## How to Estimate the Cost of Painting an Exterior Masonry Wall

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## Section 1: Introduction

The purpose of the following technical paper is to provide the reader general information on how to estimate the painting of an exterior masonry wall. There are several components that can be part of painting a masonry wall such as sealers, repellents, sealants/caulking. However, this paper will only focus on the application of a primer and top coating to a new exterior concrete wall surface comprised of "masonry units". The paper will be presented from the view of a painting subcontractor.

## Main CSI (Construction Specifications Institute 2004 MasterFormat) Division

Division 09 - Finishes

## Main CSI (Construction Specifications Institute 2004 MasterFormat) Subdivisions

Subdivision 099000 - Painting and Coatings

## Brief Description

The use of masonry unit walls is common in facilities such as elementary schools, prisons, carwashes, or where abuse to the facility is a concern. Unfortunately, the standard gray color of a typical masonry unit is not quite appealing especially if it makes up a large amount of the exterior wall. The requirement to paint new exterior masonry addresses the look of an unfinished product along with preserving a porous material. Adding further protection to a durable material minimizes the amount of future maintenance and increases the overall longevity of the wall. Properly painting an exterior masonry wall often proves advantageous to the project considering the long term benefits over the initial cost.

## Section 2: Types and Methods of Measurement

Paint is quantified by surface area, referred to as square feet, however suppliers sell and quote large amounts of painting materials by the gallon. Traditionally, paint manufacturers
suggest a coverage area per gallon based on the type of paint and certain conditions. The suggested paint coverage areas typically range between 200 and 300 square feet per one gallon of paint. Keep in mind that the suggested coverage areas are usually considered a "rule-ofthumb" and may not account for waste, multiple coats, and unusual surface conditions. In regards to painting an exterior masonry wall, the amount of square feet covered by a gallon of paint is highly dependent on whether the masonry wall is comprised of smooth or "split-face" units. Another concern affecting the amount of materials used but also the productivity is the method in which the paint materials are applied. The estimator must recognize the projects conditions and identify the most effective method for applying the required paint material. The concerns with different surfaces and the appropriate method of application will be discussed further in the section below (Section 3: Factors that Affect Take-Off and Pricing).

The overall floor plans and exterior elevations in a set of construction documents are best used to calculate the surface area (square feet) of an exterior wall surface. The use of a digital take-off tool is ideal in measuring and keeping a total tabulation of exterior walls on a large project in a short period of time. Therefore, a digital tool eliminates extensive use of the architect's scale that requires the estimator to keep a manual tabulation. Be cautious with noted scales on the plan documents by confirming with a noted dimension.

The aerial view of a floor plan allows the estimator to accurately identify and measure the horizontal dimension (length) of all exterior walls that require painting. The floor plan allows the estimator to accurately measure curved walls along with identifying alcoves that many times do not appear on the exterior elevations. Any curved walls that do appear in the exterior elevations many times depict a foreshortened view that would cause inaccuracies in the take-off. The estimator should also view the site plans for dumpster enclosures and retaining walls that are
usually constructed of masonry and require painting. The site and floor plans usually identify a masonry wall with a cross-hatching pattern. The exterior elevations are then used to determine the vertical dimension (height) of the exterior wall. In turn, the length and the height are multiplied to calculate the overall surface area (square feet) of the exterior wall. Additional areas for openings and changes in materials are gathered from the exterior elevations. If available, the estimator will need to review building sections and wall sections to help confirm wall heights and material transitions that may not be as distinct in the exterior elevations.

The estimator should recognize the amount of openings that can lead to reduced production for "masking" the openings or "cutting-in" around them. The estimate should deduct for large openings exceeding 100 square feet. In turn, reducing the amount of surface area for calculating materials is can be displaced by the increase of labor cost to account for each opening. Once the surface area of the wall is known, the estimator can apply multipliers for waste or unique conditions such as type of paint, surface texture, and method of application. The use of a waste factor covers the extra materials that assist in completing the project but considered not a part of the final product. A waste factor typically accounts for color selections and stored paint materials for the owner's future use. This waste factor is applied to the original amount of calculated materials. Adjusting the manufacturer's suggested coverage areas is the preferred method to account for unique conditions. These adjustments are gathered from the estimator's previous project experience along with accurately utilizing historical data. The estimator should be cautious and carefully evaluate all project conditions that may affect one or several components of the material take-off. The calculations can then be summarized to determine the amount of paint required for the project.

## Material Take-off Review

The material take-off is done by first measuring the wall for both the horizontal and vertical lengths in order to calculate the area. A spreadsheet with formulas added (see Section 9: Sample Material Take-Off and Pricing) can assist in accounting for required gallons of paint along with factoring waste, surface conditions, openings, and various dimensions.

Surface Area (Square Feet) - calculated by multiplying the horizontal dimension (length) by the vertical dimension (height).

## Section 3: Factors that Affect Take-Off and Pricing

## Small versus Large Quantities

The size of the project should always be kept in mind when estimating any type of project. The smaller projects with fewer quantities tend to have a higher unit cost than larger projects with far more amount of materials. At times a supplier may offer a discount when a large amount of materials are being purchased for a single project. However, the same discount might not be available on the next project that has half the amount of materials. Also, keep in mind that it will cost the same for the supplier to deliver twenty gallons of paint as it would to bring out forty gallons. Quantity also has a direct impact on production rates and the overall labor cost. A larger project offers more time to absorb any learning curves ultimately increasing the effectiveness of the operation and reducing the labor cost.

## Effects of Application

Completing the project in a timely fashion is heavily dependent on the method of application. If unexpected or unproductive time is spent on a project utilizing personnel due to improper application, the labor cost begins to increase. The preferred method for applying paint to a masonry wall is with an airless paint sprayer. The use of a block filler primer before
spraying allows for fewer top coats which helps provide the required amount of coverage in less time. The painting of a masonry surface without a block filler primer is a slower process that would most likely require additional materials to achieve the desired coverage. Other methods include using paint rollers and brushes; however these methods prove to be the most time consuming thus affecting the productivity.

## Geographic Location

The material, equipment, and labor costs are impacted to some degree by geographic location. The ability to acquire the required materials for a project should be determined beforehand. Additional cost may arise for delivery and handling of materials if a local supplier is not available to fill the order. Also, some project sites may have challenging terrain with steep grades thus requiring the use of wheeled man-lifts and required personnel to operate such machinery. Unfortunately, the availability of skilled painters and laborers varies from one location to another and greatly affects the ability to perform top quality results. If the appropriate personnel are not factored in then the consequences usually mean decreased productivity and work that must be redone at a loss to the company. Remember, using an appropriate labor force that commutes will also add cost to the project for provisions such as fuel, lodging, meals, and incidentals.

## Weather

The main issue with unexpected weather changes is the reduced productivity that causes labor cost to increase. The fact that painting an exterior masonry wall occurs outside should force the estimator to adjust production rates based on anticipated changes in weather at different times of the year. The use of relevant past productivity is most likely the best adjustment tool. Also, the estimator can gather weather records and identify common trends to determine when the most
adverse weather conditions may occur during the project schedule. The weather conditions that greatly impact the painting of an exterior masonry wall are high winds, precipitation, and extreme temperatures.

## Section 4: Overview of Labor, Material, Equipment, Indirect Costs, and Mark-Ups

The total price for painting an exterior masonry wall is broken down into three categories labor, materials, and equipment. Taking the time to review all plan documents along with specifications will ensure that proper components are included in the project cost. The following sections will also inform how a contractor's indirect costs and mark-ups play a factor in the estimate.

## Labor

A labor force is comprised of people who perform the necessary work for compensation defined as a labor rate. Labor rates include the person's base hourly wage and labor burden. Depending on the work itself, labor rates vary by the employer or may even be based upon government issued Prevailing Wage Rates; either source is dependent on market conditions that fluctuate from location to location. On larger projects labor rates are converted into a crew rate to accommodate the unit of measure used for take-off and productivity rates. The pricing used in the sample estimate is based on two painters, one acting as a supervisor, plus one common laborer to develop a total crew rate.

| CREW RATE | Base | Labor |
| :--- | :---: | :---: | :---: |
| Laborer | Wage Rate | Burden, 15\% |$\quad$| Labor Rate |
| :--- |
| Supervisor / Painter |
| Painter |
| Common Laborer |
| TOTAL - CREW RATE |
| AVERAGE - CREW RATE |

Larger and more complex projects will require a closer analysis to determine the best crew make-up that ensures the most productivity with the lowest cost. An estimator should understand that an increase in personnel doesn't necessarily affect the productivity in a positive way. As discussed earlier, labor productivity can be affected by the availability of skilled labor, site constraints, and adverse changes in weather.

## Material

The required amount of paint can be calculated from the total square feet area and priced by the gallon. A sufficient amount of time should be taken to properly list and organize all required materials. The initial time used helps evaluate and adjust any future changes in an accurate and timely fashion. Keeping track of supplier discounts on materials and knowing when to apply them can often dictate who gets the project. As discussed earlier, a waste factor should be added and based upon the calculated gallons of paint being applied. The estimator must also remember to include other possible charges to the materials such as sale tax and delivery costs.

## Equipment

For every project a close consideration should be given to what type of equipment is needed and how much is actually required. A close survey of the site conditions will help determine what equipment is needed to effectively complete the project. Depending on the size of the project the estimator may need to factor in the use of scaffolding, man-lifts, and airless sprayers. If the company does not own the equipment that is needed or the equipment is occupied on another project it can be rented from a local equipment company. The opportunity to rent a piece of equipment by the day or week can be cost less than purchasing new equipment and having to deal with recouping the investment, especially if it's a small project. Small tools can
also be handled by itemizing or applying a percentage on labor costs to cover items such as rollers, brushes, and masking tools.

## Indirect Costs

The indirect costs applied to the direct costs above are for items that allow the company to perform and complete the project. Such indirect costs include bonding, insurance, temporary facilities, and fuel. The estimator can list and add all necessary indirect cost or most commonly a percentage is applied to the direct cost. A percentage for indirect cost is different for each company and should be determined by specific project conditions.

## Mark-Ups

The gain from a company's capital investments is considered being profitable. In other words, the remaining revenue after paying for both direct and indirect costs for the project is a profit for the company. This is usually handled by applying a percentage mark-up to the entire cost. Depending on the company, mark-ups can be separated with distinct percentages for overhead and profit; some companies chose to view mark-ups as a total combination of overhead and profit. Applying the correct mark-ups can be influenced by several factors such as competition, risk, and the amount of work the company has back-logged. Most companies have upper management apply the final mark-ups because of the overall goal to have a successful project along with future growth for the company.

## Section 5: Special Risk Considerations

The following risk or concerns are some of the most impactful items that the estimator should consider when finalizing the estimate. Being that painting an exterior masonry wall occurs outside only increases the level of risk an estimator has over the actual cost upon
performing the work. The estimator cannot control all possible risk; however one can anticipate the situation and determine whether to account for it in the final cost. Some of the risks are:

1. Adverse weather conditions (i.e., high winds, precipitation, extreme temperatures)
2. Available skilled labor force
3. Material availability
4. Site conditions (i.e., sloping/steep grades, limited staging area)
5. Surface conditions (i.e., Smooth, Split-face)
6. Existing surfaces to be re-painted

## Section 6: Ratios and Analysis

The proven method to determine accuracy in an estimate comes from previous results on projects performed by the company. It's important to gauge the estimate to a project with similar conditions in order to have an accurate comparison. Certain conditions such as quantities, crew size, and productivity have the greatest impact on an accurate comparison. The estimator should take the time to review the estimate for any possible mathematical errors before determining that the historical data proves the initial estimate false. Ratios are another helpful tool when verifying unit cost in comparison to the total cost. A typical ratio for painting an exterior masonry wall is for the material cost to fall between 45 to 65 percent of the total cost. Experience and keeping track of project results is vital for an estimator to create a systematic approach to accurately compare projects. If lack of experience is an issue, the estimator can use publications or software programs to determine a starting point on completing a project specific estimate. Keep in mind that many industry sources provide cost information that does not consider unique site conditions or local competition to name a few.

## Section 7: Miscellaneous Pertinent Information

The most frequent cause in producing inaccurate estimates is failure to examine all project documents. All project documents not only include floor plans, walls sections, and details but specifications as well. Most importantly, front-end documents (General and Supplementary Conditions) contain information on working hours, weather days, and provisions on price increases. On the same note, the specifications may require that certain items such as scaffolding be provided and installed by the general contractor for use by all trades. If the estimator is unaware of such a provision and includes it in the project costs then it could reduce the chances of getting the job. Numerous other items that may be requested as part of the painting estimate which we have not gone over today are power washing, sealants/caulking and water-repellants.

## Section 8: Sample Drawings and Details

This section includes examples of floor plans, elevations, and details commonly used to estimate the cost of painting exterior masonry walls.





## Section 9: Sample Material Take-Off and Pricing

Please note that the following take-off and sample estimate is not based on the plans included in Section 8.

| MATERIALS <br> Location of Exterior Wall | Length | Height | Quantity |  | Coverage Areas | Gallons | Unit Cost | Total Cost |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| North Elevation | 500 | 15 | 7,500 | SF | 200 SF/GAL | 75 | \$28.25 | \$ | 2,118.75 |
| East Elevation | 150 | 15 | 2,250 | SF | 200 SF/GAL | 23 | \$28.25 |  | 635.63 |
| South Elevation, (2 Openings Deducted) | 500 | 15 | 7,000 | SF | 200 SF/GAL | 70 | \$28.25 |  | 1,977.50 |
| West Elevation | 150 | 15 | 2,250 | SF | 200 SF/GAL | 23 | \$28.25 |  | 635.63 |
| Dumpster Enclosure, (both sides) | 50 | 8 | 800 | SF | 200 SF/GAL | 8 | \$28.25 |  | 226.00 |
| Waste Factor (10\% of Applied Gallons) |  |  |  |  |  | 20 | \$28.25 |  | 559.35 |
| Temporary Protection (5\% of Materials) |  |  |  |  |  |  |  |  | 307.64 |
| Subtotal |  |  |  |  |  | 218 |  | \$ | 6,460.49 |
| Sales Tax (8.25\%) |  |  |  |  |  |  |  |  | 532.99 |
| TOTAL - MATERIALS |  |  | 19,800 | SF |  |  | \$0.35 | \$ | 6,993.48 |

LABOR - (1 Supervisor/Painter, 1 Painter, \& 1 Common Laborer)

| Item | Length | Height | Quantity |  | Productivity |  | Crew Hrs. | Crew Rate | Total Cost |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| North Elevation | 500 | 15 | 7,500 | SF | 300 | SF/HR | 25 | \$51.41 | \$ | 1,285.13 |
| East Elevation | 150 | 15 | 2,250 | SF | 300 | SF/HR | 8 | \$51.41 |  | 385.54 |
| South Elevation, (2 Openings Deducted) | 500 | 15 | 7,000 | SF | 250 | SF/HR | 28 | \$51.41 |  | 1,439.34 |
| West Elevation | 150 | 15 | 2,250 | SF | 300 | SF/HR | 8 | \$51.41 |  | 385.54 |
| Dumpster Enclosure, (both sides) | 50 | 8 | 800 | SF | 150 | SF/HR | 5 | \$51.41 |  | 274.16 |
| TOTAL - LA |  |  | 19,800 | SF |  |  |  | \$0.19 | \$ | 3,769.70 |

TOOLS AND EQUIPMENT

| Item |  |  |  |  | Total Cost |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Misc. Tools (Rollers, Brushes, etc..., 10\% of Labor) |  |  |  |  | \$ | 376.97 |
| Airless Paint Sprayer (Rental Quote) |  |  |  |  |  | 504.17 |
| Scaffolding (Provided by the General Contractor) |  |  |  |  |  | - |
| TOTAL - TOOLS \& EQUIPMENT | 19,800 | SF |  | \$0.04 | \$ | 881.14 |
| SUMMARY |  |  |  |  |  | Total Cost |
| Materials | 19,800 | SF | 47\% | \$0.35 | \$ | 6,993.48 |
| Labor | 19,800 | SF | 26\% | \$0.19 |  | 3,769.70 |
| Tools and Equipment | 19,800 | SF | 6\% | \$0.04 |  | 881.14 |
| Subtotal |  |  |  |  |  | 11,644.32 |
| Overhead (15\%) |  |  |  |  |  | 1,746.65 |
| Profit (10\%) |  |  |  |  |  | 1,339.10 |
| TOTAL - MAT., LABOR, \& EQUIP. | 19,800 | SF |  | \$0.74 |  | 14,730.06 |

Estimate Notes:

1. Two $10^{\prime} \times 25^{\prime}$ Overhead Door Openings were deducted from the South Elevation calculation.
2. The shown coverage area \& unit cost is an average based on (1) coat of block filler primer and (1) coat of top paint.
3. The shown productivity rate is an average for both the block fill primer and top coat.
4. Quote for rental equipment is based on a 40 hour work week.
5. Productivity adjustments have been made to the South Elevation \& dumpster enclosure walls.
6. Excludes the cost for scaffolding, to be provided by the general contractor.

## Section 10: Terminology/Glossary

Masonry Unit: natural or manufactured building units of burned clay, stone, glass, gypsum, concrete, etc.

Rule-of- Thumb: a statement or formula that is not exact but is close enough for practical work. Split-Face Unit: concrete masonry units with one or more faces produced by purposeful fracturing of the unit to provide architectural effects in masonry wall construction.

Masking: the temporary covering of areas adjacent to those to which paint is to be applied.
Cutting-In: a painting technique used to paint around the edges of an object or areas, such as trim, light fixture, or an opening.

## Section 11: References

R.S. Means Building Construction Cost Data, $65^{\text {th }}$ Edition 2007

ASPE's Standard Estimating Practice Manual, $7^{\text {th }}$ Edition

