

## The ultimate GUIDE to getting Started in 1/43 Scale

### Part 1 - Closed cars

by Wayne E. Moyer

Building a 1/43 scale model is really no different from building larger scale models from plastic or wooden kits. Some of the materials - glues and tools - may be a little different but the techniques are similar and the same basic procedures are used in parts cleanup, preparation, painting, detailing, and final assembly.

#### Tools and Materials.

Resin and white-metal kits are made in relatively soft (very soft for some resin kits) rubber moulds and so will almost always have some mould lines on their bodysHELLS and small pieces, and possibly some thin "flash" (casting material that's been forced out between the mould faces) in the window or wheelarch (fender) openings and around smaller pieces. The tools needed for 1/43 scale models are really very simple (PHOTO 1). Small, fine-tooth modeler's files in flat, knife, half-round, and round shapes will be required for metal kits; they will work on resin too, but I prefer to use common "emery boards" (the fine-grit coated cardboard sticks made for filing fingernails) when working with resin. Wet-or-dry sandpaper (320, 400, and 600 grit) is used to smooth out file and emery board marks. A modelling knife (X-Acto type) will be needed to do rough trimming or cut parts from their "trees"; and yes, the blades *will* cut white-metal! Old blades that are too dull for plastic kits are fine for cutting white-metal. Other necessities include tweezers (a couple of styles/sizes), small scissors, some "holding tools" like clothespegs or forceps, toothpicks, paintbrushes, and the usual "miscellaneous" modelling tools.

Model cement of the type used on plastic kits will **not** work on these kits; you'll need to use either alpha cyanacrylate (ACC, or "super-glue") or epoxy (PHOTO 2) to hold major components together and a clear water-based adhesive like Micro "Kristol Kleer" for "windows" and tiny trim pieces. Finally, you will need some putty to fill larger bubble holes or surface blemishes; I recommend a two-part epoxy putty (A + B in the U. S., Milliput in Europe) because lacquer-based auto putties will continue to shrink for months - epoxies won't.

#### Preparation.

Always examine a kit as soon as you get it to make sure all the parts are there—neither GPM or the maker may have any spare pieces a year from now so if any parts are missing, order them at once. When you're ready to build it **read** the instructions and be sure you know where everything fits. Remove the mould lines from the body (inside and out, if necessary) (PHOTO 3) with emery boards or files, then sand the "filed" areas with #320 and #400 sandpaper; yes, white-metal can be effectively sanded! Thicker flash can be cut away with a razor knife, while thin flash and rough edges like those in wheel arch openings can be simply sanded smooth with sandpaper wrapped around a finger (PHOTO 4). Small openings in resin castings can be cleaned up with an emery board cut to a point (PHOTO 5), while one or another of the files will work on just about any white-metal casting (PHOTO 6). Don't forget the small mould lines on wheels, mirrors, seats, and other small components. If, in sanding the body, you've partially filled a panel line, re-scribe it by first making a cut with the sharp edge of the knife blade, then pulling the back (flat) side of the blade through the cut to

re-scribe the line.

Build up as much of the model as possible before putting on the first primer coat. I like to attach spoilers (IF they are to be painted the same color as the body), lower nose sections, and similar pieces before priming, glue bonds to resin more strongly than primer. I use a toothpick, cut to a chisel edge (PHOTO 8) to apply a drop of "super glue" in small, thin spots like the grooves for spoilers. A small drill (about #60) should be used to make a "pilot hole" for the screws that attach the baseplate to the body - the "cast in" holes are never deep enough. The final step in preparation is washing the pieces to remove both the mould release agent and oils from your fingers. I first soak the pieces in warm water and dish-washing detergent for a half-hour (or more), and then scrub them **thoroughly** with an old toothbrush before rinsing in hot water. That - especially the soak - seems to be the key to getting a good clean surface.

#### Priming, Filling, and Painting.

The principal difference between plastic kits and those cast in white-metal or resin is that the latter must be primed. You can save time by filling large surface blemishes like bubble holes with putty and at least roughly sanding them smooth before the primer coat. An artist's palette knife (PHOTO 9) is very useful for applying putty. Primer should be sprayed on - I prefer using an airbrush but aerosol cans will work if used carefully. Be **sure** that the primer and paints you select will be compatible - don't use an enamel primer if you plan to use lacquer paint!! I prefer a primer meant specifically for models - the pigment grains are ground finer, which means that less sanding will be required to get a good smooth primer surface. I use one of the model car "polishing kits" with sanding cloths ranging from 2400 grit to 12000 grit, but use only 2400 and 3200 grit on the primer.

The first primer coat will often show surface blemishes - bubble holes and nicks you didn't see and even file marks that weren't sanded smooth. Small holes can be filled with a drop or two of thick, partially dried primer (PHOTO 10), while larger ones will need more putty. **Very** tiny blemishes and file marks can be eliminated by simply sanding the surrounding area, leaving primer in the blemish (PHOTO 11, top body). Extreme cases (rare now, but common with older kits) may require sanding off most of the first, or even the second coat of primer before the surface is completely smooth (PHOTO 12).

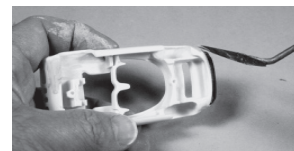
There have been several good articles in FSW magazine on painting, so I'll just say that a **smooth** primer surface and spraying on 5 or 6 thin coats of paint, rather than a single heavy coat, are the "secrets" to a good paint job. I use a spray stand (PHOTO 13) so I can turn and twist the model while painting, and I sand the surface between coats (PHOTO 14) with 3200 and 4000 grit sanding cloth. Decals, too, are a subject best treated separately.

Here are some hints for painting all the details that abound in modern kits. Always bend photo-etched pieces to shape (PHOTO 15) before painting them. A totally "flat black" interior isn't realistic; each

continued on the following page



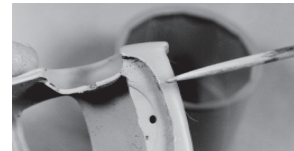
1 The tools required to build resin and white-metal kits are the same as those required for most types of models and are neither elaborate or expensive.



9 A palette knife, trimmed to a trowel shape, is very useful for applying putty.



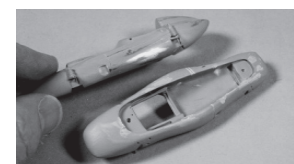
2 Both white-metal and resin kits require either epoxy or "super glue" to bond the parts together - plastic cement will not work.



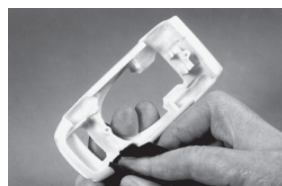
10 Small blemishes like these bubble holes may not be visible until after you've applied a primer coat. It's easy to fill them with a drop of primer, but a second application may be necessary after the first has dried.



3 Common emery boards make great "files" for cleaning up resin kits. Use sandpaper to smooth the "filed" surfaces.



11 Large blemishes in the lower body-shell have been filled with putty, while tiny ones in the upper shell were "filled" by simply sanding the surrounding area to bare metal.



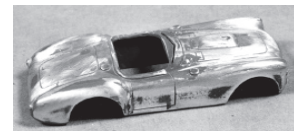
4 Medium-grit (320) sandpaper will make short work of thin flash and "ragged edge" mould lines.



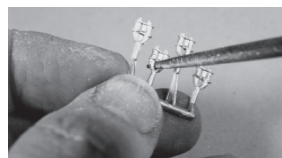
11A There may be a number of surface blemishes visible after the first primer coat; fill the larger ones with 2-part putty.



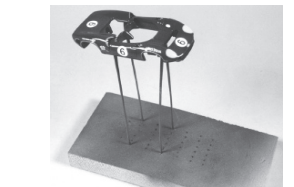
5 Emery boards can be cut with scissors to create the shape you need to get into small openings in castings.



12 Although this model had no major surface blemishes, almost all the primer coat had to be sanded off to fill smaller ones; note the darker primer remaining in many small spots.



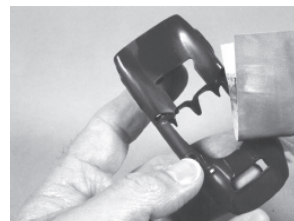
6 Even small parts will have flash and mould lines (carburetor at left has yet to be worked on) that must be filed or sanded away. That's where small modelling files in several different shapes are needed.



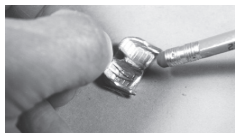
13 A simple spray stand, made from a piece of wood and four pieces of spring-steel "music wire" will let you turn and twist the model to get paint into all the small nooks and crevices.



7 There is no Photo 7!  
8 Small amounts of "superglue" can be applied with a toothpick; sharpen it to a point to apply a dot or to a chisel point to put glue in a narrow slot.



14 Sanding the paint between coats will not only get rid of any trapped dust flecks, but will give you an even smoother surface.



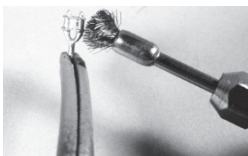
**15** Bend photo-etched seat belts to conform to the shape of the seat before painting either of them.



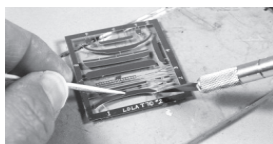
**16** Use a variety of shades within a colour for maximum realism; using lacquer, acrylic, and enamel paints will let you apply one colour over another without "muddying" the colours.



**17** Support delicate white-metal pieces by laying them on a piece of thick glass while carefully polishing them with steel wool.



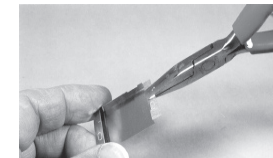
**18** Sturdy white-metal pieces can be polished easily with a soft wire brush in a Dremel Tool.



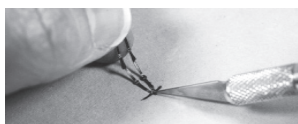
**19** Hold small photo-etched parts firmly with a toothpick or something similar while cutting them away from the "tree" that holds them. Placing the tree on a piece of glass or similar hard, smooth surface keeps it from bending.



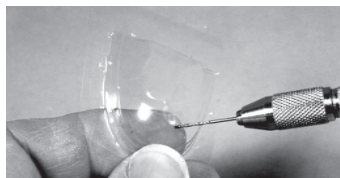
**20** A variety of hard smooth surface shapes are very useful for bending photo-etched pieces.



**21** Small pliers with wide flat noses are also very useful for bending photo-etched pieces.



**22** Chrome "hardware" is easily reproduced by painting the entire part, then carefully scraping the paint from the raised instrument bezel, seat belt buckle, or other chromed piece.



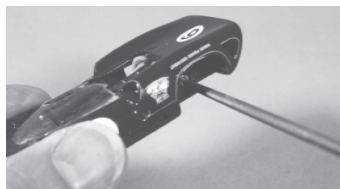
**23** Open up any required holes in vac-form pieces before cutting it to shape.



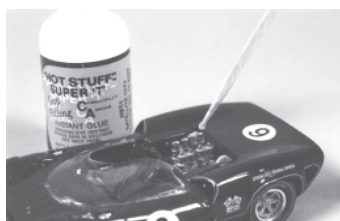
**24** Apply adhesive for vac-forms with a small, thin paintbrush. If necessary, glue one side in place and let it dry overnight before gluing the second side.



**25** If there are no brake discs, paint the inside of the wheels silver before building them up. A coat of semi-gloss clear applied over the sidewall decals will both protect and blend them into the tyres.



**26** Test-fit wheels to the model, and if necessary, enlarge the axle holes with files in the wheels to enable them to fit within the wheel arches correctly.



**27** It's much easier to control the application of "thickened" super-glues; small amounts can be precisely applied with the point of a toothpick.



**28** Good tweezers are a "must have" tool for building 1/43 scale models; all too often the spot where a piece must go is too small for fingers.

paint manufacturer's shade of Flat Black is different, so use several. I like to use a softer, more "grey" shade for fabric upholstery, dead flat black for instrument panels, satin colours for seat belts (PHOTO 16), and semi-gloss shades for leather upholstery, for example. It also helps to use different kinds of paint; water-based acrylics can be applied over both lacquer and enamel (and vice versa) without eating into the paint under it, and excess paint can be removed with a toothpick. Different shades of aluminium, steel, and other metallic paints can really bring an engine compartment to life, too.

### Bits and Pieces.

While the body paint coats are drying, I polish small pieces, build up sub-assemblies, and in general try to get everything ready for final assembly. Both polished and chromed parts can be reproduced by polishing the white-metal castings. Long thin suspension arms, roll bars, and similar pieces can be bent whilst being polished unless care is used, so I place them on a piece of thick glass (PHOTO 17) while buffing them to a shine with steel wool. Initial polishing of stronger parts can be done more quickly with a soft wire brush (PHOTO 18) fitted into a Dremel Tool. A final polish with Simi-Chrome or similar metal polish will leave a white-metal piece shining as brightly as chrome and looking much more realistic than if you had painted it silver.

Large photo-etched pieces can be cut from their "tree" (the metal framework that holds them) with small sharp scissors or with a knife; I find a sharp knife works best for small pieces. Lay the photo-etched tree on a hard surface (my piece of thick glass again), hold the piece being cut free with a toothpick (PHOTO 19), and simply cut through the thin tab holding the piece. If you don't hold the piece being cut free, it will most likely simply pop off into another dimension, never to be seen again, when the cut is made. Many etched pieces will need to be bent to shape, and I've found that a set of small, shaped aluminum sanding blocks (PHOTO 20) are useful for bending photo-etched pieces, as are wide flat-nosed modeller's pliers (PHOTO 21). Other parts like seat belts and instrument panels may be "3-D" etched (put through the chemical milling process twice to produce three-dimensional surfaces) so that "chrome" hardware can be part of the piece. Do not prime these pieces, simply paint them flat or satin black, and then when dry, carefully scrape the paint (PHOTO 22) from the raised surfaces with a knife blade. If you remove too much paint, touch the piece up and do it again!

Vac-forms (clear "glass" pieces that are formed by using a vacuum to draw a piece of heated clear plastic either into or over a mould) sometimes need to have holes made for mirrors; it's best to do this with a small drill bit (usually #65 to #70) before the vac-form is cut to shape (PHOTO 23). Cut the vac-form larger than indicated to start then check the fit of the piece, and carefully trim it to fit the opening a bit at a time.

I highly recommend Micro Kristal Kleer for attaching clear parts (it works very well for tiny photo-etched pieces, too) to the body. It dries, as the name indicates, perfectly clear, will fill small gaps, and it's flexible when dry, unlike ordinary white glue which gets brittle. If a vac-form is slightly undersized (PHOTO 24), glue one side in place, let it dry overnight, then stretch the other side to fit and glue it in place. It's often possible to hold the vac-form in place with small pieces of tape and apply a bead of Kristal Kleer between it and the bodyshell.

Tyres, both rubber and black resin, should have the mould lines and feed tags (the "nubs" where the tyre has been cut away from the "sprue" of material that formed it) sanded off; emery boards work very well for this, too. I like black resin tyres; they are usually accurate in size and profile and are easy to work with. Sidewall logos stick better to resin than rubber, and can be applied before the wheel is fitted. In either case, once any sidewall markings have been applied, I brush a coat of semi-gloss clear over the decals to protect them and also blend the (usually) glossy decal into the tyre. If there are no separate brake discs (PHOTO 25) paint the

inside of the wheel silver before fitting the center section, or "spider" of the wheel.

### Final Assembly.

Most modern kits provide an assembly sequence, but don't follow that blindly - look everything over and think about what parts must fit where before gluing anything. I personally prefer "super glues" because they set in seconds and need only a very thin film of glue between the pieces. Super glues can be hazardous - sloppy application can lead to fingers glued to the model, or to even worse places. I use the "thickened" super glues because their application can be controlled better and because they require 30 seconds or so to set. And I always have a bottle of de-bonder on my bench! Epoxy is the only other reasonable alternative - it's safer, but does take at least 5 minutes to set, and leaves a noticeable thickness of glue between the pieces.

"Ride height", the distance a model sits above the ground, is a subject that's too often either ignored or over-emphasized for full-bodied cars. When building models of full-bodied cars, it's the relationship of the wheel/tyre to the wheelarch (fender) openings that really determine whether or not a model "looks right" when it's completed. The biggest villain here is the thickness of the wheelarches; on the real car they are only a few thousandths of an inch thick. Look at photos; tyres are usually pretty much centered in the wheel arches and tucked up inside the lower edge of the fender (OK, the wing!) Glue the axle into one wheel, cut it slightly longer than the final length, and test-fit the wheels to the body. I often enlarge the axle mounting hole both vertically and fore-and aft (PHOTO 26) so that the wheel can be located within the wheel arch to match photos. It may be necessary to either compromise the track (distance between the centerline of the tires) or to shave a bit off the outer, upper edge of the tyres to get them up inside the wheelarches correctly. Make sure all four tyres are "square" and that all four touch the ground (an all too common failing in 1/43 scale models). If those are correct and the tyre is located in the wheel arch correctly, the model will "look right" regardless of its actual ground clearance. Once you have the wheels positioned, drops of super glue in the enlarged holes will keep them where they should be.

Take plenty of time when adding the small detail parts that add so much realism to current kits. I apply a very small drop of super-gel to the location with a toothpick (PHOTO 27) and then use tweezers (PHOTO 28) to set the part in place. Since thick super-glue takes 30 seconds to set up, there's time to get the part in place and "tweak" it to the correct angle if necessary.

I try to add larger photo-etched pieces first, then the smaller ones; small amounts of thick superglue work well if you are comfortable with its application. If not, use equally small amounts of either clear paint or Kristal Kleer. Neither is as strong as glue, but both are definitely easier to clean up if you make an error. I sharpen a toothpick to a point and use it to apply just a tiny dot of glue. I then take a fresh toothpick, touch it to my tongue, and then to the tiny photo-etched piece, which will stick to the damp wood. I very carefully touch the part to the dot of glue and make any minor adjustments (30 second setting time, remember) with the point of a knife. It may not be very sanitary, but it works for me! Larger etched pieces can be picked up with "sticky sticks" (small sticks with a gum on their end, or a toothpick with "Blu-Tack" or a similar sticky substance stuck on the end).

There are no "tricks" to building 1/43 scale models; a few simple tools, the proper paint and glue, and patience work as well here as in any other form of modelling. The biggest difference is the vast array of subjects from which to choose. Happy 1/43 scale modelling!

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## The ultimate guide to getting started in 1/43 scale

### Part 2 - Open wheel cars

by Wayne E. Moyer

Although a 1:43rd scale model of a modern open-wheel race car can look very complex - all those little, *tiny* pieces - current casting and photo-etching techniques make the construction relatively easy. With the proper preparation and some patience, you can create a highly detailed model that is especially impressive - and only other modellers will know that it was easier to build than it appears to be. While some of the materials, glues and tools used in building a 1:43rd scale model may be a little different than those needed for plastic kits, the techniques and basic procedures used in parts cleanup, preparation, painting, detailing, and final assembly are very similar.

#### Tools and Materials.

Most models of current open-wheel race cars (single seaters) have the bodyshell and interior cast in "white-metal", a soft metal alloy that can easily be filed, sanded, and bent, if necessary. The suspension and some wing elements will be made with photo-etched (more correctly, chemically milled, but p/e is the accepted term) brass or stainless steel. Models of older cars, especially those with less of the suspension exposed, tend to be cast in resin, but the techniques for both types are essentially the same. Both are cast in relatively soft (very soft for many resin kits) two-part rubber moulds that can leave "mould lines" on bodysells and small pieces, and possibly some thin "flash" (excess casting material that's been forced out between the two-part mould faces) in the cockpit and axle openings.

The tools needed for 1:43rd scale models are really very simple (PHOTO 1). Small, fine-tooth modeller's files in flat, knife, half-round, and round shapes will be required for metal kits; they will work on resin too, but common "emery boards" (the fine-grit coated cardboard sticks made for filing fingernails) work very well and can be discarded when they become clogged with resin dust. Wet-or-dry sandpaper (320, 400, and 600 grit) is used to smooth out file and emery board marks; yes, it will work quite well on white-metal castings. A modeling knife (X-Acto type) will be needed to do rough trimming or cut parts from their "trees"; the blades will cut white-metal and old ones that are too dull for plastic kits are fine for white-metal. Other necessities include tweezers (a couple of styles/sizes), small scissors, some "holding tools" like clothespins or forceps, toothpicks, paintbrushes, and the usual "miscellaneous" modeling tools.

Plastic model glue will **not** work on these kits; you'll need to use either alpha cyanoacrylate (ACC, or "super-glue") or epoxy (PHOTO 2) to hold major components together (GPM stock a range of them) and a clear water-based adhesive like Micro "Kristal Klear" for "windows" and tiny trim pieces. Finally, you will need some putty to fill larger bubble holes or surface blemishes; I recommend a two-part epoxy putty (A + B in the U. S., Milliput in Europe), because lacquer-based auto putties will continue to shrink for months—epoxies won't.

#### Preparation.

Relatively few examples of a 1/43 scale white-metal or resin kit are made, usually something like 300-500 copies compared to 40,000 to 100,000 mouldings of a plastic kit, and when they are sold out, they're gone. So examine a kit immediately to make sure all the parts are there - neither GPM or the maker may have any spare pieces a year from now. Quite often a 1/43 scale kit will include parts (especially p/e parts) for more than one version, so first **read** the instructions and figure out just which pieces you'll be using!

I begin an open-wheel model by opening up the suspension mounting holes with a pin-vice and small drill bit (PHOTO 3). These are often indicated only by small indentations in the casting and may be "lost" if you file and sand mould lines first. Often lower body sections

must be cast separately to model the complex shape of a modern Formula or Indy-car body accurately; glue as much of the body together as possible and fill to join lines (PHOTO 4) with putty. Remember, though, that interiors, engines, and other small bits must be added **after** the body is painted so don't glue a panel in place that must be fitted **after** something like that. Files are needed to remove the mould lines (inside and out, if necessary) from white-metal bodies (PHOTO 5). Once I've filed a mould line away, I sand the "filed" area smooth with #320 and #400 sandpaper (PHOTO 6); yes, white-metal can be effectively sanded! Emery boards make perfect "files" for resin bodies (PHOTO 7) and can be cut to get inside small openings (PHOTO 8). Don't forget the small mould lines on wheels, mirrors, seats, and other small components. If you have a variety of file shapes, one will work on just about any white-metal casting (PHOTO 9). If, in sanding the body, you've partially filled a panel line, re-scribe it by first making a cut with the sharp edge of the knife blade, then pulling the back (flat) side of the blade through the cut to re-scribe the line (PHOTO 10).

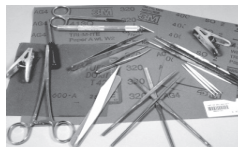
Don't forget to open up the hole for the screw(s) that attach the baseplate to the body with a small drill (about #60); the "cast in" holes are never deep enough. The final step in preparation is washing the pieces to remove both the mould release agent and oils from your fingers. I first soak the pieces in warm water and dish-washing detergent for a half-hour (or more), and then scrub them **thoroughly** with an old toothbrush before rinsing in hot water. That - especially the soak - seems to be the key to obtaining a good clean surface.

#### Filing, Priming, and Painting.

White-metal kits must be given a coat of primer before being painted, and I highly recommend the same for resin kits. Any visible large surface blemishes or bubble holes should be filled with putty and sanded smooth before the primer coat. An artist's palette knife (PHOTO 11) is very useful for applying putty. Be **sure** to select a primer that will be compatible with the final colour paint; don't use an enamel primer if you plan to use lacquer colours. I prefer lacquer primers since they dry quickly and lacquer, enamel, and acrylic paints can be used over them. Primer should be sprayed on - I prefer using an airbrush but aerosol cans will work if used carefully. The first primer coat will often show you small imperfections and, in resin castings, tiny bubble holes ("pinholes") that you couldn't see in the bare surface. Small holes can be and a white-metal body (top) whose minor blemishes and file marks were eliminated by simply sanding the surrounding area, leaving primer in the blemish. The same technique (sanding to bare metal) can be seen in PHOTO 14. Extreme cases (rare now, but common with older kits) may require sanding off most of the first, or even the second coat of primer before the surface is completely smooth (PHOTO 15). A good smooth finish is absolutely dependent on a smooth primer surface, and I use 2400 and 3200 grit sanding cloths from a model car "polishing kit" as a final step before painting the body.

There have been several good pieces in FSW on painting, so I'll just repeat that a **smooth** primer surface is a major factor in a good paint job. I use a simple spray stand that lets me hold it to turn and twist the model while painting, and I sand the surface between coats (PHOTO 16) with 3200 and 4000 grit sanding cloth. Decals, too, are a subject best treated separately.

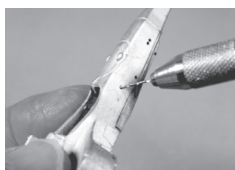
Open-wheel cars also have open cockpits, which play a major part in how realistic a model looks. No interior is a single shade of "flat black"; upholstery, painted surfaces, padding, steering wheels, and other components all have different shades and textures. "Flat Black" acrylic paint looks different from "Flat Black" enamel, and "satin" shades are different yet. I like to use a softer, more "grey" shade for steering wheels, dead flat black for instrument panels, satin colors for seat belts and semi-



1 The tools required to build resin and white-metal kits are the same as those required for most models and are neither elaborate or expensive.



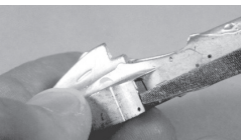
2 White-metal and resin kits require either epoxy or "super glue" to bond the parts together—plastic cement will not work.



3 Drill out the holes for the suspension mounts before beginning cleanup of white-metal bodies. Use small drill bits in a hand-held "pin vice". Note the seam where the lower nose section has been glued in place & note the small mould line inside the air scoop which must be filed off.



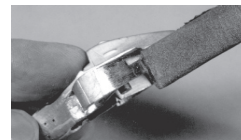
4 Glue as much of the body together as possible - remember - engines, interiors, etc. must be fitted later - & fill the seams with putty.



5 Small modeling files are needed to remove the mould lines and thin flash found on even the best white-metal castings.



5A Half-round files work best for removing mould lines from the inside of body shells.



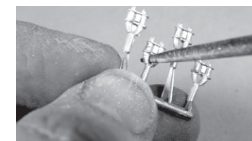
6 File marks are large gouges in 1/43 scale, so sand all the filed areas smooth with successively finer "wet-or-dry" sandpaper.



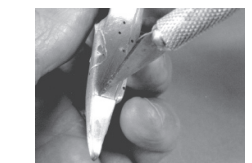
7 Common emery boards make great "files" for cleaning up resin kits. Use sandpaper to smooth the "filed" surfaces.



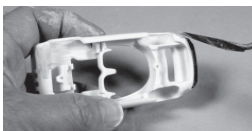
8 Emery boards can be cut with scissors to create the shape you need to get into small openings in castings.



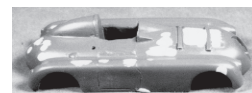
9 Even small parts will have flash and mould lines (carburetor at left has yet to be worked on) that must be filed or sanded away. That's where small modeling files in several different shapes are needed.



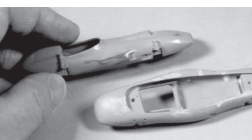
10 Rescribing panel lines



11 A palette knife, trimmed to a trowel shape, is very useful for applying putty.



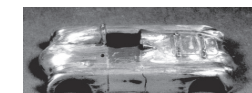
12 Small blemishes like these bubble holes may not be visible until after you've applied a primer coat. It's easy to fill them with a drop of primer, a second coat may be necessary after the first has dried.



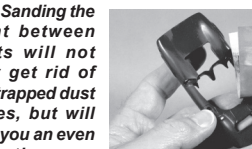
13 Large blemishes in the lower body shell have been filled with putty, tiny ones in the upper shell were "filled" by simply sanding the surrounding area to bare metal.



14 The body of this Novi had many small "blemishes", none large enough to require filler. Simply sanding the general area to bare metal and spraying on another coat of primer produced a smooth surface. Some models may need to have this repeated a couple of times.



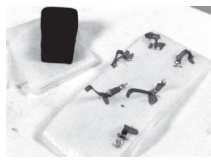
15 Although this model had no major surface blemishes, almost all the primer coat had to be sanded off to fill smaller ones; note the darker primer remaining in many small spots.



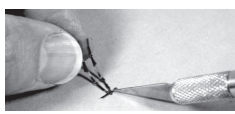
16 Sanding the paint between coats will not only get rid of any trapped dust motes, but will give you an even smoother surface.

continued on the following page

17 Bend photo-etched seat belts to conform to the shape of the seat before painting. The "hardware" on p.e. brass belts must be picked out with silver paint.



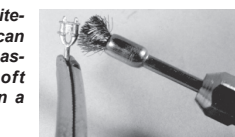
18 Simply scrape the paint from the raised buckles if the belts are made from



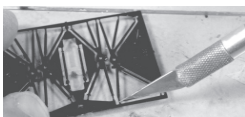
19 Support delicate white-metal pieces by laying them on a piece of thick glass while carefully polishing them with steel wool.



20 Sturdy white-metal pieces can be polished easily with a soft wire brush in a Dremel Tool.



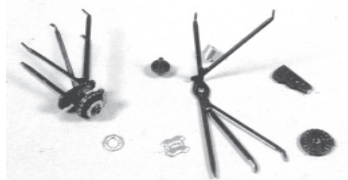
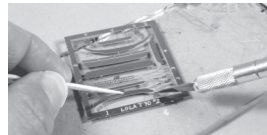
21 Photo-etched pieces can be cut from their tree with a modeling knife (don't use a new blade!) or with small



22 Use VERY tiny amounts of glue to attach one wing element at a time to a sideplate; when all are in place, carefully add the other sideplate.

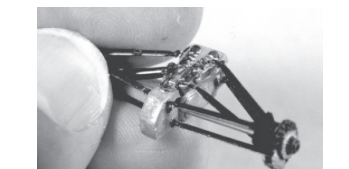


23 Hold small photo-etched parts firmly with a toothpick while cutting them away from the "tree" that holds them. Placing the tree on a piece of glass or similar hard, smooth



24 Most current kits have both A-arms, the upright, and shock pushrod all in one photo-etched component. Although it can be tricky to get all those "pins" in the corresponding holes, the resulting suspension is both sturdy and realistic.

25 Apply a small drop of glue in each mounting hole for the lower A-arm and fit that in place.



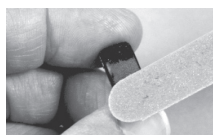
26 Fit the upper arms into their mounting holes but do not glue them in place at this point.



27 The front suspension will attach to the body, and the "barge boards" add a complexity factor. Mounting rods and edges will be "touched up" after everything is glued in place.



28 At this point, all four corners are attached only by their lower suspension arms, so the angle of the arms (and uprights) can be easily adjusted.



29 Mould lines on all tyres can be sanded off with an emery board.



30 The first time you place your model on a flat surface, it may resemble a dog at a fire hydrant. That's why the upper arms aren't glued in place yet!



31 Once the model sits with all four wheels squarely on the ground, apply tiny drops of glue to the upper suspension mounting points.



32 Compromises make a good-looking model; my finished model's suspension looks like what I see in photos and the "ride height" isn't unreasonably high.



33 Given the extreme complexity of a Formula One car, Tameo's kits do an excellent job of producing a very realistic model that's still easy to build.

gloss shades for upholstery, for example. It also helps to use different kinds of paint; water-based acrylics can be applied over both lacquer and enamel (and vice versa) without eating into the paint under it, and excess paint can be removed with a toothpick. Always bend photo-etched pieces to shape (PHOTO 17) before painting either the belts or the seat. If the seat belts or instrument panel are "3-D" etched "chrome" (really stainless steel) pieces the "hardware" can be brought to life by painting the belts (without primer) and then simply scraping the paint off the raised buckles (PHOTO 18) with the point of a sharp knife. Different shades of aluminium, steel, and other metallic colors can really bring out cast-in engine and transaxle details, too.

### Bits and Pieces.

Most modern open-wheel cars have relatively flat (really aerofoil-shaped) suspension arms that can be very realistically duplicated with photo-etched components. Some kits, like those by Tameo, have powder-coated suspension pieces for a very durable and realistic finish. The suspension arms on cars from the mid-1970's back were usually fabricated from round steel tubing, and realism suffers if flat etched parts are used for those. Cast metal parts, though requiring some additional work to polish, definitely look better. I use the time between coats of body paint to build up sub-assemblies, polish small pieces, try to get everything ready for final assembly. White-metal parts can be polished to simulate "polished metal" pieces (surprise, surprise) and even chrome-plated components. It's easy to bend or distort long thin suspension arms, roll bars, and similar pieces while polishing them, though, so I place them on a piece of thick glass (PHOTO 19) while buffing them to a shine with steel wool. Initial polishing of stronger parts can be done more quickly with a soft wire brush (PHOTO 20) chucked into a Dremel Tool. A final polish with Simi-Chrome or a similar metal polish will leave a white-metal piece shining as brightly as chrome.

Although I prefer to assemble "wings" before they are painted, often that's impossible. I cut a toothpick to a flat, "chisel" edge, and use that to apply a thin bead of glue to the slot etched into the wing endplate (PHOTO 22) and then carefully hold each element vertical until the glue sets. Fit all the wing elements to one endplate, then start at the top or bottom of the other endplate, making sure each element is in its proper "slot" before going to the next.

Large photo-etched pieces can be cut from their "tree" (the metal framework that holds them) with small sharp scissors or (PHOTO 21) with a knife. A sharp knife works best for small pieces; place the "tree" on a hard surface and hold the piece being cut free with a toothpick (PHOTO 23), and simply cut through the thin tab holding the piece. If you don't hold the piece being cut free, it will most likely simply pop off into another dimension, never to be seen again, when the cut is made.

Older kits often have upper and lower A-arms and uprights as separate pieces, but most current kits have the entire "corner" made from one photo-etched piece (PHOTO 24) like the Tameo Williams shown. It's a simple matter to fold the two A-arms over and add the brake discs, callipers, and air ducts to make a strong and realistic suspension unit. Take the time to study the instructions before you make the first fold, though - if you fold an arm the wrong way, it will most likely break off if you try to bend it back in the right direction. I place a small drop of glue in each of the lower A-arm mounting holes (PHOTO 25) and then insert the "pins" on the ends of the A-arm. When that's set, I insert the upper A-arm and shock absorber pushrod into their mounting holes, but do not glue those at this point. The rear suspension (PHOTO 26) of Tameo's Williams FW-18 is especially easy to build up, as it all connects to the engine; most kits are a bit more complicated.

The same procedure is used for the front suspension, though it gets a bit more tricky here. Counting the "barge board" mounts, there are no less than nine (9!) pins (PHOTO 27) that must fit into locating holes for each front corner! Once you've glued the lower A-arms in place, the upper arms can be gently "tweaked" to mate up to their holes and the barge board mounts can be glued to the body. Once you have all four corners attached at the bottom (PHOTO 28), the front wing and tyres will have to be added before the "ride height" can be set.

Tyres, whether rubber or black resin, should have the mould lines and feed tags (the

"nubs" where the tyre has been cut away from the "sprue" of material that formed it) sanded off (PHOTO 29); emery boards work very well for this, too. If the sanded surface of a rubber tyre is unrealistically rough, apply a coat of water-based acrylic semi-gloss clear paint. Decal sidewall logos can be blended into the tyre by a coat of semi-gloss clear, too.

### Final Assembly.

Most modern kits provide an assembly sequence, but don't follow that blindly - look everything over and think about what parts must fit where before gluing anything. I personally prefer "super glues" because they set in seconds and need only a very thin film of glue between the pieces. Super glues can be hazardous - sloppy application can lead to fingers glued to the model, or to even worse places. I use the "thickened" super glues because their application can be controlled better and their 30 second "cure" time allows me to move a piece slightly if necessary. And I always have a bottle of de-bonder on my bench! Epoxy is the only other reasonable alternative - it's safer, but does take at least 5 minutes to set, and leaves a noticeable thickness of glue between the pieces.

"Ride height", the distance a model sits above the ground, is often of too much concern for open-wheel models. With the ride height of most Formula One cars measured in millimetres, it can't be duplicated precisely in 1/43 scale, and often attempting to do so will introduce more obvious visual errors. Before beginning to "tweak" your model, look at photos of the real car at rest (unless you're doing a diorama, of course) paying particular attention to the angle the suspension arms (especially the front ones) make with the body. The correct "look" of the suspension and how the tyres "sit" are critical to the overall appearance of an open-wheel model. Autocourse photos of the Williams FW-18 showed that the suspension arms were essentially horizontal and parallel to each other with the car sitting in the pits sans driver. Place the model on a flat surface (my piece of heavy plate glass gets used for this, too) and you'll usually find one wheel lifted well off the "ground plate" (PHOTO 30). Make sure all the upper suspension pins are in their proper holes, then either bend the offending tyre down, or move the diagonal rear one up (or both) until all four tyres touch the ground. Now check that they all sit squarely on the ground; since the upper arms aren't glued, the wheel (actually, the upright) can be twisted about a horizontal axis to get its surface flush with the ground-plate. Of course, you may now have to tweak the suspension arms again! Once the model sits squarely, touching the ground at all four corners, turn it over and apply small drops of glue (PHOTO 31) to the underside of each upper A-arm where it fits into the body.

This model, like many, required a compromise. In order to get the front wing and undertray right down on the ground (a scale, if not realistic-looking "ride height") the front suspension would have had to angle up several degrees. I chose to decrease the deflection of the front suspension at the expense of a greater than scale "ride height" (PHOTO 32); there's still a slight angle to the suspension, but the model doesn't look like an "off-road" vehicle either! If you get down for a "ground-level" look, the model sits slightly high at the rear but the more unacceptable alternative would have been to have the half-shafts angling "uphill". With all the detail pieces in place, and viewed from a more usual perspective (PHOTO 33), the model really does look right. Any small-scale model has many compromises; you just cannot view one from the same perspective as you see a real car. The "trick" then, is to decide which features are most important to you, and to get those "looking right" rather than strict insistence on exact "scale". Happy (1:43rd scale) modelling! ©GPM 1998

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