

Color matching Guidelines

The following are updated guidelines to help match both solid and metallic colours.

- Whenever a colour is matched the formula should be faxed to endura manufacturing so that a permanent record can be made in the formula software.
- Endura's colour software works in quart formulas and can only go to 4 decimal places.
- Med, lo, and no gloss colours require 90,110, and 130 grams of flattening powder (tb500) per quart respectively.
- SFC colours require 360 grams of fc#3 (tb726) resin per quart while FC colours require 230 grams per quart.
- Flop control (tb763) is used in metallics to prevent blotchiness and in solid colours to prevent floating and flooding. It is unnecessary in whites. In reds it should not be used so that a greater amount of UV absorbers can be present (flop control does not contain UV absorbers). Generally we use 70 grams per quart but this can be increased up to 140 grams per quart if a colour proves to be troublesome.
- tb03, tb10, tb25, tb33, tb34, tb35 are tinters that are discontinued and should not be used in new colours.
- TB39 is only used in older colours and should not be used in new ones.
- In solid colours transparent tinters such as tb14, tb20 are almost never used.
- In metallic colours opaque tinters such as tb13, tb22 are almost never used.
- Also in metallic colours tb15, tb17, tb19 are absolutely never used.
- A good starting point for matching is a pint formula which is scaled back about 10-20%. This allows room for any necessary additions.
- If 3 or more additions are made the formula should be restarted as colour accuracy is questionable as more additions are made.
- Try to use the smallest number of tinters necessary to match a colour, usually 4 tinters for a solid colour. Too many tinters can make a colour "twitchy". This will make reproducing a colour harder as well as making it harder for the mixer to make that colour in the future.
- Try to have "good numbers" in a finished formula. This will also make it easier for the person making that colour in the future.
- Generally this means having numbers divisible by 5 or 10 when the total amounts are greater than 50 grams per quart.
- Final formulas should be checked for hiding and accuracy before being sold. Hiding can be checked by spraying or doing a drawdown on a black and white card. Hiding power can also be determined using the attached excel document.

Whites

- tb01 should be used in amounts varying from 900g to 1200g per quart depending on how much black is used (more black use 900g, less black use 1200g).
- Tinters used in 99.9% of whites are:
 - tb05, tb13, tb20, tb27, tb31, tb160.
- Less common tinters used are: tb23, tb30, tb32
- When trying to make a white colour more yellow, tb13 will give you a “redder” yellow, tb05 will give you a “greener” yellow.
- A white colour that has black in it will have a yellowish hue and tb30, tb31, or tb32 will take the hue away when used in small amounts.
- Using dilute tinters to match a white will give you much greater accuracy and reproducibility.
- Tenths of a gram are as low as our colour software will go, any lower and we will not be able to record it.

Yellows

- Tinters used are:
 - Tb01, tb05, tb07, tb09 (occasionally), tb11, tb13, tb15, tb17, tb19,
 - tb22 (occasionally), tb27, tb160.
- If a lead free colour is desired do not use tb15, tb17, or tb19
- tb15, tb17, tb19 should never be used in amounts less than 100g per quart (that is all 3 tinters added together), as these tinters are not as light stable as the others in small concentrations. The colour, if made with small amounts of these tinters, will change within months.
- tb05, tb07, tb09, tb13 are the most stable tinters but tb05 and tb09 are relatively expensive and transparent and should not be used unless necessary. Tb05 and tb09 should not be used in amounts greater than about 800 grams per quart or the final formula may appear “orange peely”.
- tb07 is a new lead free yellow tinter that has greater hiding than tb05. It is not exactly the same colour as tb05 but anywhere we used to use tb05 in matching a new colour we would use tb07 now. The customer will benefit from a lower cost and better hiding power.
- If tb27 or tb160 are necessary they should be used sparingly and of course dilute tinters should be used.
- tb15 is a lemon (greener) yellow and tb17 is a chrome (redder) yellow.
- tb13, tb15, tb17, tb19 change colour (get redder) when warm or hot and should be cooled off prior to making a colour correction.
- “Cat yellows” usually can be matched with tb01, tb13, tb22, and tb160.

- “Dirty” yellows like “cat yellow” hide better and the clear 111 can be up to 350-400 grams per quart. “Cleaner” yellows do not hide as well and the clear 111 should be about 150-250 grams per quart.
- If a yellow formula has really bad hiding a white base (white 120) is recommended.
- Flop control is recommended when tb13 is used in amounts greater than 20 grams per quart.

Greys

- Tinters used are: tb01, tb160.
- tb05/tb13, tb13/tb22, tb27/tb31, tb30/tb31 are the most common tinter combinations used to give a bit of colour to a grey.
- Try not to use tb27 and tb30 together as this will make a formula “twitchy”.
- Very rarely tb22/tb31 are used to give a bit of colour to a grey.
- The amount of clear 111 should be 350-550 grams per quart as greys have pretty good hiding.
- Flop control should always be used in grey colours.

Browns

- Tinters used 75% of the time are: tb01, tb13, tb22, tb160.
- About 20% of the time tb01, tb17, tb19, and tb160 are used when the “miliness” of the tb13/tb22 combination are to be avoided.
- Remember not to use less than 100 grams per quart of tb17/tb19.
- About 5% of the time tb21, tb23, tb30 are used to make a brown redder without “miliness”
- Browns are generally good hiding colours so the clear 111 in a final formula should be from 350-550 grams per quart.
- Flop control should always be used in brown colours.

Reds

- Tinters generally used are: tb01, tb11, tb19, tb21, tb22, tb23, tb24, tb160.
- tb11 and tb24 are the most light stable tinters but also the most expensive and transparent.
- tb20 is usually only used when matching an old, faded red sample.
- Do not use tb19 if a lead free formula is required.
- tb11 or tb19 will lighten a red in a “yellower” direction while tb01 will lighten a red in a “pinker” direction.

- tb22 or tb160 will darken a red but at the same time make it “dirtier”.
- tb24 will make a colour redder in a “yellow” direction, tb21 will make a colour redder in a neutral direction, and tb23 will make a colour redder in a “bluer” direction.
- For good hiding the final clear 111 should be about 250-300 grams per quart unless there is a lot of tb01, tb22, or tb160 in which case the clear 111 could be up to 400 grams per quart.
- Flop control is not used in red colours so that the maximum amount of UV absorbers can be present.
- -it is recommended that all red colours be cleared for maximum UV protection.

Blues

- Tinters used are:
 - tb01, tb27, tb30, tb31, tb32, tb45, tb160.
- The tb27/tb30 combination is to be avoided to prevent “twitchy” formulas.
- tb32 and tb45 are expensive and generally not used in solid colours.
- tb05 and tb13 are sometimes used in an unusual blue
- Clear 111 in the final formula should be from 300-500 grams per quart depending on the hiding power.
- Flop control should always be used in blues.

Greens

- Tinters used are:
 - tb01, tb05, tb09, tb13, tb15, tb17, tb27, tb31, and tb160.
- tb01 and tb160 are almost always used with either tb05/tb27, tb13/tb27, tb27/tb31 combinations used in between most often.
- Remember not to use tb15 or tb17 in small amounts.
- Clear 111 in the final formula should be 300-500 grams per quart depending on the hiding power.

Purple/Pinks

- Tinters used are:
 - Tb01, tb11, tb13, tb21, tb22, tb23, tb24, tb30, tb31, tb32, and tb160.
- tb30 should not be used in excessive amounts (over 300 grams per quart), as this will reduce the gloss of the final colour.
- The final clear 111 amount should vary from 300-500 grams per quart depending on the hiding.
- Flop control should always be used in purples/pinks.

Metallic colours

- Tinters used are tb05, tb09, tb14, tb20, tb21, tb23, tb24, tb27, tb30, tb31, tb32, tb45, and tb160.
- Try to use no more than 3-4 tinters plus the metallic tint bases.
- Tinters never used in metallics are tb15, tb17, and tb19. For the exception see the red metallic section
- tb09, tb11, tb13, tb22, and tb24 are rarely used (only in colours with a special “flip”). These can best be viewed at a side angle.
- tb36 is the smallest flake and will be used mostly in very “silvery” colours and in large amounts to make the most of
- The small flake size. This final colour will need to be cleared if using over 500 grams per quart of the tb 36.
- tb37n is the medium metal flake and gives a little bit of “play” to the colour.
- tb38n is the largest metal flake and gives much more “play” than tb37.
- A lot of colours can best be matched using a combination of tb01/tb37n/tb38n. The tb01 kills the “play” while tb38n keeps the “sparkle”.
- To “kill” the play of a colour tb01 or tb40 are used. Tb01 causes a great effect in small amounts so it should be used sparingly and carefully. Tb01 can cause excessive “miliness” in a colour in which case tb40 would be better.

Pearls

Pearls are used much more in newer colours and the sample being matched should be looked at under a bright light to determine which pearl to use. This decision should be made carefully as it is not always obvious which colour pearl to use in a colour. Some green metallics have blue pearl in them and red metallics can have gold pearl or blue pearl not necessarily red pearl. Also the metallic flake will pick up the colour of the tinters around them. Remember pearls do not have a lot of “play” to them. If a metallic has pearl in it you can usually best see its colour when viewing at a direct (90 degree) angle.

Matching a base/clear colour in a single stage is usually no better than an approximate match. Customers desiring a perfect match (to paint a fender/door/hood only) should really just get OEM paint.

Customers who are painting larger things (tankers, trailers, etc.) usually just want a single stage match that looks close to the sample. They generally do not want the trouble of clearing the job after. If they can be convinced to go for a base/clear match the metallic content of the colour can be scaled up. It is usually easier to match the colour better at all the angles this way. This will make the metal flake appear a little smaller and will give excellent hiding. Sprayability is also increased. The resulting colour will have to be cleared because, if left alone it will have a reduced gloss.

Metallic colours are carefully formulated to achieve a balance between hiding power, gloss, and sprayability.

Flop control should always be used in metallics to decrease blotchiness, it can be doubled in a formula to 140 grams per quart for colours with tb36.

Silver and grey metallics

- A colour that is mostly silver in appearance should have a metallic content of about 450-750 grams per quart in a single stage to achieve hiding (depending on which metal flake is used, tb38n is on the high end as it retains its gloss well, tb37n and tb36 will be on the low end as they will lose their gloss more).
- The more black or other tinters you use in a colour the less silver you will need to still achieve hiding.
- Black and silver alone has a “yellowish” tone to it and tb30, tb31, tb32, and tb45 are used to reduce the yellow tone. Using tb31 on its own tends to make a colour look “greenish” which is why it is most often used with tb30.
- To make a silver/grey metallic yellower tb14 is most often used.
- To make it redder tb20 is used unless it needs to be a “bluer” red in which case use tb23 or tb30.

Blue metallics

- Tinters used in blue metallics are usually: tb27, tb30, tb31, tb32, tb45, and tb160.
- tb31 has a greenish (direct angle) to reddish flip (side angle) to it and tb05 is usually used to reduce the reddishness of the colour on the flip.
- tb45 maintains a greenish tone to it on all angles.
- tb32 maintains a reddish tone to it on all angles.
- tb23 is occasionally used as it has an unusual “play” to it. It will make the colour redder mostly on the side angle.
- Pearls used in blue metallics are usually blue pearl (tb715) or white pearl (tb40). Very occasionally green, purple, or red pearl is used.

Green metallics

- Tinters used are:
 - tb05, tb09, tb14, tb27, tb31, tb45, and tb160.
- tb09 is an orange that will kill the play of a colour, as it is a semi-transparent tinter. It will also make it more orange on the side angle.
- The use of tb31 will make it redder on the side angle and if this is not the effect desired use tb45 instead of tb31.
- To make it yellower use tb14 if a dirtier colour is required, and tb05 if a cleaner direction is required. Both yellows will give an even play- meaning they will both make it as yellow head-on as on the side angle.
- Pearls usually used are green, gold, super gold, white (tb40), and blue.

Gold Metallics

- Tinters used are:
 - Tb05, tb09, tb14, tb20, tb21, tb27, and tb160.
- tb14 and tb20 in combination are most commonly used.
- tb09 will make a colour especially orange on the side angle.
- Pearls used are generally gold, super gold, and white (tb40).

Red Metallics

- Tinters commonly used are:
 - Tb20, tb21, tb23, and tb160.
- Tinters occasionally used are tb11 and tb24. They will give a special play, tb11- orange on the side angle, tb24- red on the side angle.
- tb21 gives a “warmer” red than tb23 which gives a “bluer” red.
- tb20 and tb160 will both “dirty up” a red, tb20 with more of a brownish tone especially on the direct (head-on) angle.
- Pearls used are red, gold, super gold, super copper, super bronze, red russet, and white (tb40), although some unusual red metallics may use blue pearl.
- Seminole red metallics are unusual in that they are made like a solid colour with a little metallic or pearl thrown in. This is the only case where you will use tb19 in a metallic.

Brown Metallics

- Brown metallics are made using the same tinters as gold and red metallics with the same conditions to give it an unusual play if required.

Purple/Pink Metallics

- Purple and pink metallics are made using the same tinters as blue and red metallics with the same conditions to give it an unusual play if required.

If you have any questions or concerns regarding these color matching guidelines please call Richard Jackson (color matcher) at 1-800-661-9930 or 451-4242.

Endura Lab Staff