

An Introduction to Coating HVAC Systems

- What are coatings?
- Contractor concerns.
- Why do you use coatings?
- When do you use coatings?
- Prior to coating.
- Applications tools.
- General cleaning procedures.
- How to estimate a coating project.
- Sample estimate.
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Blueprint for Success

What are coatings?

Lets Look at what some of the manufacturers and suppliers say (this information is taken from the manufacturer/ suppliers spec sheets and web sites):

“Fiberlock 8000 is for HVAC duct remediation projects, apply Fiberlock 8000 to seal and resurface cleaned insulation. Fiberlock 8000 will help strengthen existing insulation material and also contains an EPA registered fungicide to prevent mold from growing on the surface of the coating.”

“Foster 40-20 Fungicidal Protective Coating is a polyacrylate copolymer emulsion specifically formulated for long-term fungicidal activity, with no loss of activity on aging. It is formulated to effectively prevent the spread of molds and odor causing bacteria on its surface. It provides a tough, elastic, decorative finish that allows for movement without splitting to create lodging places for bacteria”

“Tough Coat mechanical insulation repair coating is a tough acrylic polymer designed specifically to enhance and repair mechanical insulation (both duct liner and duct board) found in air handlers, rooftop units, VAV boxes, ductwork, etc. After thorough cleaning, the coating provides a new or enhanced air stream surface that bonds with the existing insulation to lock down remaining loose fibers and provide a much more durable air stream surface that is more resistant to the collection of dirt, debris and moisture. This can significantly extend the life of the HVAC system and represents a significant savings for the building owner when compared to relining or replacing ductwork. Tough Coat is also

formulated with an EPA registered preservative for use in HVAC systems. The EPA registered preservatives are designed to protect the coating from microbial growth.

“BioFlex Fungicidal Protective Coating contains fungicides that help stop the growth of molds on its surface, and helps prevent the migration of microbes through its coating. BioFlex testing include dermal irritation, inhalation, ocular irritation, ingestion and others.”

“DP 2540 is a water based protective coating formulated with a preservative that prevents the growth of mold & mildew on the surface itself. DP 2540 forms a durable, flexible film over metal, fiberglass insulation and wood used in HVAC and general construction applications.”

“ Safe Encasement 130 is a water based, high solids, flexible acrylic coating that is rust, mold, dirt, weather and fire resistant. Suitable for application over friable damaged insulation SE 130 forms a tough, seamless flexible protective enclosure.”

Now lets look at the National Air Duct Cleaners Association (NADCA) definition per their standard, ACR 2006:

“Coatings are surface treatments designed to repair surface defects or modify surface characteristics”

ACR 2006 is referenced several times in the publication. It stands for Assessment, Cleaning and Restoration of HVAC Systems and it is the cleaning standard developed by NADCA. A free download of this document is available at www.nadca.com.

Typical Characteristics

In reviewing the product data and spec sheets most of the coatings share the following characteristics:

- Water based
- Solid content: 45% to 70%
- Weight per gallon: 8.8 lbs to 12 lbs
- Color: Black and/or white
- All pass smoke & fire spread standards
- Most have anti-microbial components to protect the coating from mold and mildew.
- Most coatings cost between \$35 and \$45 per gallon.

Suppliers

Listed below are five suppliers and their web sites. You are encouraged to do additional research . The more knowledgeable you are the better you will be able to assist your customers:

- Foster Products
www.fosterproducts.com
- Fiberlock
www.fiberlock.com
- Tough Coat
www.vacsysint.com
- Safe Encasement
www.vacsysint.com
- Design Polymerics
www.designpoly.com
- BioFlex
www.cleanac.com

Beware of IAQ claims!

The primary purpose of additives in coatings are to protect the coating from mold and mildew. Not all coatings have additives and not all additives are EPA registered.

Contractor Concerns

In trying to decide what coating to use many contractors will ask themselves the following.

1. Is this product suitable for the insulation and/or hard surface on my project?
2. What is the coverage rate on hard surfaces or insulation?
3. What is the drying time of this product and how will that affect my productivity?
4. What is the viscosity of this product and how easy or hard is it to apply?
5. What kind of odor does this product have? Does it have high or low VOC's?
6. What is the total cost to apply this product?

Why do you use coatings?

Lets look at the benefits the coatings offer, they:

1. Locks down any remaining loose fibers after cleaning.
2. Isolates residual spores left in the matrix of the insulation after cleaning.
3. Provides a more durable surface that is more resistant to air erosion/moisture/dirt.
4. Easier to clean in the future.
5. Enhances and extends the life of that surface.

For the Building Owner:

Coatings enhance and extend the life of the HVAC system, giving the building owner a less expensive alternative to replacing existing ductwork and other HVAC components.

Cleaning and coating HVAC ductwork in an occupied building is normally 1/3 to 1/2 the cost of replacing that ductwork. In some cases however, it can make economic sense to replace ductwork instead of cleaning and coating it.

For the Contractor:

Coating gives the Contractor another service/solution to offer it's customers providing the existing conditions qualify to clean and coat.

When do you use coatings?

NADCA's ACR 2006 has 3 sections that deal with this question:

Section 9.1 "Resurfacing of thermal acoustic fiber glass components such as duct liner or duct board within the HVAC system should be considered if the materials show visual signs of abrasion or degradation or if the project requires a change of the fiberglass' original surface to a smoother surface for reduction of the fiber glass' ability to capture and collect particulate. An assessment must be made to determine whether the surface of the component will provide a strong, bondable surface for the coating material after undergoing proper mechanical cleaning."

Section 8.3 "It is highly recommended mechanical cleaning procedures be performed on porous HVAC materials prior to the application of any surface treatments such as mechanical repair coatings. Surface treatments may be used to restore the integrity of material surfaces only as an interim control measure, and must not be used as a substitute for mechanical cleaning or complete removal. Surface treatments must only be applied after confirming the system has been cleaned, utilizing the cleanliness verification tests as defined in the standard."

Section 8.3.1 " Use of anti-

microbial treatments and/or coating products may be considered only after mechanical surface cleaning has been performed and the need for such treatment has been deemed necessary."

Typical HVAC components that can be coated include:

1. Ductwork
2. Air handlers
3. Rooftop units
4. Heat pumps
5. VAV boxes
6. Diffuses

Prior to Coating.

Per ACR 2006:

Section 9 "It is highly recommended that the fiber glass duct liner or duct board present in equipment or ductwork be cleaned with HEPA contact vacuuming equipment or other appropriate equipment. The components being cleaned must be under a consistent negative pressure differential to the surrounding area. Fiber glass materials that become wet with cleaning fluids or water during cleaning should be reassessed and potentially discarded after the incident has occurred.

It is highly recommended that the mechanical cleaning methods selected for duct liner of fiberglass duct board not create abrasions, breaks or tears to the fiber class liner or duct board surface. Cleaning methods used must be capable of rendering the system visually clean in accordance with this standard and capable of passing applicable cleanliness verification requirements.



Thermal acoustic internal fiber glass liner and other thermal acoustical liner areas with visual signs of degradation, like delaminating, abrasions, or tears may be treated with the appropriate repair products only after mechanical cleaning has been performed.

If repairs are not practical or desired, it is highly recommended that the damaged materials be removed/ replaced.”

Conclusion: *The insulation must be cleaned first. If the insulation is in good enough condition to clean then it is in good enough condition to coat.*

Application Tools

Depending on the size of the project you should select the application tools that give you the coverage you want while maximizing your productivity. These can include:

1. Paint brush
2. Paint roller
3. Commercial airless sprayer
4. Cart Spray systems
5. Robotic spray systems

Airless Sprayers

The commercial airless spray system must be sized to handle the product you want to apply. Different coatings will require different size airless sprayer because some coatings are thicker than others. Check with the manufacturer/supplier of the coating you want to



apply to determine what size airless sprayer works the best. Airless sprayers range in price from approximately \$1,000 to \$2,500 depending on size and accessories.

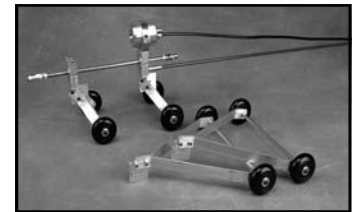
You can check the following airless sprayer manufacturers to see what they have to offer:

- Graco
www.graco.com
- Titan
www.titantool.com
- SprayTECH
www.spraytechsys.com

Cart Spray Systems

Most cart spray systems are used with a commercial airless sprayer. A typical cart spray system would include:

- Set of spray nozzles to handle different coatings
- Adjustable height capability
- Set of push/pull rods give you a reach of 33' feet in each direction from an access opening.
- Fluid coupler for use with airless sprayer
- Remote on/off control for airless sprayer.
- Optional cameras are available on some systems that allow the operator to view the spraying operation which can help improve quality and productivity.
- Cart spray systems can range in price from \$500 (for mini systems) to \$1,200 (for larger systems)



The following is a list of manufacturer/supplier of cart spray systems (and some photos). This list was taken from the NADCA buyers guide:

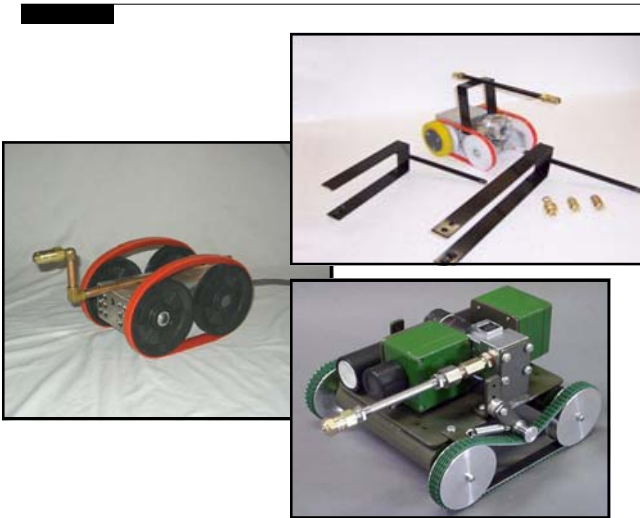
- Vac Systems International
- Nikro Industries
- Meyer Machine & Equipment
- Indoor Environmental Solutions

Robotic Spray Systems

Most Robotic systems that have spraying options that are used with a commercial airless sprayer. Others use a pressure pot type system. A typical Robotic spraying system would include:

- Set of spray nozzles to handle different coatings
- Adjustable height capability
- Reach of approximately 100'
- Fluid coupler for use with airless sprayer
- Remote on/off control for airless sprayer.
- Robotic systems can range in price from approximately \$5,500 to \$15,000 depending on capabilities and options selected.

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The following is a list of manufacturer/supplier of Robotic systems with spraying systems (and some photos). This list was taken from the NADCA buyers guide:

- Triventek Inc.
- Vac Systems International
- Nikro Industries
- Lloyds Inc.
- Lifa Air
- Indoor Environmental Solutions
- BioVac Systems

General coating procedures

One of the most frequent questions we hear is, "How do we know how much coating is enough?" Since the condition of the insulation in each project is different there is no one answer. Some insulation is in poor shape and some insulation is in good shape.

The best way to determine how much coating is enough is to do a test section for your customer on that project. By doing a test section (5' to 10') you and your customer can agree on what thickness is adequate. This can eliminate a potential dispute at the end of the project. Plus, it helps you to determine what spraying speed will give you the coverage you need and will verify that the airless sprayer you have can handle the coating you want to apply.

Prior to Applying Coating

1. Check airless sprayer and other application tools to make sure they work.
2. Prep area (i.e. cut access openings where needed, cover furniture, cover sensors/dampers etc.)
3. Mix coating with drill and mixing paddle.
4. Strain coating to remove lumps that can clog airless spraying equipment.
5. Do a post cleaning visual inspection to verification proper cleaning was done.
4. Keep area under negative pressure.
5. Apply product per manufactures instructions (on label).

On large ductwork you would normally put a person inside the ductwork with a respirator and apply the coating with a airless sprayer as they back out of the duct. You must take precaution not to damage the insulation on the bottom of the duct.

On large (walk in) air handler you would normally put a person inside the air handler with a respirator and apply the coating with a airless sprayer. You must protect the other components from the spray.

On a small to medium size air handler you would normally remove the panels and apply

the coating with an airless sprayer to the insulation on the panels and other insulation inside the air handler. You must take precautions not to coat other items like fans, filters motors inside the air handler.

On medium and small ductwork you typically would use a cart spray system or a robotic system with the airless sprayer. You would position the cart or robot at the far end of the duct and spray as you pull back on the cart system or drive the robot in reverse. Depending on the number and location of the access openings you made for cleaning the ductwork and the reach of the cart spray system or robotic system you may have to cut additional access openings.

On medium and small ductwork without a cart or robotic system you can use an airless sprayer with extension wands. You will have to cut additional access openings based on the length of your extension wand. For example if you have a 5' extension wand on you airless spray gun you would need to cut access opening every 10'.

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On small areas/components you would use a brush or a roller and you may have to take the component apart to coat the required surfaces.

Remember to keep area ventilated to facilitate drying. You can do this by keeping your vacuum collection system hooked up to the ductwork and running after coating is completed. Some coating will dry/cure in 1-2 hours while other can take up to 16 hours or more depending on temperature and humidity.

Post coating application visual inspection and documentation may also be required depending on the specifications on the project. It's a good idea to take photos or video anyway to show your customer what a good job you did. Lastly you would reinstall all the service panels over access openings.

If you have never done a coating project before you may want to hire a experienced trainer to assist and teach you on that first project.

How to estimate a coating project

Your estimate will have two parts; materials and labor. You will need to know the following to prepare a coating estimate:

- The total square footage of the area you need to coat.
- The coverage rate (square feet per gallon) of the coating you are using.
- The cost per gallon of the coating
- Production rate
- Labor rate

Example estimate:

Project Details:

- 200' of lined ductwork that is 24" x 12."

- 400' of lined ductwork that is 12" x 12."
- (1) air handler that is 8' x 8' x 8.'
- Coverage rate of coating on insulated material is 70 square ft per gallon.
- Cost of coating is \$40.00 per gallon.
- Accessibility is good.

Square Foot Calculation:

- 200' of lined ductwork that is 24" x 12" = 1,200 sq. ft
- 400' of lined ductwork that is 12" x 12" = 1,600 sq. ft.
- (1) air handler that is 8' x 8' x 8' = 384 sq. ft.

Total square feet of surface area to be coated is 3,184 sq. ft.

Amount of coating required:

3,184 divided by 70 sq. ft. coverage rate = 45.5 gallons which we round up to 46 gallons.

Coating Cost:

Cost of the coating would be 46 gallons x \$40.00 per gallon = \$1,840. You may want to mark up the coating so you make some profit on it. In this example we will mark the up the cost by 15% = \$ 2,116

Production Rate:

- Production rates can vary from 175 to 375 sq. ft. per man hour. For this example we will use a production rate of 275 sq. ft. per man
- Divide 3,184 by 275 = 11.6 man hours rounded up to 12 man hours.

Labor Cost:

Using a labor rate of \$60 per man hour x 12 man hours = \$720.

Total Estimate:

\$ 2,116 Coating cost
\$ 50 Other consumable material cost
\$ 720 Labor cost
\$ 2,886 Total

This estimate would be in addition to your cleaning

estimate for this project.

Summary

Coating insulation provides a definite benefit to the building owner by extending the life of that ductwork and HVAC system.

It also provides you the contractor with the following benefits:

- Coatings insulation and ductboard gives you another service you can offer your clients.
- Helps to strengthen customer relationship.
- Makes you more competitive.
- Generates more revenue.

If you have any questions on anything in this "Blueprint for Success" document please contact:

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