



IN THE CONTAINER

1. Settling

- Over-reduction or improper thinner: Follow instructions
- Too rapid thinning: Add thinner gradually, stirring constantly
- Poor agitation: Use large paddle gear reduced air agitators

2. Gelling

- Any material which will dry in the presence of air at normal temperatures will tend to take on body by virtue of oxidation which takes place.
 - If bodying of the material has not proceeded to the point where there is livering action, it is often possible to bring the thickened particles back into solution by addition of a stronger solvent of the same general type or class.
- Even a straight baking-type enamel will tend to take on additional body due to evaporation of solvents.
 - Add proper solvent to bring liquid to proper viscosity and body.
- In the more advanced stages of oxidation, a livering action often occurs which is aggravated by the too-swift addition of extra thinner. It should be remembered that thinner should always be added slowly and the mixture stirred at the same time.
 - If a definite livering has occurred, it is not easily feasible to reclaim the material. Sample should be submitted to your Diamond Vogel representative or to Diamond Vogel Paint & Coatings, 1020 Albany Place S.E., Orange City, Iowa 51041.
- Use of improper solvent: Use recommended thinner.

General: The primary cause of excessive bodying is, in most cases, improper handling of dip tank or other storage facilities. A method for keeping all storage tanks tightly sealed should be arrived at and carefully adhered to.

3. Skinning

- While it has been possible (to a large extent) to minimize skinning, it is something which will occur to a varied degree whenever an air-drying enamel is exposed to the air.
 - Make sure that containers in which the material is stored are airtight. Dipping tanks should have a sealed cover that is in place whenever the tank is not in use. Whenever conditions are such that skinning cannot be overcome by normal means, consult your Diamond Vogel representative.
- **Note:** To avoid skinning during storage of open containers or during long disuse of dip tank, cover remaining contents with a small amount of reducer before sealing.

APPLICATION PROBLEMS

4. Slow Dry Time

- Humid weather: If possible, place in heated drying room.
- Cold weather: Maintain a temperature of at least 65°F. 76°F is desirable for normal drying.
- Greasy, oily, or otherwise unclean paint surface.
 - Clean surface carefully with volatile solvents. If metal, use special metal treatments such as alkaline or acid cleaners and phosphatizers.
- Failure to stir all pigment of pigmented finishes into proper suspension before application. Failure to stir properly unbalances the formula of applied material and often will cause poor drying.
 - Stir the material thoroughly so that liquids and pigment will be evenly dispersed.
- Improper ventilation.
 - Provide ventilation and air movement.
- An attempt to fill rough wood or metal by applying a heavy coat retards thorough drying.
 - Do not attempt to use finish coat as a surfacer. Apply only a full covering coat. Do not exceed recommended dry film thicknesses.
- Improper catalyzation: Follow instructions.

5. Poor Hiding

- Over-reduction.
 - Add fresh, unreduced material to that which has been reduced.
- Application on very hot, smooth surface which tends to cause film to flow off.
 - Use a faster evaporating solvent. Remove from direct sunlight.
- Pigment not properly stirred into suspension.
 - Agitate thoroughly to properly distribute pigment.
- Too-slow evaporating solvent, causing too much flow.
 - Use faster evaporating solvent.
- Improper atomization.
 - Adjust spray equipment.
- Low film thickness.
 - Apply more paint with more passes of spray gun. Use higher solids paint (less reduction), or faster thinner.
- Lighter colors (lead- free yellows, oranges and reds).
 - Use a white primer to prevent shadows from showing through.

6. Lack of Flow (see Orange Peel section 11)

- Insufficient reduction: Reduce or heat paint according to instructions.
- Use of solvent with too fast evaporation rate: If fast evaporation is due to local weather conditions, choose slower evaporating solvent than originally recommended.
- Improper atomization of spray gun: Adjust spray equipment.
- Application of too thin a film: Apply more material to surface.
- Draft conditions: Find reducing solvent or blend to provide proper flow in a draft or eliminate the draft.

7. Color Separation

- Poor agitation: Stir thoroughly to properly distribute pigment.
- Too thick a film: Reduce film thickness.
- Too slow reduction solvent: Use a faster solvent.

8. Dusting

- Wrong solvent blend: Usual remedy is to choose a slower evaporating thinner.
- Excess spray pressure: Reduce pressure.
- Over-reduction of material: Use less reduction. Add fresh material to that which has already been over-reduced.
- Gun held too far from surface: Hold gun at proper distance from work (usually 8 –12 inches).

9. Sagging

- Sagging can be caused by either over-reduction or by use of too slow a solvent.
 - Use the proper solvent consistent with the general nature and temperature of the surface to be coated.
- Application of too heavy a coat.
 - Do not apply so much material to the surface.
- Draft conditions.
 - Eliminate draft.
- Strong sunlight causing top drying and consequent later slippage and wrinkling of film on vertical surfaces.
 - Avoid application in strong sunlight.
- Uneven distribution of spray coating.
 - More careful application by proper handling of spray gun.
- Jerky operation of mechanical equipment for withdrawal from dip tank.
 - Repair or redesign equipment.
- Cold weather.
 - Use faster evaporating reducing thinner or bring room temperature up to 75°F.

10. Bleeding

- Organic red pigments or various dyes used in undercoats have not been sealed properly. This causes a pink or reddish shade to show through a white topcoat.
 - Best remedy is to avoid use of bleeding colors (usually reds or oranges). Where bleeding colors have been used, a weak solvent or water base sealer usually will seal the bleeding.

11. Orange Peel (see Lack of Flow section 6)

- Use of improper solvent for prevailing temperature condition.
 - Choose a solvent which will allow greater flow.
- Improper handling of spray equipment.
 - Adjust air pressure and fluid flow, and be sure that gun is held at proper distance from work.
- Application of too thin a film, not allowing proper flow.
 - Apply heavier coating.

12. Lifting or Wrinkling

- Sometimes strong solvents tend to react with preceding coat.
 - Be sure that the undercoats are thoroughly dry. Use primer recommended. Use thinner with lowest solvent strength which will still act as steady diluent.

13. Poor Electrostatic Wrap

- Dry over spray: Use retarder such as 150 reducer. Reduce pressures.
- Low polarity: See paint and equipment manufacturer's recommendations for reduction of paint and polarity requirements.
- Electrical: Check power at transformer and gun.
- Ground: must have a good earth ground.

14. Bubbling/Pin Holes

- Drafts which cause surface drying and force the solvent to break through surface film in order to evaporate.
 - Avoid excessive drafts or sunlight.
- Fine drops of moisture coming through separator in spray apparatus.
 - Clean spraying equipment.
- Air entrapment.
 - When using air assist airless equipment, lower the atomizing air and raise the fluid pressure. Try a smaller tip orifice size.
- Thinner evaporates too fast.
 - Use slower thinner or lower viscosity.
- Spots of grease on surface.
 - Clean surface carefully.
- Material applied while frothy, following violent agitation.
 - Allow froth and bubbles to subside before applying.
- Poor wetting of the surface by the enamel.
 - Wipe surface to be sprayed with a solvent-saturated cloth before application of the next coat.
- Bake oven is too hot.
 - Allow more flash off time or lower temps.

15. Washing of Film

- In some dip operations, faulty ventilation in the hood above the dip tank allows a concentrated collection of solvent vapors. This reduces the film on the object which has just been withdrawn from the dip tank, thereby causing the film to wash or flow off the finishing surface.
 - Provide proper ventilation over dip tank or in spray booths.
- Faulty ventilation in oven causes concentration of vapor.
 - Provide proper ventilation.
- Wash caused by cleaning solvents remaining in crevices.
 - Be sure surface is clean and dry, as well as all crevices. Change angle of drain.

16. Fish Eyes

- Silicone contamination: Locate source of contamination and eliminate it. Check wipers, belt dressings, lubricating greases, and oils, hand creams, metal and wood polishes, etc., as possible sources.
- Oil or water in air lines: Provide adequate filtration.

FILM PROPERTY PROBLEMS

17. Dirty or Seedy Finish

- Unclean conditions of application.
 1. Dust in paint room.
 2. Dirt in air or paint lines of spray apparatus.
 3. Dirt on conveyors.
 - Cleanliness. Rearrange equipment so that any spray dust from booth does not reach previously painted parts.
- Improper solvent which tends to throw resin out of solution.
 - Use the proper recommended thinner.
- Material has been subjected to extreme cold which tends to throw some particles out of the solution.
 - Allow material to reach 75°F before applying. If still seedy, consult your Diamond Vogel representative.

18. Poor Adhesion

- Certain types of metal such as galvanized iron, cadmium, and zinc are difficult surfaces to obtain proper adhesion upon.
 - If normal methods of metal preparation do not overcome adhesion difficulties, send full particulars, with samples of metal to your Diamond Vogel representative or to Diamond Vogel Paint & Coatings, 1020 Albany Place S.E., Orange City, Iowa 51041.
- Unclean surfaces or excessive phosphate residues.
 - Clean carefully with a commercial metal cleaner/conditioner. Follow with adequate rinsing.
- Sometimes the finish coat and the primer used are not meant to be used together, and the solvent in the finish coat practically lifts the primer from the surface. Even though film will dry and have good appearance, primary adhesion has been ruined.
 - Make sure that the recommended primer and finish coat are used together.
- Overbaking, which accelerates loss of flexibility in the film.
 - Check oven and bake according to instructions.

19. Poor Inter-Coat Adhesion

- Primer is too hard to accept adhesion with topcoat.
 - Use properly recommended system.
- Primer or previous coat dries too hard—or glossy—due to inherent drying quality or long aging prior to application of finish coat.
 - Roughen coating with sandpaper or steel wool. It may even be necessary to use a reducer of higher solvent strength in the second coat in order that a tooth can be obtained in the film.

20. Poor Flexibility

- It is often difficult to differentiate between “lack of adhesion” and “brittleness” in evaluating film failures. Other than inherent brittleness or lack of adhesion in a finish, the cause for either difficulty will be the same.
 - See Poor Adhesion in section 18.
- Improper baking. If complete polymerization of film has not been effected, brittleness may follow.
 - Check oven operation and follow baking instructions.

21. Poor Hardness (Mar Resistance)

- Film not completely dried; Allow for more complete air-drying or baking. Water spotting may occur.
- Coating was incorrectly catalyzed: Make sure proper mixing ratio is followed.