



Application Instructions

When using ZYBAR professional grade coatings, always use safe industry practices.

All personnel handling and/or using ZYBAR should be trained on all industry safety practices, laws and other regulations. Including but not limited to:

- Protective clothing, safety glasses, protective breathing equipment,
- Complete review and understanding the contents of the Safety Data Sheet (SDS) for ZYBAR.
- Spray booths which comply with all local and federal laws, regulations, and safety requirements.

Surface Preparation (REQUIRED)

****** GLASS BEADS ARE NOT AN EFFECTIVE MEDIA FOR PROPER SURFACE PREPARATION ******

Throughout the application process, make sure the substrate surface is clean and free of all contaminants including but not limited to oil, grease, dirt, fingerprints, drawing compounds, surface passivation treatments and other sources of contamination which can cause coating adhesion failures as well as cosmetic blemishes.

Surface Preparation – The Importance of Surface Prep trumps Coating Application

Virtually all metal substrates have some degree of impurities on them ranging from release agents from casting to machining oils and whatever was on the hands of the people handling it. Depending upon which one you use, chemical cleaning of metal surfaces first is highly recommended. On metal substrates, recommended solvents include Isopropyl Acetate, Tert-Butyl Acetate (TBAC). We do Not recommend use of any petroleum-based solvents (aka Naptha) such as Methyl ethyl ketone (MEK). While solvents are a good starting point for surface prep, they don't necessarily release the impurities within the pores of the substrate. As a result, we recommend that this step be followed by pre-heating the part(s) as described below.

Solvent Cleaning

When coating a part that has already been used in service, it is particularly important to preheat the part to 500° F for 1-hour before surface cleaning and preparation is done. This will carbonize most of the impurities whether on the surface as well as those that have worked their way into the pores of the metal.

In all cases, ZyBar™ should be applied over clean substrates. Normal industrial coating practices, such as chemical washes or solvent cleaning and degreasing provide a good starting point and are recommended. These practices should not be used after media blasting the part. However, it should be noted, these pre-cleaning methods alone do not remove all the surface residues.

Inspect the parts for dirt, rust, mill scale, paint, etc. After cleaning, the metal should be handled with gloves. Often fingerprints can contaminate the surface and be seen after the next step (Preheating below) as well as in the final finish. Likewise, residual oil often leaves stains on the surface that can affect the adhesion of the coating later.

Preheating

Metal substrates such as castings which have greater metal porosity and should always be pre-heated to 500° F for 1-hour whether new or used. Likewise, metal parts that have been machined, polished, or manufactured with oils, release agents, rust-inhibitors, etc. should also be pre-heated. This thermal process will convert the organic fluid into a carbon ("carbonize") via thermal pyrolysis.

NOTE: If forced to choose between solvent cleaning and pre-heating, it is recommended to pre-heat the parts prior to grit blasting.

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Grit Media Blasting

The choice of blast media for your work is typically chosen based on the substrate's hardness and the anticipated dry-film thickness (DFT) of the coating.

The 3rd-step in your surface preparation uses a blast media. The blast media used for ZyBar™ coating finishes should provide a consistent surface profile of 7-17 microns (approx. .25-.75 mil) and result in a sharp tooth-like profile. Achieving this kind of profile requires using “angular abrasives” versus “spherical abrasives”. Spherical abrasives such as steel shot or glassbead create a surface profile that is not suited for ZyBar™ coatings.

In general, we recommend the use of either #100 Aluminum Oxide or Garnet Sand grit media.

- Hard substrates of Carbon, Cast and Stainless Steel are best prepared with #100 grit aluminum oxide at air pressures of 100+ PSI (5.8-7.3 kg/cm²) at the gun.
- Although aluminum is softer than Stainless Steel, the same grit size can be used, but you will want to lower the air pressure down from the Stainless Steel settings to 80 PSI so as not to erode the surface.

The chart below shows a general comparison of aluminum oxide grit sizes vs. their applications

Aluminum Oxide Size Chart			
Grit Size	Micron		
24	1000-850	Coarse	Removal of thicker coatings
36	710-600		Engraving
46	425-355		Deep profiling/etching
60	300-250	Medium	Removal of most coatings
80	212-180		Fast cleaning
100	150-125		Medium profiling/etching
120	125-106	Fine	Removal of light coatings
150	106-75		Gentle cleaning
180	90-63		Minimal profiling/etching

Grit medias not recommended:

- River Sand. River Sand medias such as used for blasting heavier gauge metal is generally considered too smooth, uniform, and short-lived to be useful in preparing metal substrates and is not recommended.
- Glass bead. Glass bead is too soft and somewhat spherical in shape. Therefore, it is not recommended to achieve the surface profile needed.
- Hand or mechanically operated abrasion. Abrading by hand using medias such as wire brushes, Scotch-Brite™ or other grit pads. These methods have their place in some situations such as touching up, or areas where masking is required, but as a general rule these methods are not consistent enough to provide the profile needed for coating adhesion and often lead to a cosmetically flawed appearance.

Time Period between Blasting and Painting

Once blasted, all metal substrates begin to corrode on some level over time. In particular, cast iron and other metals with alloys that corrode quickly grit blasting should be coated very shortly thereafter. Coating over metal that has been allowed to corrode can result in outgassing and delamination.

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Aluminum (untreated) & Steel

1. Media Blast is REQUIRED first step in all applications
2. Remove all rust, mil scale, and any other forms of oxidation products.
3. Blast metal surface.
 - a. Blast profile of .0025 to a maximum of .005 (.5 mil)
 - b. Suggested blasting media. Clean 100 to 120 grit aluminum oxide, garnet sand or other blast media designed to etch metal surface at 90-100 psi.
4. Ensure that the substrate is free of all media, dust and any contaminants through the use of clean compressed air.
5. Spray immediately after blasting to prevent surface contamination.

NOTE: Metal fabricated tubing/exhaust systems have varying levels of quality, porosity, welding, fabrication and other variables can influence the cosmetics, adhesion, and performance of the coating. Likewise, the design of the final fabricated parts can influence the outcome of the coating application as well. Ex. If there are components bolted on or areas of the metal fabrication creates area where the cleaning/blasting cannot reach; this can hold oils and other impurities which are not released until the high temperatures of oven cure or in service operation are reached.

Blast profile substrate notes



Cast components

1. When preparing Cast formed components we recommend pre-baking (often referred to as “outgassing”) the component at 450°F to 500°F for up to one hour to bring the oils and other contaminants out of the porosity of the cast part.
2. Remove the component from the oven allowing it to cool to the touch and wipe it with Acetone, TBac or similar solvent (No mineral spirits or naptha solvents) to remove surface oils
3. Media Blast is REQUIRED next step in all applications
4. Remove all rust, mil scale, and any other forms of oxidation products.
5. Blast Stainless surface.
 - a) Blast profile of .0025 to .005 (minimum .25 mil) may be required.
 - b) Suggested blast media due to hardness of stainless or chromed parts is provided in the chart above.
 - c) Blast to rough etched surface visual to the eye. This will appear as a coarse or rough texture on the blasted part.
6. Other suggested blasting media which provides a good etched surface is clean 100 to 120 grit aluminum oxide, garnet sand or other blast media designed to etch metal surface at 90-100 psi.
7. Ensure that the substrate is free of all media, dust and any contaminants through the use of clean compressed air.

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8. Spray parts within one hour immediately after blasting, especially cast or steel parts as rust bloom can occur within 60-90 minutes in high humidity climate.



Stainless Steel – or –

Prior Ceramic Coated Components:



1. When preparing stainless steel, previously ceramic coated – new or used components we recommend pre-baking (often referred to as “outgassing”) the component at 450°F to 500°F for up to one hour to bring the oils and other contaminants out of the porosity of the cast part.
2. Media Blast is REQUIRED step in all applications.
3. Remove any surface contaminants from the component.
4. Blast Stainless surface.
 - a. Blast profile of .0025 to .005 (minimum .25 mil) may be required.
 - b. Suggested blast media due to hardness of stainless or chromed parts is provided in the chart above.
 - c. Blast to rough etched surface visual to the eye. This will appear as a coarse or rough texture on the blasted part.
4. Blow off the component after blasting to remove all media, dust and any contaminants through the use of clean compressed air.
5. Spray parts within one hour immediately after blasting, especially cast or steel parts as rust bloom can occur within 60 minutes in high humidity climate.

Tip: If you do not possess the ability to do in house MEDIA BLASTING equipment or capability, we suggest taking your components to your local automotive paint shop or powder coater for surface preparation. Provide your local shop the specific blast method detailed above with your order.

Mixing and dispensing the coating material:

1. Temperature of the coating should be at 65°F to 80°F prior to using.
2. Stir the product aggressively to get solids that settled on the bottom of the bottom to disperse within the coating. Then shake the can well before using. The ZYBAR incorporates ingredients which can settle when left sitting for more than 20 minutes; it is important to stir using mixing sticks, focusing on any corners or bottom edges of the container.



3. Follow hand-mix with a mechanical paddle mixer, or shaker, if one gallon size or larger.
4. If the ZYBAR has been in storage for an extended period, more mixing/shaking may be necessary as you spray the component.
5. Filter the coating using fine (100) mesh paint strainer while pouring ZYBAR into the pressure pot or paint cup. Filters are readily available from most retail home paint stores.
6. If the can should sit idle for longer than 2 minutes shake the can again to ensure the solids remain dispersed in the coating.

NOTE: Always re-seal the containers holding the remaining, unused ZYBAR immediately after dispensing. This not only keeps the solvents from evaporating, but better protects against airborne contaminants.

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Application:

ZyBar™ coating can be applied to both the inside and outside substrates of exhaust systems components to provide increased corrosion protection and heat management. For experienced liquid coating applicators should be aware that ZyBar™ “flashes-off” quickly, so it takes a little bit of trial and error to see how it builds versus looking for a (lasting) “wet” look. It is recommended to spray all areas that are difficult to get the coating into first, such as the collector and bends in tube on headers versus waiting to touch those areas up again later. Then, as you coat the rest of the part, you can recoat the difficult areas again with a second pass without being concerned about inter-coat adhesion. ZyBar™’s chemistry permits you to let parts ambiantly cure for 30 minutes (sometimes longer) and still recoat the part(s) if you think there are light spots.

Application Tip: Shake or agitate the coating every 60-120 seconds throughout the spray application process to prevent settling of the solids in container or spray gun reservoir.

Interior substrate application

1. Follow the instructions noted above regardless of interior or exterior components and substrates of parts.
2. Metal temperature should be 65°F-80°F.
3. For components such as tubing which cannot be easily sprayed, ZyBar™ can be applied in a manner which flows over the surfaces. For components such as headers, or manifolds ZyBar™ can be applied as follows:
4. Utilize a flexible hose/wire with jaw clasp at one end (Tool Grabber).
5. Select clean cotton “buffing ball” and use jaw clasp to hold.
6. Dip the cotton ball into ZyBar™ cup and allow it to soak up coating thoroughly.
7. Pull the ball through both ends of each port on tube or header
8. Dip the ball as needed to keep ball wet with coating (very light drip)
9. Hang the component and allow the coating to dry
10. Use a non-cling rag wetted with Acetone or other like solvent to remove any drips or excess coating that should drain out of the tubes
11. Due to the difficulty with geometries of the component it will not be possible to ensure 100% consistent coverage. We have found this process to be the most thorough with ZyBar™.
12. An alternate method of coating the interior of tube or headers is:
13. Follow the instructions noted above regardless of interior or exterior components and substrates of parts.
14. Metal temperature should be 65°F-80°F Alternate application method to coat the interior of headers:
 - a. Prepare to pour ZyBar™ in one end by sealing off all other openings except the planned point of coating entry. Sealing can be done using commercially available silicone plugs, tape and other materials.
 - b. Pour a suitable amount of coating material into the unsealed opening.
 - c. Then seal the “pour” opening.
 - d. Gently rotate the tubes/manifold to permit the coating to flow over all interior surfaces.
 - e. Due to the wide range of manifold geometries and configurations, fully ensuring that adequate coverage has been achieved is not possible. Thus, the greater the number of angles of rotation that are used, the greater the probability of full coverage.
15. Drain the manifold or tubular item.

NOTE: Be sure to pour out the coating used on the inside surfaces into a second container for disposal later. Cross-mixing of the “virgin” ZyBar™ can cause problems.

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- a. Just as in the application of the coating, it is important to fully rotate the pipe/manifolds in numerous angles so as to avoid trapping any coating in recesses. If this happens, the added coating thickness in these recesses will result in the coating “mud-cracking” once it cures.
- b. Hang the internally coated part to allow for continued uniform draining, until it is dry to the touch.
- c. Use a lint free cloth or toweling wetted with Acetone or similar solvent (No mineral spirits or naptha solvents) to remove any coating that has gotten onto the exterior surfaces before it dries.
- d. Note: Saving the leftover material in a sealed container for future use is not recommended.

DISCLAIMER: Good coatings do not overcome bad surface preparation or application.



Coating of the Exterior surface:

1. Metal surface temperature is at 65°F-80°F
2. Repeat “Mixing and Dispensing” instructions.
3. Low pressure 30 PSI conventional spray paint equipment.
 - a. Set gun settings to achieve wet film coating thickness of 1.5 – 2.5 mils.
 - b. Fine nozzle tip size (example:.08 to 1.0 mm or similar)
 - c. Use a low air pressure setting approx. 28-30 PSI
 - d. Wet thickness should not exceed 3.0 mils to prevent mud-cracking.
4. Spray booth or work area humidity should be moderate when applying the product.
5. Subtle airflow through the spray booth or work area is best for proper spraying and limits waste through air filtration system.
6. Hang part in a manner that allows the applicator easiest access to all surfaces.
7. Keep gun nozzle 3” to 6” from the surface of the part and spray at angle to substrate surface
8. Throughout the process (every 60 – 120 seconds) shake the sprayer to allow the solids to remain dispersed in the spray reservoir.
9. Start in recessed areas or joints first and then work out to more open and straight surfaces. This will prevent excessive build-up or “mud-cracking” of the coating
10. Allow the coating to flash off, and dry to the touch
 - a. Dry time can vary based on booth temps, humidity and other environmental conditions. Dry time to touch should be within 2 hours under ambient 60-80 degree temperature and less than 70 percent humidity.
 - b. Do not accelerate dry time with heat until the coating is dry to touch. Air movement and temperatures up to 100 deg. F is acceptable after the flash-off has completed (coating no longer looks wet or moist). DISCLAIMER: Good coatings do not overcome bad surface preparation or application.

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Curing of the coating:



ZYBAR can be cured either by ambient air or oven:

- **Air Cure** - Allow the part to continue to be at ambient temperatures of 70 to 90°F for approximately 5 days (120 hours), the coating at this time is ready to be put into use.
***** NOTE When Air Cure method is used we recommended when placing the coated component in service for the first time, allow the vehicle to idle for a minimum of 10 minutes allowing the component surface to ramp up to normal operating surface temperatures.*
- **Oven Cure** - Once the coating application is done and the part is “dry to the touch” (allow a minimum of 30 minutes post application for the solvents to completely flash). The part can now be placed into a paint curing oven at 450°F for 120 minutes.

*****NOTE: After the coating has cured either by air or oven and once placed in service, the first time the component surface operating temperature reaches 650 degrees F it will likely cause the coating to smoke for a short period of time (20-40 seconds), this is the normal final stage of the cure process.*

Disclaimer

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of ZyCoat, LLC. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your ZyCoat, LLC representative to obtain the most recent Product Data Information and Application Bulletin. ZyBar™ shelf life is 12 months from date of shipment of the product also known as the invoice date.

Safety Precautions

Refer to the SDS sheet before use.

Warranty

ZyCoat, LLC warrants our products to be free of manufacturing defects in accord with applicable ZyCoat, LLC quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price of the defective product as determined by ZyCoat, LLC. ZyBar™ is patented. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY ZyCoat, LLC, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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