



# ESTIMATING MANUAL

## SOUTHWEST FIREPROOFING PRODUCTS

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### **ESTIMATING MANUAL AND PRODUCT SELECTOR FOR TYPES 5GP™, 5MD™, 5AR™, 7GP™, 7HD™, 7TB™ and DK3™**

**DOCUMENT No.:** 100919-SW-A

**DATE:** October, 2019

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# ESTIMATING MANUAL

## SOUTHWEST FIREPROOFING PRODUCTS



### SECTION 1: Southwest Fireproofing Product Selector

Product	Type 5GP	Type 5MD	Type 5AR	Type 7GP	Type 7TB	Type 7HD
<b>Product Type</b>	Gypsum Plaster	Gypsum Plaster	Gypsum Plaster	Portland Cement	Portland Cement	Portland Cement
<b>Density (Class) lb/ft<sup>3</sup> (pcf)</b>	15	15-22	15	22	22	35-40
<b>Bond Strength (psf)*</b>	>200	>430 (15 pcf) >1,000 (16.5 pcf) >3,000 (22 pcf)	>200	>2,000	>1,200	17,000
<b>1-4 Hour Protection Cellulosic Fire Rated ASTM E119 UL 263 NFPA 251 CAN/ULC S101</b>	X	X	X	X		X
<b>Thermal Barrier Rated UL Enclosed Corner Test</b>					X	
<b>Extended Set Material</b>			X			
<b>Can be injected with Accelerator A-20</b>	X	X	X			
<b>Suitable For High Humidity Applications</b>				X	X	X
<b>Meets Minimum Bond Strength Requirement for High Rise Buildings up to 75 ft. (150 psf)</b>	X	X	X	X	X	X
<b>Meets Minimum Bond Strength Requirement for High Rise Buildings 75 to 420 ft. (430 psf)</b>		X		X	X	X
<b>Meets Minimum Bond Strength Requirement for High Rise Buildings &gt;420 ft. (1,000 psf)</b>		X		X	X	X
<b>Target Yield (Bd. Ft./Bag)</b>	44	44 (15 pcf) 42 (16.5 pcf) 30 (22 pcf)	44	30	30	16
<p>* Bond Strength tests conducted under ASTM E-736 standard procedure and/or in accordance with Appendix B of AWCI Technical Manual 12-A.  <b>Note:</b> Contact local Carboline sales representative for third party test reports if needed.</p>						

### **SECTION 2: Introduction, Guidelines & Scheduling**

#### INTRODUCTION

Carboline is providing this estimating guide to assist you, our valued customer, in making a competitive bid, with a user friendly source of information. This guide is essentially for all products, with emphasis on Types 5 materials. See current price lists and other published data on product yields, as they may change, to be current in product use and quantities. The information in this guide, are provided in good faith, and of general nature only. Conditions on each individual project change. Be careful in your estimates, in your planning and preparations. Carboline cannot assume responsibility for its use. The responsibility must rest with the user of this guide.

#### GUIDELINES

Be sure you have these tools and information:

1. Project specifications and all addendum
2. Complete set of plans, including structural and architectural. It may be prudent to have mechanical and electrical as well, but not always necessary.
3. The most recent ULI or ULC Fire Resistance Directory
4. Local codes and national codes applicable

Remember, when selecting a UL design(s) to base your bid on, be sure it meets all specifications and codes. Call Carboline should you need guidance in the selection process.

Estimators may find discrepancies in requirements between the project's plans and specifications. When this occurs, contact the project Architect or General Contractor before finalizing your bid. Sometimes specifications require the use of certain designs, but may not match the construction plans.

#### COORDINATION AND PROJECT SUPERVISION

Project scheduling, coordination and supervision must always be considered in your estimate. Make sure your estimate is based on a clear understanding of sequencing to efficiently maximize your field crew's time. Attempt to finish all work on a floor before proceeding to the next. Reduce or eliminate as much as possible, any equipment and personnel movements, as they are costly, waste time, and will factor into a competitive bid.

### SECTION 3: Estimating Columns

#### ESTIMATING WIDE FLANGE COLUMNS

1. Separate the columns on a floor by floor basis from the largest to the smallest.
2. Determine the hourly rating required and the corresponding fireproofing thickness. If this is not printed on the plans or specifications, the thicknesses may be determined by using appropriate UL column designs. Call Carboline, if you need assistance.
3. Then use the column worksheet, Appendix D, to sum up your columns.
4. Write down column size, number of columns, and lineal feet of column. Then, multiply the no. of columns by the lineal feet, to arrive at total lineal feet for that column.
5. To convert the lineal footage (of each column and thickness of Southwest products required, to provide the fire rating,) to board footage of fireproofing, use the column conversion factor from Appendix B.
6. To calculate board footage, multiply the proper conversion factor from Appendix B by the total lineal footage of the individual column.
7. Repeat this procedure for each column size and material thickness. Add the resulting board footage amounts to determine a total board footage of product for columns per floor.
8. Repeat this procedure on subsequent floors and add these total individual floor board footage results, to arrive at a total for the project.

#### *Sample procedure (on column worksheet)*

1. # column x l'm. ft. per column = Total lin. ft. of columns
2. Total lin. ft. x column conversion factor Table A = BD. Ft.
3. Repeat for each size column on the floor
4. Sum up individual totals for floor Board footage results and record.

#### ESTIMATING PIPE AND TUBE COLUMNS

1. Separate columns on a specific floor by size, from largest too smallest.
2. Determine required material thickness for each column size. The proper material thickness is based on the column size (A/P value) and hourly rating requirement.
3. Determine the total lineal footage for each column size.
4. Use the following formula to determine board footage for product for each column size and respective material thickness. Also see the end of this guide for calculations completed for UL Design: X771.

#### *Pipe Columns:*

$$\frac{(d + 2 \text{ th}) \times \text{lineal footage}}{15.28} = \text{bd. ft.}$$

#### *Tube Columns:*

$$\frac{((2L + 2H) \times \text{th}) + (4 \times \text{th} \times 2) \times \text{Total lin. footage}}{12} = \text{bd. ft.}$$

L = length in inches

d = outside dia. of pipe in inches

H = height in inches

Th = thickness of Southwest products

5. These calculations yield board ft. of product per lineal foot of column. Add the result of each specific column size and thickness per floor. Repeat the procedure for each floor.

**Note:** As with steel bar joists and trusses, the above formulas are a general solution to the estimating of these steel columns. Experience and specific job conditions will have more effect on total material usage, than the actual are of the pipe or tube column. Remember to consider over-spray on small steel members.

### SECTION 4: Estimating Beams, Decks and Joists

#### ESTIMATING BEAMS

1. Separate beams on each floor from the largest to the smallest and list them on the beam work sheet, Appendix D.
2. Determine fireproofing thickness, if not given on plans or specs, from the appropriate Southwest UL design.

Note: Be sure to determine if beams are restrained or unrestrained, as ULI requires at times different thicknesses.

3. Determine the total footage of each beam size for each respective material thickness.
4. Convert the lineal footage of each beam and thickness required to provide the fire rating, to board footage of product, by using the beam conversion factors from Appendix B.
5. Repeat these steps for each size beam. If you have more than one floor that are identical, you can multiply your bd. ft. by that no. of floors, otherwise a complete take off will have to be done per floor.

Note: Beams that have a W/D smaller than the minimum beam size listed in a UL design, will have to be adjusted accordingly. See the current UL directory for W/D calculations.

#### ESTIMATING DECKS

Determine type of deck, depth of decks, concrete type (reg. or light wt.) type of profile or the steel floor unit, i.e.: cellular, fluted, or blended. All these factors determine the UL design to be used, and fire proofing thicknesses to bid. Be sure if shear connectors are included in the design, as well as in the construction. Finally note if the requirements are for composite or non-composite decks.

Determine the total thickness of the concrete slab: amount above the flutes... and the concrete type. Check for any electrification units. Determine the width and number of trench headers and bottom less trench headers and electrical inserts. These are covered in certain designs, and may require greater thicknesses.

1. After you have collected the above information, and selected a UL design, commence with the estimate.
2. Calculate the total area of each section of deck, that requires as specific thickness.

#### CELLULAR DECKING

To determine the sq. ft. for a cellular deck, multiply the length of the deck by the width of the deck, or the entire floor area, if applicable.

#### FLUTED DECKING

For a fluted deck, the depth and profile of the deck will determine the total surface area to be sprayed. Multiply length x width, of each fluted deck. Then, multiply this area by correct expansion factor shown in Appendix C, for that type of deck.

3. Once the total area to be sprayed for either type of deck, is known, multiply by the thickness required, to obtain bd. ft.

Note: Often more than one thickness is specified by UL for fluted decks. Check UL designs carefully.

4. Repeat this procedure on each floor, and record data per floor.

#### SAMPLE PROCEDURE

##### *Cellular Decks: (flat)*

1. Multiply length x width = sq. ft. of flat area
2. Sq. ft. x material thickness = Total bd. ft. deck area

### *Fluted Decks:*

1. Multiply length x width = sq. ft. fluted decks
2. Sq. ft. x factor (from deck profile) = Total expanded surface area to spray.
3. Surface area x material thickness = Total bd. ft. of surface area

### ESTIMATING STEEL BAR, JOISTS AND TRUSSES

Steel bars and joist have many configurations, hence estimating fireproofing on these elements is difficult. However, as so many new buildings are low profile, with joist as a cheaper alternative to structural steel construction, a good estimating technique is very important.

Be careful in estimating, and if prior experience is available, be sure to use it. One way to reduce the amount of product to be used, is to use fiber glass scrim on joists, to substantially reduce overspray. The following procedure is a recommendation. Use your experience as a guide.

1. Separate joists by size (depth) and required fireproofing thickness.
2. Determine material usage necessary by considering the joist to be a beam.
3. Calculate the area to be covered as follows:

$$\frac{(d \times 2 + w) \times \text{ft.} \times \text{th}}{12} = \text{bd. ft.}$$

Where: d = depth in inches  
w = width in inches  
th = thickness of product

### MATERIAL TOTALS

1. First of all, determine the material totals required for each of the Southwest products to be used on each different substrate, be it beams, columns, decks or roof configurations.
2. Add your total bd. ft. requirements for each substrate for each floor.
3. Add the totals for each floor to arrive at the amount of product subtotal for the project.

### WASTE

It is necessary to compensate for waste during application. Experienced contractors use a 4-6 % factor, assuming the job is "straight foreword", but it is very dependent on the sprayer, job conditions and supervision.

Waste on bar joists or angle trusses can be controlled, by careful work, and experience. Generally, fiberglass scrim can reduce the waste from 25% to less than 10%. Let your experience be your guide.

To adjust your material, estimate for waste, multiply the total bd.ft. of product required by the appropriate waste %.

Example: Assuming a 10% waste factor on a project that has been estimated to require 100,000 bd. ft. of Southwest product.

100,000 bd. ft. x 1.10 = 110,000 bd. ft. (Note, a 10% waste factor is high, and should be in the range of 4 - 6 % for well managed projects; let your experience be your guide; waste on joists of course will be higher than on beams, decks and column work)

### CONVERSION OF BRD. FT. TO TOTAL BAGS

To convert total bd. ft. of product to bags (including waste at 10%) divide bd. ft. coverage per bag given in current price sheets and yield factors:

Example:

If you estimated 110,000 bd. ft. of Type 5 (GP) is required and you anticipate applying it at 17 PCF (lbs/ft. 3), your calculation would be:

$$\frac{110,000 \text{ bd. ft.}}{38} = 2,895 \text{ bags of Type 5}$$

Note: you have already included a waste factor; hence this represents the total bags required.

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### **SECTION 5:** Type DK3 Adhesive/Spattercoat

#### TYPE DK3 ADHESIVE/SPATTERCOAT

When Type DK adhesive is required, particularly with all flexible roof deck systems, add this material to your estimate.

1. Determine the total area in sq. ft. requiring Type DK adhesive.
2. Divide this area by the coverage of Type DK to arrive at the no. of bags.

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### **SECTION 6: Estimate Build-Up**

#### TOTAL MATERIAL COSTS

To determine the total material costs, multiply your unit cost for, products and add appropriate sales taxes and freight. Be sure to add costs of drop trailers, if used, including the cost of returning empty trailers.

#### LABOR AND INCIDENTAL COSTS

These costs will represent a significant percentage of the overall estimate, and project bid price.

Cost in these areas are directly related to your crew's application skills and operational capability. Field proficiency is very important. Hence, SOUTHWEST cannot suggest specific costs related to labor, staging costs and other costs associated with field production.

#### FINAL PROJECT ESTIMATE

1. The complete project estimate and subsequent bid price will be composed of the preceding items.
2. Project specifications should be carefully understood, and re-examined, so that all costs are covered.
3. Pay particular care when estimating UL designs to accomplish what local codes require, or is specified, preventing potential job site disputes later into a project.

We anticipate this guide is helpful in estimating SOUTHWEST FIREPROOFING PRODUCTS. Call us if you need guidance.

**APPENDIX A**  
SIMPLIFIED DESIGN FLOWCHARTS

**APPENDIX B**  
CONVERSION TABLES

**APPENDIX C**  
DECK PROFILE AND FLUTE CHARTS

**APPENDIX D**  
WORKSHEET TEMPLATES





**APPENDIX E**  
THICKNESS TABLES