this process two coats are applied in one go. The ply sheet is laid flat in warm conditions. Sufficient WEST is mixed to equate to about 2 coats. The WEST is poured on and spread quickly over the surface. It should go off quickly to a level glossy finish, which can be sanded when fully cured.

Useful WEST™ System reading and viewing:

Basic application technique VHS training video.

The Gougeon Bros. on Boat Construction (we assume throughout that you have a copy of this).

WEST™ system Technical Manual.