

Many engineers understand the benefits of *Duraglide* Dry Lubricant, but are not aware of the numerous ways that *Duraglide* can be applied. *Duraglide* can easily be applied by brush, spray, wipe, or by dipping. For each of the methods described below, it is important that parts be clean and dry before the application of *Duraglide*. Below is a brief overview of the different application methods:



### Dipping

Regardless of what quantity of parts you need to lubricate, dipping provides the best way to a consistent and uniform coating on virtually any surface geometry including internal areas of complex assemblies. Dipping is also most commonly used in high volume production and is suitable for coating large batches of small parts, tubing, coils of wire, and parts with irregular shapes.

**Dipping Small Quantities:** If dipping for a prototype or a qualification test requirement, a glass beaker, or measuring cup may be the ideal dipping “tank”. Pour well-shaken *Duraglide* into the beaker and dip parts at room temperature using tongs or wire hangers. You will marvel at the consistency of the coating and the speed the carrier dries from the part. For novice users, the glass container makes it easy to visually confirm the dispersion is well mixed, and also ensures the purity of the dispersion.

For dipping parts in a production environment, a more engineered process is advised. Two commonly used dipping processes are described below:

**Chilled Dipping Tank:** Use of a chilled dipping tank (15-21°C / 60-70° F) will help minimize carrier fluid losses through evaporation. Chilled dipping tanks should be equipped with agitation vanes or circulating pumps to ensure a well-mixed dispersion. Chilled baths are readily available and can be a low-cost option for dipping large quantities of parts. The down-side to any chilled dipping bath is the treated parts come out cold, slowing the drying time which may result in a streaky coating. Slow drying may also increase usages due to drag-out losses. Also, ambient moisture can condense onto the surface of the cool *Duraglide* bath, resulting in water pooling on the carrier's surface, making bath change-outs more frequent.

**Heated Dipping Tank:** Specially modified vapor degreasers are recommended as the best option for high production dipping. They use a heated single-sump tank equipped with cooling coils above the vapor surface to trap and contain carrier fluid vapors. The carrier is maintained in a rolling boil (45-55°C / 113-131°F) and may use a circulating pump to keep PTFE particles well dispersed. The heated carrier warms the treated parts to enhance drying upon removal from the bath and helps ensure a uniform coating. The warm carrier is especially advantageous when complex internal surfaces require lubrication. The warm parts speed drying on internal surfaces promoting a uniform and consistent coating and minimizes carrier drag-out losses.

### ***Tips for Dipping:***

- A single dip is adequate for most uses.
- For a chilled bath, parts are typically fixtured and then dipped in small quantities. Heated baths are well suited to the use of wire baskets that are loaded with parts for dipping.
- For both chilled and heated baths, automated dipping fixtures or hoists are highly recommended to ensure consistent coating and minimal drag-out losses. Automated fixtures also greatly simplify process validation requirements.
- *Duraglide* carrier fluid vapors are heavier than air, thus floor-level ventilation is both appropriate and advised as opposed to hooded ventilation, which increases air movement and evaporative losses from the bath.
- For consistent coating from part to part, the bath should be well agitated to ensure the dispersion of PTFE solids is uniform in the carrier.
- In a filled tank, the equipment cooling and heating components (as appropriate) should be kept running at all times, even during evenings and weekends, to minimize carrier fluid losses.
- Use a lint-free disposable wipe moistened with isopropyl alcohol for maintenance cleaning, cleaning small spills, or for cosmetic cleaning of treated parts. If heat treating to anneal the coating is specified (for enhanced coating durability), wipe-cleaning of the coating should be performed before the parts are subjected to heat.

## Equipment Resources for Dipping

- a. Heated: Baron Blakeslee ([www.baronblakeslee.net](http://www.baronblakeslee.net)) ref. “Lab Koat series coater”
- b. Heated: Branson ([www.emmerson.com](http://www.emmerson.com)) ref. “Branson VDX-452 R”
- c. Refrigerated: Julabo USA ([www.julabo.com](http://www.julabo.com)) ref. “Refrigerated Circulators”

## Wiping or Brushing

Useful for coating continuous surfaces such as rods, tubing, or sheets where a dipping bath is not practical. Wiping and brushing is also appropriate for coating small, selected areas of a larger part. This can be done at room temperature and with brushes or wipes easily obtained at any hardware store.

## Air Spraying / Air-less Spraying

*Duraglide* can be easily applied with a hand-held spray gun or with fixtured automatic spray heads. Spraying is often used to upgrade away from a wiping/brushing process which may be less consistent in application. Operation can be either intermittent or continuous. Unlike dipping, spray coating should be done in a succession of thin coats, allowing the surface to dry between applications. Results from this technique are typically better than the application of a single thick coating, which can take longer to dry and can result in a coating with “mud cracks,” uneven coverage and poor adhesion.

### *Tips for Wiping, Brushing and Spraying:*

- Prevent evaporation losses of *Duraglide* by storing in factory packaging or steel containers that can be closed and sealed tightly when not in use.
- For best application, it is important that the particles not “fall-out” of the dispersion when in use. Dispense *Duraglide* from a container that is sized to easily allow routine shaking/agitation to ensure the PTFE particles remain in a well-mixed dispersion during use.
- Although breakage is a possible safety concern, closable glass containers give operators a visual confirmation that the *Duraglide* is both well-mixed and free from contamination during use and storage.
- Plastic containers are not recommended for storage. Plastic can distort significantly with temperature variations, often causing a poor seal at the closure resulting in vapor losses.

## Aerosol Sprays

*Duraglide* Dry Lubricant is packaged in aerosol dispensers for convenient surface application and quick coverage for spot-applications. Aerosol packaging ensures the lubricant is always high purity regardless of the user environment. Use aerosol sprays on hinges, hubs, gears or mechanical pinch points that benefit from the presence of a lubricant. Aerosols are packaged with a fan spray making them ideal for applying *Duraglide* on large surface areas such as injection mold tooling. *Duraglide* is also aerosol packaged with a tight spray pattern to enable pin-point lubrication of small areas such as micro-hinges and pivot points.

## Drying

*Duraglide* dries almost instantly, but time-to-dry may be dependent on carrier fluid composition and thickness of coating. Increasing the temperature of the treated part and/or the bath (if dipping) can reduce drying times especially on internal surfaces of complex assemblies where fluid can be trapped.

## Heat Treating to Anneal the *Duraglide* Coating

In some applications a more durable coating is desirable. *Duraglide* Dry Lubricant coatings can be made more durable by heating the coated parts to 305-310°C (581-590°F) which melts the coating and “fuses” it to the substrate. Either radiant or induction heating is suitable, and short treatment times (5 to 10 minutes) are preferred over an extended heating cycle. Heat treating also turns *Duraglide* completely clear; it appears nothing is on the surface of the device. This is particularly helpful if the coating needs to be invisible on the device for cosmetic reasons.

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