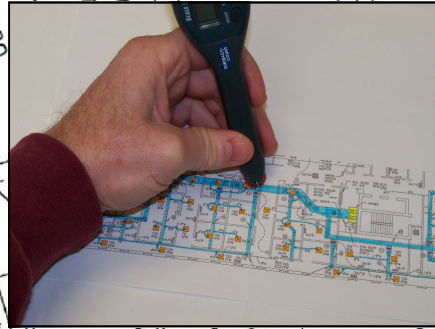


Blueprint for Success



Introduction to estimating commercial air duct cleaning projects:

- Review and understand the cleaning specification.
- Review and understand the mechanical blueprints.
- Do a project walk through.
- Do a take-off of the HVAC system.
- Determine the numbers of man hours required.
- Determine the charge per man hour.
- Determine materials charges.
- Create your proposal.

Introduction to Estimating Commercial Projects

Introduction

Estimating commercial air duct cleaning projects is different than estimating and pricing residential projects. You cannot count the number of vents or go by the square footage of the building to estimate commercial projects. There is such a wide variety of HVAC system types that a simple one size fit all estimating approach will not work.

A workable estimating plan/process must be able to handle the wide variety of HVAC systems and components found in today's commercial buildings including:

- Constant volume systems like:
 - fan coil systems
 - water source heat pump systems
 - packaged terminal systems
- Variable volume systems
 - with radiant heat
 - with reheat coils
- High, medium and low pressure systems
- Etc.

Plus you must have a good understanding of the various components that you will encounter in these various HVAC systems like:

- Rooftop and built up air handling units.
- Variable air volume units.
- Mixing boxes

- Humidifiers
- Heat pumps.
- Reheat coils
- Diffusers & grilles.
- Sound baffles.
- Flex duct.
- Metal duct
- Metal duct with internal insulation.
- Duct board.
- Filters.
- Etc.

Each of these components offer their own unique cleaning challenges.

Typical Steps

Typical steps in doing a commercial estimate and proposal (pricing) includes the following:

1. Review and Understand the cleaning specifications.
2. Review and understand the mechanical blueprints.
3. Do a project walk through.
4. Do a take-off of the HVAC system.
5. Determining the number of man hours required.
6. Determining the charge per man hour.
7. Determining consumables supply charges
8. Creating your proposal.

Review and Understand the cleaning specifications.

Most commercial projects have a cleaning specifications that tells you what

needs to be cleaned, the level of cleanliness that must be achieved, visual documentation requirements, etc.

Cleaning specifications are determined by the project engineer or environmental consultant. The NADCA cleaning specification (ACR 2006) is the basis for many of these specifications.

You must read and understand the cleaning specification if you are going to prepare a proper proposal. If you have questions on a cleaning specification be sure to call the engineer for clarification.

If there is no cleaning specification you can assist the building owner by providing one. The cleaning specification that you provide will include items and requirements that can favor your company's capabilities and give you a bidding advantage.

Review and understand the mechanical blueprints.

Get a set of blueprints for the project. You will need to know how to read blueprints. Large projects can have many pages of blueprints that can be very challenging. The best way to approach something like this is to look at one air handler and its associated ductwork at a

Introduction to Estimating Commercial Projects

time. It's like the question: "How do you eat an elephant?" Answer: "One bite at a time." The mechanical prints can also have important information regarding the scope of the air duct cleaning requirements and a schedule of units. All of this information is very important because it helps you to understand the HVAC system you are estimating.

Do a walk through of the project.

This will help you understand the project and let you see anything that will affect accessibility to the cleaning of the HVAC system. Accessibility to the HVAC system and components will help determine the production rate you will use. Good accessibility generally means a higher production rate and poor accessibility means a lower production rate.

Do a take off of the HVAC system.

After you have looked at and gained a good understanding of the mechanical blueprints and have done a walk through of the project you are ready to start working on your estimate.

Based on the blueprints, you break down the

HVAC system into its component parts and determine the number of each component you have. For example:

- number of air handlers
- linear feet of supply duct work
- linear feet of return ductwork
- number of grills and registers
- number of VAV boxes
- number of coils
- Etc.

It can be very helpful to use different color markers to color in on the blueprint to identify the different components in the HVAC system you are looking at like:

- air handlers
- supply ductwork
- exhaust ductwork
- vav/mixing boxes
- etc.

You then count the number of each component and enter that number on your take off sheet.

Determining the number of man hours required.

Once the take off is complete, you determine the number of man hours needed to clean each component.

- For example: 2 air handlers at 6 man hours each = 12 man hours, 500 linear feet of ductwork at 15 feet per man hour = 33

man hours, etc. You then add up all the man hours for each component to get the total man hours for the project.

Determining the charge per man hour

Once you have determined your total man hours needed to complete the project you apply the labor rate that you will charge your client. For example: if you have a total of 250 man hours on the project x a \$75.00 labor rate = \$18,750 labor estimate. You will need to charge at least \$75.00 per man hour to have gross profits that ranges from 40% to 60%. Some parts of the country charge more. And some charge less. You may have to do a little research in your area to determine what a competitive labor rate will be.

Determining consumables supply charges

Next, you determine your consumable supply cost. These are the costs for things like duct tape, poly, etc. The percent of labor method (typically 5% - 7%) will cover the cost of the cost of these items.

Determining other miscellaneous charges.

If you apply a coating or sanitizers, reline air handlers, need to rent additional equipment like a lift or airless sprayer, have any travel costs you will need to add these items also. Each one of these would be a separate line item on your estimate sheet.

Estimating Example.

We will now work through a simple estimating example so you can experience the steps we have talked about. In this example the HVAC system will include:

- An air handler
- Sheet metal supply ductwork
- Reheat coils
- Flex duct supply ductwork
- Supply diffusers
- Plus, we will coat the mechanical insulation in the air handler

We will use the following diagrams and forms:

Diagram 1: Copy of part of a mechanical system.

Diagram 2: Mechanical system colored in.

Form 1: Take off sheet empty

Form 2: Take off sheet completed.

Form 3: Production rate ranges

Form 4: Simple estimating form empty

Form 5: Simple estimating form completed.

The data on Form 5 is what you use to prepare your proposal/bid.

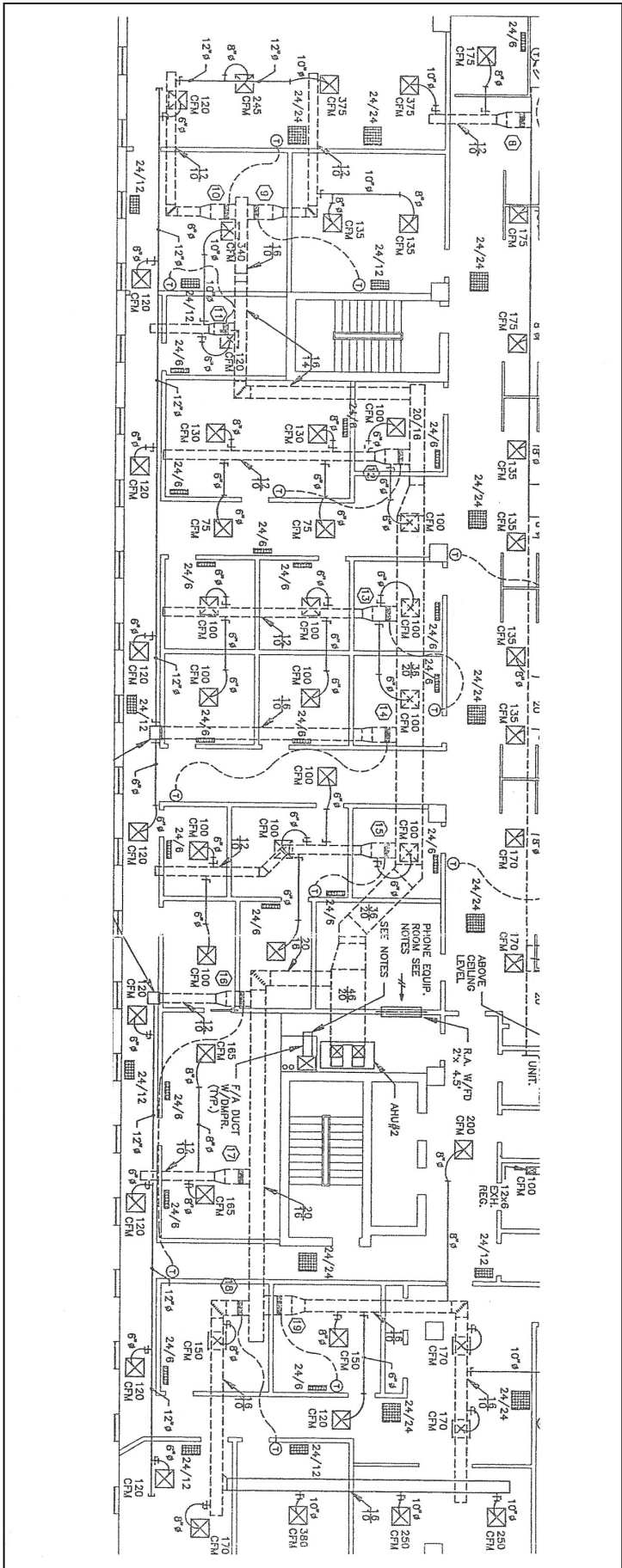


Diagram 1

This is the blueprint we will use for our estimating example. We will be cleaning the air handler, supply ductwork, reheat coils and registers. Then we will coat the interior fiberglass insulation in the air handler.

Mechanical drawing can be confusing so it is always a good idea to get a set of color markers and color in the components you will be cleaning (see Diagram 2).

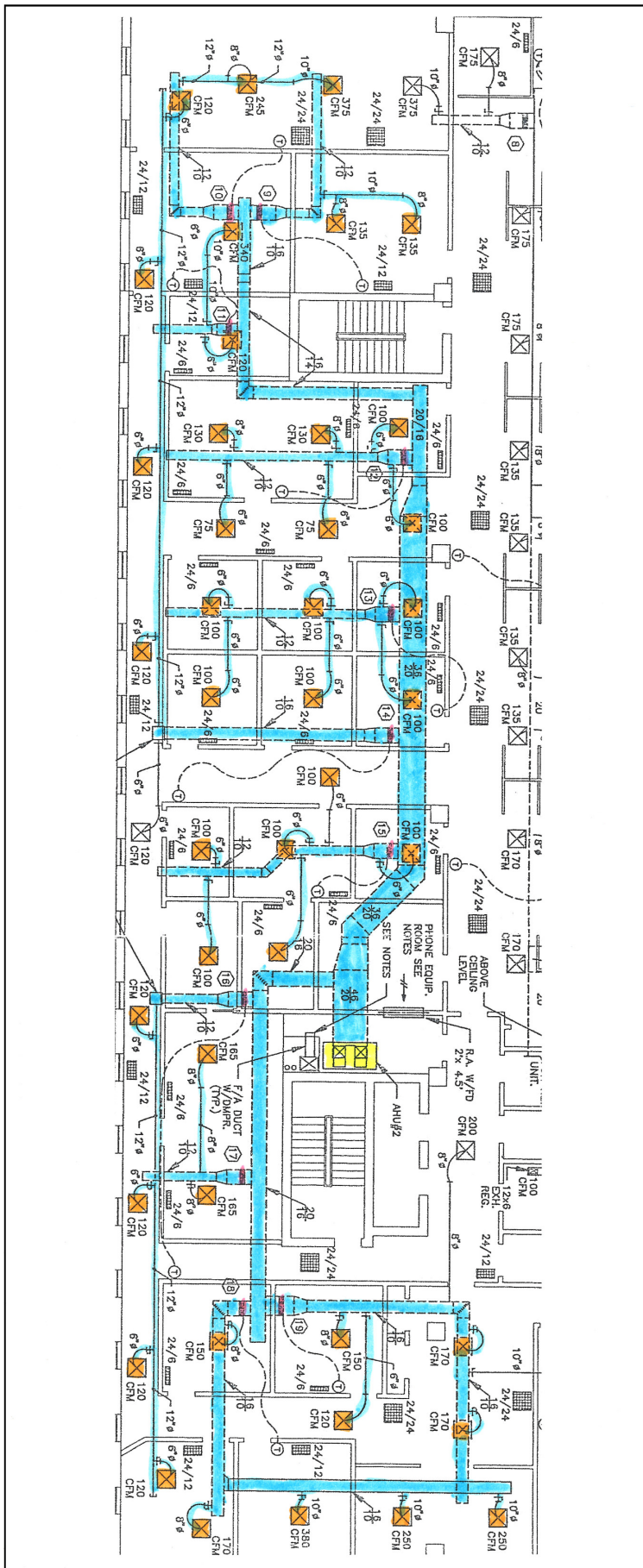


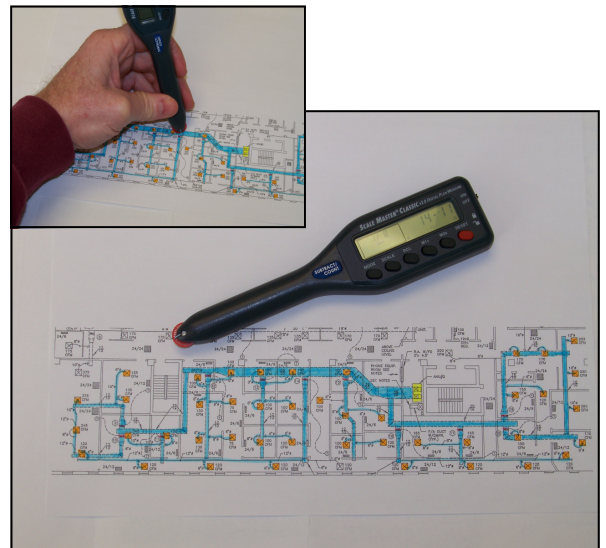
Diagram 2

We have colored in the various system components as follows:

- Supply ductwork = blue
- Air handler = yellow
- Reheat coils = red
- Supply diffusers = orange

As you can see, once the mechanical drawing is colored in they are much easier to understand.

The next step is to do your take off. You measure the linear feet of ductwork and count the various components. A plan wheel is an excellent tool for measuring the linear feet of ductwork. We take this data and enter it on the take off sheet (see form 1 and form 2).



Form 1: Take Off Sheet

Project: _____

Estimator: _____

Air Handling Unit:	Types	Quantity
	_____	_____
	_____	_____
	_____	_____

System Components:	Types	Quantity
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Ductwork:	Types	Quantity
	_____	_____
	_____	_____
	_____	_____

Sanitizing:	Types	Quantity
	_____	_____
	_____	_____
	_____	_____

Coating:	Types	Quantity
	_____	_____
	_____	_____
	_____	_____

Other:	Types	Quantity
	_____	_____
	_____	_____
	_____	_____

Form 2: Take Off Sheet — Completed

Project: Estimating Sample HVAC System

Estimator: P. Haugen

Air Handling Unit:	Types	Quantity
--------------------	-------	----------

	Packaged air handler (inside)	<u>1</u>
--	-------------------------------	----------

System Components:	Types	Quantity
--------------------	-------	----------

	Inline reheat coils	<u>11</u>
--	---------------------	-----------

	Supply diffuser	<u>44</u>
--	-----------------	-----------

Ductwork:	Types	Quantity
-----------	-------	----------

	Supply duct - unlined	<u>230 ft</u>
--	-----------------------	---------------

	Flex duct	<u>160 ft</u>
--	-----------	---------------

--	--	--

Sanitizing:	Types	Quantity
-------------	-------	----------

Coating:	Types	Quantity
----------	-------	----------

	Packaged air handler (inside)	<u>1</u>
--	-------------------------------	----------

Other:	Types	Quantity
--------	-------	----------

Form 3: Production Rates

<u>Type of Activity</u>	<u>Production Rates</u>
Cleaning Unlined Ductwork	10 - 25 linear feet per man hour
Cleaning Lined Ductwork	10 - 25 linear feet per man hour
Cleaning Spiral Duct	10 - 30 linear feet per man hour
Cleaning Flex Duct	15 - 45 linear feet per man hour
Cleaning Air Handling Units (no coating or insulation repair)	8 - 20 man hours each
Cleaning & Insulation Removal AHU	8 - 20 man hours each
Cleaning VAV Boxes	1 - 5 man hours each
Cleaning Registers/Grilles	1/4 - 1/2 man hours each
Pressure Washing Reheat Coils	1/2 - 2 man hours each
Coating Ductwork	175 - 375 sq. ft. per man hour
Coating AHU	1 - 3 man hours each
Relining AHU w/Closed Cell Insulation	6 - 12 sq. ft. per man hour

Notes:

- * All ducts are power brushed and air washed.
- * Cutting/patching of ductwork and protecting desks, computers etc. is included in cleaning rate.

Form 4: Simple Estimating Form

Project Name: _____

Estimator: _____

Direct Labor Items

Air Handling Units	Quantity		Production Rate Per Man Hour	Total Hours
Built up air handler		X		
Packaged air handler (inside)		X		
Rooftop air handler		X		
		X		
		X		
		X		
		X		
				Total

Ductwork				
Supply duct - unlined		÷		
Supply duct - lined		÷		
Flex duct		÷		
Return duct - unlined		÷		
Return duct - lined		÷		
Fresh air duct		÷		
Exhaust duct - unlined		÷		
Exhaust duct - lined		÷		
Riser - unlined		÷		
Riser - lined		÷		
		÷		
		÷		
				Total

System Componets				
Diffuser		X		
Inline coil		X		
Mixing box		X		
VAV unit		X		
		X		
		X		Total

Sanitizing (list components)	
-------------------------------------	--

Ductwork		÷		
		÷		
		÷		
Component		x		
		x		
		x		
				Total

Coating (list items)	
-----------------------------	--

Ductwork		÷		
		÷		
		÷		
Component		x		
		x		
		x		
				Total

Other (list activity)	
------------------------------	--

		x		
		x		
		x		
		x		
		x		
		x		
		x		
				Total

Additional Labor

Mobilization	
Demobilization	
Project Management	
	Total

Total Direct Labor Man Hours	
Times An Hourly Rate Of	
Equals Total Direct Labor Cost	

Non Direct Labor Items

Subcontracting Expenses	Quantity		Unit Cost	Total Cost
Electrician		X		
Bonding		X		
Permits		X		
		X		
		X		
		X		
		X		
				Total

Travel Expenses	Quantity		Rate	Total Cost
Mileage		X		
Gas		X		
Motel		X		
Rental Car		X		
		X		
		X		
				Total

Rental Expenses	# of Days		Rate	Total Cost
Man Lift		X		
Scaffodling		X		
		X		
		X		
		X		
		X		
				Total

Subcontractor Expenses	
Travel Expenses	
Rental Expenses	
Total Non Direct Labor Cost	

Materials Cost

% of Labor Method		
Total Direct Labor Cost		
x Desired Percent (normally 5-7%)		
		Materials Estimate

Itemized Method		Cost		Total		Price	Total
Item	Qty	per Item		Cost		Per Item	Price
Itemized Material Estimate Totals							

Summary

Total Direct Labor Cost		
Total Non Direct labor Cost		
Materials - % of Labor Method		
Material - Itemized Method		
Sub Total		
Taxable Amount		
x Tax Rate Of		
Total Tax		
Total Project Estimate		

Form 5: Simple Estimating Form

Project Name: Sample HVAC System

Estimator: P. Haugen

Direct Labor Items

Air Handling Units	Quantity		Production Rate Per Man Hour	Total Hours
Built up air handler		x		
Packaged air handler (inside)	1	x	8	8
Rooftop air handler		x		
		x		
		x		
		x		
		x		
				8

Total

Ductwork				
Supply duct - unlined	230 ft	÷	15 ft	15.3
Supply duct - lined		÷		
Flex duct	160 ft	÷	20 ft	8
Return duct - unlined		÷		
Return duct - lined		÷		
Fresh air duct		÷		
Exhaust duct - unlined		÷		
Exhaust duct - lined		÷		
Riser - unlined		÷		
Riser - lined		÷		
		÷		
		÷		
				23.3

Total

System Components				
Diffuser	44	x	.25 hr	11
Inline coil	11	x	1 hr	11
Mixing box		x		
VAV unit		x		
		x		
		x		
				22

Total

Sanitizing (list components)

Ductwork		÷		
		÷		
		÷		
Component		x		
		x		
		x		
				Total

Coating (list items)

Ductwork		÷		
		÷		
		÷		
Component		x		
Air Handler	1	x	2	2
		x		
				Total

Other (list activity)

		x		
		x		
		x		
		x		
		x		
		x		
		x		
				Total

Additional Labor

Mobilization		2
Demobilization		2
Project Management		
		4
		Total

Total Direct Labor Man Hours

Times An Hourly Rate Of

Equals Total Direct Labor Cost

59.3 = 60

\$75.00

\$4,500.00

Non Direct Labor Items

Subcontracting Expenses	Quantity		Unit Cost	Total Cost
Electrician		x		
Bonding		x		
Permits		x		
		x		
		x		
		x		
				0
				Total

Travel Expenses	Quantity		Rate	Total Cost
Mileage		x		
Gas		x		
Motel		x		
Rental Car		x		
		x		
		x		
				0
				Total

Rental Expenses	# of Days		Rate	Total Cost
Man Lift		x		
Scaffolding		x		
		x		
		x		
		x		
		x		
				0
				Total

Subcontractor Expenses	
Travel Expenses	
Rental Expenses	
Total Non Direct Labor Cost	0

Materials Cost

% of Labor Method	
Total Direct Labor Cost	\$4,500
x Desired Percent (normally 5-7%)	7%
	\$315.00

Materials Estimate

Itemized Method		Cost	Total	Price	Total
Item	Qty	per Item	Cost	Per Item	Price
Tough Coat Coating	5 gal	\$45	\$225	\$54 gal	\$270
Itemized Material Estimate Totals					\$270

Summary

Total Direct Labor Cost	\$4,500.00
Total Non Direct labor Cost	\$0
Materials - % of Labor Method	\$315.00
Material - Itemized Method	\$270.00
Sub Total	\$5,085.00
Taxable Amount	0
x Tax Rate Of	
Total Tax	0
Total Project Estimate	\$5,085.00

Explaining the Steps:

Air Handler:

In this example, the air handler is a medium size packaged air handler that has internal mechanical insulation which we will clean and coat.

In our estimate we used 8 man hours to clean the air handler and 2 man hours to apply the coating. You would use an airless sprayer to apply the coating.

Ductwork:

We have three types of ductwork:

- The 230' of sheet metal ductwork ranges in size from 46" (w) x 20" (h) to 12" (w) x 10" (h). You won't be able to crawl this ductwork and will have to use various power brushing and air washing tools through the access openings you cut into the ductwork.

In the estimate we used a production rate of 15 liner feet per man hour on the sheet metal ductwork for = 15.3 man hours.

- The 160' of flex ductwork has been installed correctly (from our walk through) so we should have no problems cleaning

ing it. We used a production rate of 20' per man hour = 8 man hours.

To clean all the ductwork we have 23.3 man hours.

System Components:

We have two different systems components that we are dealing with:

- We have 44 diffusers that we would take down, bring to a utility sink, clean, and then reinstall. We used a production rate of .25 man hours per register = 11 man hours.

- We have 11 inline coils to clean. We used a production rate of 1 hr. each = 11 man hours.

To clean all the system components we have 22 man hours.

Coating:

To apply a coating to the mechanical insulation in the one air handler with an airless sprayer we have a total of 2 man hours.

Additional Labor:

We allow 2 hours for mobilization (driving to the project and setting up equipment) and 2 hours for demobilization (take-

ing down the equipment and returning to the shop) for a total of 4 man hours.

Total Direct Labor Man-hours:

Adding up the various man hours we have a total of 59.38 which we round up to 60. We take the 60 man hours and multiply that by a labor rate of \$75.00 = \$4,500.00 direct labor cost.

Non Direct Labor Items:

We did not have any subcontracting expenses, travel expenses, or rental expenses in this example.

Material Costs:

We used both material cost methods on the example.

- For the % of labor method we take the labor cost of \$4,500.00 time 7% = \$315.00. This covers the cost of poly, duct tape access panels, etc.
- For the itemized method we had one 5 gallon pail of Tough Coat at a cost of \$45.00 per gallon. We marked that cost up by 20% (you can use whatever % you want here) so we charged the client \$54.00 per gallon or \$270.00 total.

Summary:

Adding everything up we have a Total Project Estimate of \$5,085.00.

**Introduction
to Estimating
Commercial
Projects**

We did not discuss here the different cleaning tools and methods available that can affect your cleaning productivity. A discussion on that topic is covered on our Blueprint for Success: Selecting the right cleaning tool for the job guidelines.

Summary:

This is one example of how to estimate a commercial air duct cleaning project. I hope you found it useful. If you have any questions, comments or suggestions please call Peter Haugen at 800-597-3955 or 952-808-1619. We appreciate and value any comments you have.



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“Blueprint for Success” is a series of articles and publications developed by Vac Systems International to help you succeed as an air duct cleaning contractor. In addition to this publication they include:

- Residential Air Duct Cleaning Guidelines.
- Commercial Air Duct Cleaning Guidelines.
- Selecting the Right Tool for the Job Guide.
- Introduction to Coating HVAC Systems Guide
- How to Select an Electric Portable Vacuum Collection System Guide.
- More!