



CFSC QC Wall Panel

version 1.0



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Introduction

The **CFSC QC Wall Panel** program is the culmination of work begun by CFSC in 2009, and was the result of work by component manufacturers desiring a quantitative method to monitor the quality of their wall panel manufacturing processes. **CFSC QC Wall Panel** is a system of quality control procedures for wall panel manufacturing operations that involves doing inspections, recording the information on forms, entering the data into a database and creating reports so that all operations personnel can more easily manage manufacturing quality performance. The inspection criteria, tolerances, form, and process were created based on wall panel manufacturers input.

CFSC QC Wall Panel was developed to be as objective as possible in order to eliminate guesswork on the part of inspectors and to promote consistency in plant evaluation. **CFSC QC Wall Panel** is a system where you can quantify your quality. You will be able to identify problem areas sooner, see problem trends more quickly and take immediate action to correct these items.

Any quality control system requires time to perform accurate inspections. While this is time not being spent on production, it has been found that this time expenditure is made up for by an increase in quality and a decrease in time spent correcting errors. Also, as your quality improves—or if it's great to begin with—you can use this as a marketing tool with your customers to distinguish your product from that of your competitors.

CFSC QC Wall Panel was developed with accuracy, speed, and ease of use in mind. It was created using Microsoft® Access 2003 for Windows™. CFSC has had this quality control program reviewed by its legal counsel and encourages you to have your own legal counsel review both the forms and reports for application within your company.

I. In-Plant Quality Control Manual Specifics

AC 10 is the Acceptance Criteria that the ICC Evaluation Service has created to provide a template for what is reasonable to include in a manufactured product's quality control manual. The AC 10 is a tool or guide to help the plant meet the building code requirement that each plant have a quality control program and an accompanying quality control process.

CFSC suggests each wall panel manufacturer have and maintain an in-plant quality control manual that acknowledges the AC 10 guideline. This in-plant quality manual should contain, at a minimum, (1) a production flowchart or a description of the manufacturing process, (2) manufacturer's organizational chart, and a description of the duties and responsibilities assigned to key positions in the quality program, (3) quality control procedures, including sampling criteria and how manufacturing processes are monitored to ensure that the product is consistently manufactured within the allowable tolerances, and (4) a document retention policy.

Below is a template created by CFSC to help you make sure you have an in-plant quality control manual that follows the AC 10 minimum guidelines. Please fill in the information below, if you need a blank template to customize according to your plant's needs look on the CFSC QC Wall Panel installation CD support documents or visit the CFSC QC website at cfsc.sbcindustry.com/qcwall.php.

In the following template information has already been entered for a majority of sections. The wall panel manufacturer is responsible to complete or edit the following sections:

- 1) Contact Signature – Sign and date this section in the manual.
- 2) Plant Information – Enter your inspector's name, plant manager, etc.
- 6) Work Flow – If your work flow differs from the included flowchart please update it.
- 8) Agency Agreement – Enter your third party inspector information if applicable.
- 9) Organizational Chart – Add your plant's org chart and edit responsibilities if they differ.
- 10) Packaging – Update information to tailor it to your specific plant (optional).
- 11) Incoming Material Specifications – Update information to tailor it to your specific plant (optional).
- 12) Incoming Material Inspection – Update information to tailor it to your specific plant (optional).
- 13) In-process QC – Define set-up locations (or crews) and add a plant layout.
- 14) Final Inspection – Update information to tailor it to your specific plant (optional).
- 15) Nonconforming Materials – Update information to tailor it to your specific plant (optional).
- 17) Calibrations – Update information to tailor it to your specific plant (optional).

CFSC QC Wall Panel AC 10 Manual Supplement

Sections:

- | | |
|--------------------------------------|----------------------------------|
| 1) Contact Signature | 12) Incoming Material Inspection |
| 2) Plant Information | 13) In-process QC |
| 3) Manual Revision | 14) Final Inspection |
| 4) Product Identification | 15) Nonconforming Materials |
| 5) Traceability | 16) Test Equipment |
| 6) Work Flow | 17) Calibrations |
| 7) Product Description, etc. | 18) Sample Documents |
| 8) Agency Agreement | 19) Document Approval |
| 9) Organizational Information | 20) Records Retention |
| 10) Packaging | 21) ICC-ES Use Statement |
| 11) Incoming Material Specifications | |

1) Contact Signature – The manual shall be signed and dated by an authorized representative of the plant.

Signature:

Date:

2) Plant Information – The manual shall clearly state the manufacturing location and relative information.

Plant Name:

Address:

QC Inspector:

Plant Manager:

Telephone:

3) Manual Revision – The manual should be reviewed at least annually.

Name: **CFSC QC Wall Panel 1.0 Manual**

Revision Date: 6/1/2009

4) Product Identification – The manual shall indicate how the product is to be identified in the field.

Cold-formed steel wall panels do not have an ICC-ES report; each panel is an individually designed component.

5) Traceability – The manual shall provide a means to trace the finished product back to the production and quality control records.

The recordkeeping source for tracing the product back to production and quality control is the **CFSC QC Wall Panel** database program.

6) Work Flow – The manual shall include either a production flowchart or a description of the manufacturing process.

7) Product Description, etc. – The product shall be described, and the manual shall provide specifications, manufacturing tolerances, and assembly drawings.

A wall panel is an individual cold-formed steel component supplied for the building structural system. Design software will contain specifications and assembly drawings for the wall panel and this **CFSC QC Wall Panel** manual will contain manufacturing tolerances.

8) Agency Agreement – Evidence shall be provided that there is an agreement to perform inspections between the manufacturer and an accredited inspection agency.

Currently, third party inspections are not required on wall panels. As long as the framing members and the structural sheathing are visible, the wall panels can be inspected by the building official at the jobsite as part of the standard framing inspection.

9) Organizational Information – The manual shall include the manufacturer's organizational chart and a description of the duties and responsibilities assigned to key positions in the quality program.

General Manager - Oversees all plant operations under the direction of the Executive(s) in charge (or in smaller companies the owner may act as general manager). Oversight responsibilities include production, personnel, finance, quality control and maintenance.

Operations Manager - Responsible for the overall management/coordination of production, sales and administration functions of the plant location. Develops operating budgets and capital expenditure recommendations and creates operating policies and procedures as required.

Production Manager - Facilitates the smooth flow of work through the plant. Ensures that outgoing products meet or exceed standards. Coordinates all activities that relate to trucking, forklifts, and work flow in the yard. Answers questions from customers regarding product or service.

Quality Control Inspector - Reports to the engineering department or management that does not have direct line production responsibilities. Has knowledge of company standards and requirements for size, material, and thickness for steel wall panel components. Understands how the product is used by the customer. Records and identifies product by origin and date. Records data to identify progress of quality, either positive or negative.

Plant organizational chart:

10) Packaging – The manual shall contain information on packaging and storage of the product.

The wall panel manufacturer can use own discretion in the packaging and storage of wall panel jobs. This will be dependant upon the manufacturer's specific facility and yard layout.

11) Incoming Material Specifications – The manual shall provide specifications for incoming materials used for the manufacture of the product.

Incoming cold-formed steel studs and tracks must be the correct size, material, and thickness. Cold-formed steel studs, tracks, bracing materials, and fasteners must meet appropriate ASTM Standards.

12) Incoming Material Inspection – Details shall be provided of inspections or tests that are conducted on incoming materials.

Incoming steel must have the correct size, material, and thickness. Incoming steel and fasteners must meet appropriate ASTM Standards.

13) In-process QC – The manual shall detail in-process quality control procedures.

Inspection procedures are found in this **CFSC QC Wall Panel** manual. The inspection frequency depends on the production volume at the plant. The inspection frequency is 3 wall panels per 1000 lineal feet of production per line / per shift / per week. It is up to the plant to do the required number of inspections randomly throughout the week, to split up those inspections proportionately to how many crews they are running, and to split up those inspections proportionately to their production of interior, exterior, and special wall panels. CFSC suggests the plant use a weekly log to make sure they are meeting the inspection frequency each week. The **CFSC QC Wall Panel** database will also be updated with crews and lines.

Set-up Locations: A diagram of your current plant layout with current set-up locations labeled on the layout shall be included below:

14) Final Inspection – The manual shall detail the final inspections.

Job number and contents of job will be verified before delivery. Wall panels inspected but not meeting **CFSC QC Wall Panel** criteria will be repaired and documented.

15) Nonconforming Materials – The manual shall specify how nonconforming materials are reworked.

Assemblers are trained to identify material that is unsatisfactory and should not be used in the assembly of wall panel components. Unsatisfactory material is to be pulled out of the production process and replaced. Unsatisfactory conditions include material not meeting size, style, or material thickness requirements. Unsatisfactory conditions could also include appearance concerns such as white rust or damaged parts such as dents or holes in material. Material found to contain red rust will not be used in manufacturing. Damaged fasteners will not be used in manufacturing.

16) Test Equipment – The manual shall contain a list of the measuring and test equipment that is used.

Wall panels will be inspected to **CFSC QC Wall Panel** tolerances and tools used include design drawings, tape measure, and a depth gauge.

17) Calibrations – The manual shall note the frequency of equipment calibration.

Equipment used in the cutting and assembly of wall panel components will be checked periodically for proper functionality and for correct tolerances. The frequency will be determined by the wall panel manufacturer but a suggestion is to check screw guns, tape measures, and saws daily and to also check layout and assembly tables quarterly.

18) Sample Documents – The manual shall contain sample copies of these documents.

This **CFSC QC Wall Panel** manual includes quality control inspection forms.

19) Document Approval – The manual shall describe how the completed documents are approved by responsible personnel.

This **CFSC QC Wall Panel** manual documents how out of conformance inspections are to be documented.

20) Records Retention – The manual shall contain a statement committing the manufacturer to retaining the completed inspection information for a minimum of two years.

It is suggested that all quality control inspections will be retained in the **CFSC QC Wall Panel** database program for a minimum of 2 years. In addition, it is suggested that the wall panel manufacturer keep the most recent 2 weeks of inspection documents such design drawings and inspection forms in addition to having the inspections entered into the database.

21) ICC-ES Use Statement – The ICC-ES name, mark, or report number will only be used on products that are in compliance with the evaluation report and the approved quality control manual.

Cold-formed steel wall panels do not have a specific ICC-ES report because each panel is an individually designed component; the quality control manual follows guidelines of AC 10.

II. Inspection Procedures

Getting Started

The program uses the wall panel inspection form. It can also be printed directly from the software and customized to include your plant name in the lower right. Before you begin inspecting, the following steps should be completed:

- 1) Select a wall panel to inspect.
- 2) Find and print the drawing of the wall panel. Make sure it shows all dimensions and specifications for the size, material, thickness, and quantity of each piece.
- 3) Acquire a clipboard, tape measure, pencil, and magic marker (e.g., Sharpie) to mark the wall panel if you are labeling the inspection number.
- 4) Take the above items and a blank inspection form to where the wall panel inspection will be completed.

Note: The inspector must learn how to read a wall panel drawing. It makes sense to have the inspector meet with the wall panel designer to go over how to read the drawing and its different components. The inspector must also be able to read a tape measure in order to inspect the different wall panel components.

Definitions

The following common terms will help you understand the basics of wall panel components, and to understand the wall panel inspection process. These terms may not be used industry wide; please talk to your manager if anything is unclear.

- Abrasion - A scraped or worn area
- Base Metal Thickness - The thickness of bare steel exclusive of all coatings
- Bent member - An out of straight member with no visible kinks
- Bottom track - The bottom horizontal member of the wall panel that the vertical studs are fastened to
- Bracing - Structural elements that are installed to provide restraint or support (or both) to other framing members so that the complete assembly forms a stable structure
- Crack - A break or slit at any corner radius typically caused by the member manufacturing process.
- Crew - The group of assemblers building the wall panel
- Cripple - The short, vertical members above or below the window or door rough opening
- Dent/Ding - A depression or hollow in a member, made by a blow or pressure
- Design Thickness - Used in design which is equal to the minimum base metal thickness divided by 0.95
- Edge – Fastening pattern for the perimeter of one piece of sheathing on a wall panel (e.g., every 6 inches)
- Exterior - A wall panel built for use around the outside perimeter of the structure (usually has sheathing)
- Fastening pattern - Specific spacing for where fasteners are to be placed
- Field - Fastening pattern for the inside body of one piece of sheathing on a wall panel (e.g., every 8 inches)
- Header - The subcomponent in a door or window assembly that is above a door or window
- Header depth - The overall depth or thickness of the header subcomponent (e.g., 2x4, 2x6)
- Header height - How tall or the overall height of the header subcomponent (e.g., 2x4, 2x6)
- Header length - The overall span of the header subcomponent
- Hole - An opening forced into or through a member. A penetration through a member
- House wrap - The protective, vapor barrier material that is fastened to the sheathing of the wall panel
- Interior - A wall panel built for the inside use of the structure
- Kink - A fold, crease, tight twist, or curl at a corner radius. This causes the member to be out-of-straight.
- Knockout - Pre-punched hole in the face of the studs to allow bracing to run through the wall panel.
- Line - The name or type of the line a crew is assembling a wall panel on
- Puncture/Rip - A member that has a hole, tear, split or other type of perforation
- Red rust - Oxidation of base metal with red appearance
- Rough opening - The opening in a wall into which a door or window will be installed
- Scratch: A scrape, dig, tear or similar marking of the surface
- Sheathing - The structural wood panel covering, usually OSB or plywood, fastened to the outside of a wall panel
- Sheathing offset - The distance the sheathing is placed off the outside perimeter of the wall panel
- Sill plate - The horizontal member at the bottom of the rough opening of the window opening
- Special - A wall panel that is taller, sloped, or wider than what would normally be produced on an assembly line
- Square of wall - The diagonal distance from the corners of the wall panel (e.g., upper left to lower right corner)
- Stud - The vertical member between the top and bottom track spanning the height of the wall panel
- Top track - Top horizontal member of the wall panel that the vertical studs are fastened to
- Twist - Laying the piece flat or on end any deviation causing the steel to curl or spiral
- Warp - Any deviation or change in the true plane or surface of the steel section
- White rust - Galvanized surface oxidation with white powdery appearance (Wet storage stain)

Wall Panel Component Diagram

The below diagram (Figure 1) will point out different components and parts of a wall panel:

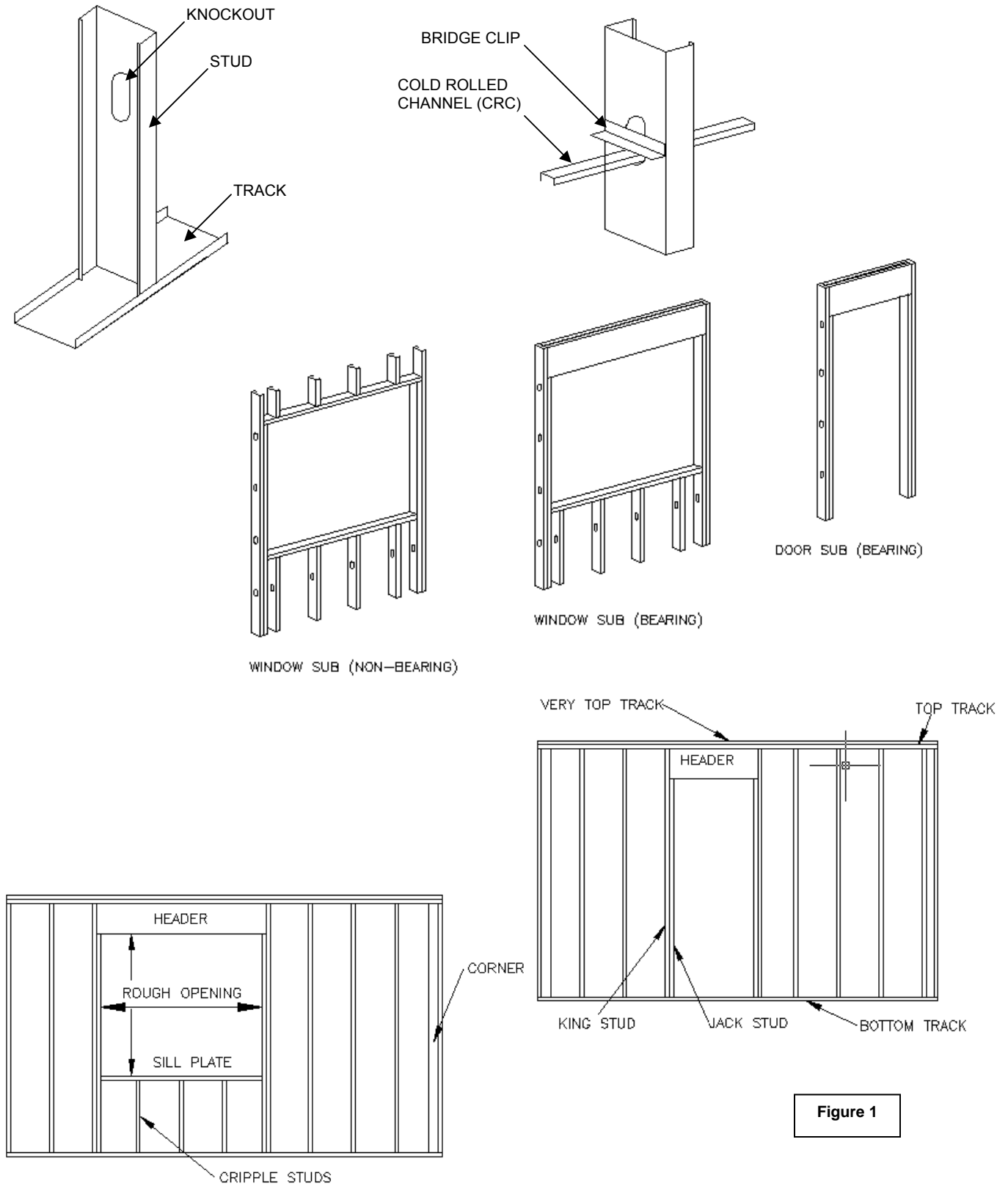


Figure 1

(Revised June 2009)

Inspection Frequency

The inspection frequency depends on the production volume at the plant. The inspection frequency is 3 wall panels per 1000 lineal feet of production / per line / per shift / per week.

Example: A plant has two crews and measures production by lineal feet. Their typical production is 4000 total lineal feet each week. $4000 \text{ total lineal feet} / 1000 = 4$
 $4 \times 3 = 12$ required inspections each week.

It is up to the plant to do the required number of inspections randomly throughout the week, to split up those inspections proportionately to how many crews they are running, and to split up those inspections proportionately to their production of interior, exterior, and special wall panels.

Wall Panel Inspection Form

While reading these instructions, refer to the **Wall Panel Inspection Form** (Figure 2). It is best to also place in front of you the hard copy of this form found in the back of the manual.

General Information

The first part of the inspection form is the general header information. The inspector will record: date, time, inspector, line, shift, crew, job number, panel number, panel type, and inspection number. It is best to name or designate labels for your crew and line. For example the group of assemblers can be named after the crew leader or the crew can be numbered (e.g., Crew 1, Crew 2). The assembly line or table can be named by where the line is located (e.g., North, South) or numbered. The job number and panel number will come from the drawing. Fill in the check box if the panel type is an exterior wall, interior wall, or special wall. A special wall panel is one that is taller, sloped, or wider than what would normally be produced on an assembly line. Last, circle the inspection number of the specific wall panel based on number 1-10 of that crew's weekly inspection frequency. The inspection number differentiates multiple wall panels should the job number and panel number be the same.

CFS Wall Panel Inspection Form

Date: _____ Time: _____
 Inspector: _____ Line: _____
 Shift: _____ Crew: _____

Frequency: 3 Wall Panels Per 1000
Lineal Feet / Per Shift / Per Week

Job Number: _____
 Panel Number: _____
 Panel Type: EXTERIOR
 INTERIOR
 SPECIAL* *A special wall panel is taller, sloped, wider, etc.

Inspection Number: 1 2 3 4 5 6 7 8 9 10 (please circle)

Dimensions

1) Do overall dimensions conform to the drawing? (length and height within 1/8") yes no
Note: Information on the right side such as dimensions is required.

2) Is square of wall within 1/8" of drawing? yes no N/A

Studs and Tracks

3) Do all sections conform to the drawing? (length, width, type, material, thickness, depth, coating) yes no

4) Is quality of steel visually acceptable? (ding, dent, rip, puncture, hole, crack, rust, bow, twist) yes no

5) Are stud knockouts correct? (holes line up correctly, are not within 10" edge of stud) yes no

6) Are gaps between stud and track within 1/8"? yes no

Headers

7) Are header lengths within -0+1/8" of drawing? yes no N/A

8) Are header heights and depths within +0-1/8" of the drawing? yes no N/A

9) Are headers square (within plane of wall)? yes no N/A

10) Is the header type and material correct? yes no N/A

Window and Door Openings

11) Are rough opening dimensions within -0+1/8" of the drawing? (length, height, square) yes no N/A

12) Are sill track heights within 1/8" of drawing? yes no N/A

13) Proper number of cripples below windows? yes no N/A

Placement

14) Does stud placement and orientation match the drawing? yes no

15) Do top/bottom tracks match the drawing? (web stiffeners, clips) yes no

16) Does bracing and blocking match drawing? (CRC, lateral strapping, x-bracing, bridging, flat stock) yes no N/A

Fastening

17) Is fastener pattern and spacing correct? (front & back of stud, multiple studs, headers) yes no

18) Are fasteners tight and not stripped? (screws should have a minimum of 3 threads showing) yes no

19) Are correct type and size fasteners used? (self drilling tapping screws, rivets, clinching) yes no

20) Do all welded connections conform to the specs? yes no N/A

21) Is all bracing fastened correctly? yes no N/A

Sheathing

22) Is sheathing placement and offset correct? (setbacks, overhangs, panel square) yes no N/A

23) Is field/edge fastener pattern/spacing correct? yes no N/A

24) Are fasteners tight and not stripped? yes no N/A

25) Are correct sheathing materials used? yes no N/A

26) Are correct fasteners used? yes no N/A

27) Is house wrap applied correctly? yes no N/A

Overall Dimensions (ft-in-16th)		
Component	Specified	Actual
Length		
Height		
<small>If answer is no, record specific cause and remedy</small>		

Identification (e.g., 600 S 162-54)		
Section	Specified	Actual
S = Stud		
T = Track		

Header Dimensions (ft-in-16th)		
Component	Specified	Actual
Length		
Height		
Depth		

Rough Opening Dimensions (ft-in-16th)		
RO Length		
RO Height		
Sill Track Height		

Stud Spacing (ft-in)	
Specified	Actual

Fasteners Per Stud (e.g., 2 per 2x4)	
Required	Actual

Fastener Spacing Pattern (in)		
Component	Specified	Actual
Field		
Edge		

Initials verifying that errors have been corrected: _____

Figure 2

The next part of the inspection covers the inspection criteria. Those criteria include: dimensions, steel, headers, windows and door openings, placement, fastening, and

sheathing. Areas shaded in gray need to be checked if the wall panel is an exterior type. If the panel is an interior it is ok to enter N/A which means non-applicable. If an issue is found, add a comment and repair the wall panel. It is important to add a specific comment documenting the problem or cause and remedy; and to make sure the panel gets repaired.

Dimensions

When looking at the shop drawing of the wall panel there are many different dimensions shown. The most important dimension is the overall length and height; the CFSC tolerance is 1/8". You are required to inspect and record the specified and actual length and height of each panel (Figure 3).

<p>Dimensions</p> <p>1) Do overall dimensions conform to the drawing? (length and height within 1/8") yes no</p> <p><i>Note: Information on the right side such as dimensions is required.</i></p> <p>2) Is square of wall within 1/8" of drawing? yes no N/A</p>	Overall Dimensions (ft-in-16th)		
	Component	Specified	Actual
	Length		
	Height		
	<i>If answer is no, record specific cause and remedy</i>		
<p>Studs and Tracks</p> <p>3) Do all sections conform to the drawing? (length, width, type, material, thickness, depth, coating) yes no</p> <p>4) Is quality of steel visually acceptable? (ding, dent, rip, puncture, hole, crack, rust, bow, twist) yes no</p> <p>5) Are stud knockouts correct? (holes line up correctly, are not within 10" edge of stud) yes no</p> <p>6) Are gaps between stud and track within 1/8"? yes no</p>	Identification (e.g., 800 S 162-54)		
	Section	Specified	Actual
	S = Stud		
	T = Track		

Figure 3

If the wall panel is an exterior wall panel, the inspector is required to check the square of the wall panel and if it is within 1/8" of drawing? To measure the square of the wall measure the diagonal distances: upper left to lower right measurement compared to the lower left to upper right measurement. If the wall panel is not an exterior checking the squareness is optional.

Studs and Tracks

The shop drawing also lists the specified size, material, and thickness for each member. The inspector will check the members to see if the size, material, and thickness match the drawing. Included in this question (3) is if the sections conform to the drawing. In addition to the size, material, and thickness is the type of section, depth, and coating correct?

The next question (4) asks if the steel is visually acceptable. This would include checking for bow or twist or the amount the board curves from end to end when laid flat. It is up to the plant to decide what is acceptable for the wall panel. A bowed end stud on an exterior wall panel can cause significant problems. If you can imagine butting up exterior wall panels that have bowed end studs it would cause the entire wall of the structure to grow. One suggestion is to measure the length or span of the wall panel half way up the wall panel, and then to see how much that distance differs from the length along the top track or bottom track. The second half of this question pertains to the quality of the steel on face or edge of the member: dings, dents, rips, punctures, holes, cracks, and rust. Again, it is up to the plant to determine what is acceptable. For example, steel members with red rust should not be used. However, the plant could accept a minimal amount of white rust.

Question 5 asks if the knockouts are correct. More specifically, from stud to stud do they line up correctly? And for load bearing walls are the holes at a minimum at least 10 inches from the stud's edge? If unclear whether the wall panel is bearing talk to the design department.

Question 6 asks if the gaps or the spaces between the stud and track are 1/8" or tighter. The American Iron and Steel Institute standard maximum gap for load bearing/structural walls is 1/8", but CFSC suggests checking all gaps making sure they are 1/8" or less.

Headers

A header is the subcomponent assembly above a door or window. There are three main types of headers: L-headers, box beam headers, and back to back headers. If the dimensions for the header are incorrect,

then the door or window assembly could very well be affected as well. The first question (7) in this section is on header lengths; here the inspector will make sure the length is $-0+1/8''$ of drawing (*Figure 4*). The tolerance allows the header to be slightly larger but not smaller than the drawing measurement. Please note there is one exception to this: an L-header is applied over the panel and must extend past the king studs on either side of the opening. In the case of an L-header verify the header has the correct length. The next question (8) targets the height and depth of the header; the inspector will make sure both are within $+0-1/8''$ of the drawing? The tolerance allows the height and depth to be smaller but not larger than the drawing measurement.

Question 9 asks the inspector to make sure the headers are square or in other words that the thickness of the header is within the plane of the wall panel. If the headers are not square it will again affect the wall panel dimensions and the ability to fasten sheathing or dry wall. The last question (10) in this section asks if the correct header type and materials have been used. Again this would be to verify first that the header is correctly built and second to verify they are the size, material, and thickness. If there is a header on the wall panel being inspected please enter the specified and actual length, height, and depth. If there are multiple headers on the wall panel then pick one of them. If there are no headers then circle N/A (non-applicable) for the header questions.

Window and Door Openings

The inspector will make sure that the window and door openings have been assembled correctly. First, the inspector will make sure the rough dimensions are within $-0+1/8''$ of the drawing. The rough opening can be slightly larger than the specified but cannot be smaller due to the actual window or door size.

The next question (12) asks if the sill track heights are within $1/8''$ of the drawing. Finally, for question 13, are the proper number of cripples below windows?

If there is a window or door opening on the wall panel being inspected please enter the specified and actual rough opening length, rough opening height, and sill plate height. If there are multiple window or door openings on the wall panel then pick one of them. If there are no rough openings then circle N/A (non-applicable) for those questions.

Headers			Header Dimensions (ft-in-16th)			
7) Are header lengths within $-0+1/8''$ of drawing?	yes	no	N/A	Component	Specified	Actual
8) Are header heights and depths within $+0-1/8''$ of the drawing?	yes	no	N/A	Length		
9) Are headers square (within plane of wall)?	yes	no	N/A	Height		
10) Is the header type and material correct?	yes	no	N/A	Depth		
Window and Door Openings			Rough Opening Dimensions (ft-in-16th)			
11) Are rough opening dimensions within $-0+1/8''$ of the drawing? (length, height, square)	yes	no	N/A	RO Length		
12) Are sill track heights within $1/8''$ of drawing?	yes	no	N/A	RO Height		
13) Proper number of cripples below windows?	yes	no	N/A	Sill Track Height		
Placement			Stud Spacing (ft-in)			
14) Does stud placement and orientation match the drawing?	yes	no		Specified	Actual	
15) Do top/bottom tracks match the drawing? (web stiffeners, clips)	yes	no				
16) Does bracing and blocking match drawing? (CRC, lateral strapping, x-bracing, bridging, flat stock)	yes	no	N/A			

Figure 4

Placement

The shop drawing shows where each member should be located. The first question (14) in the placement section targets stud placement. A stud is a vertical member; here the inspector will need to verify that each stud is spaced correctly and in the correct location. In addition, because studs have an open face the orientation is very important. Orientation, or the direction the open face faces, is noted on the design drawing.

The next question (15) targets the horizontal top and bottom tracks. The inspector will check to make sure that the top and bottom tracks are correct. This question also intends to make sure that the wall panels will match up correctly when installed on the jobsite. Last, are the web stiffeners or any clips installed correctly and in the correct locations?

The last question (16) for placement targets the bracing and blocking of the wall panel. Does the wall panel have all the bracing listed and as shown on the shop drawing (i.e., CRC or cold-rolled channel, lateral strapping, x-bracing, bridging, or flat stock). Are the wall panel blocks located as shown on the drawing?

Finally, on the right of the inspection form, list the specified and actual stud spacing in terms of feet and inches (e.g., 1-4 or 2-0). If there is no blocking or bracing on the wall panel circle N/A (non-applicable) for question 16.

Fastening

For a wall panel to perform correctly structurally there are fastener and spacing criteria. The first question (17) in this section (Figure 5) targets the fastener pattern and spacing; the inspector

Fastening					
17) Is fastener pattern and spacing correct? (front & back of stud, multiple studs, headers)	yes	no	Fasteners Per Stud (e.g., 2 per 2x4)		
18) Are fasteners tight and not stripped? (screws should have a minimum of 3 threads showing)	yes	no	Required	Actual	
19) Are correct type and size fasteners used? (self drilling tapping screws, rivets, clinching)	yes	no			
20) Do all welded connections conform to the specs?	yes	no	N/A		
21) Is all bracing fastened correctly?	yes	no	N/A		
Sheathing			Fastener Spacing Pattern (in)		
22) Is sheathing placement and offset correct? (setbacks, overhangs, panel square)	yes	no	N/A		
23) Is field/edge fastener pattern/spacing correct?	yes	no	N/A	Component	Specified
24) Are fasteners tight and not stripped?	yes	no	N/A	Field	Actual
25) Are correct sheathing materials used?	yes	no	N/A	Edge	
26) Are correct fasteners used?	yes	no	N/A		
27) Is house wrap applied correctly?	yes	no	N/A		

Figure 5

will check A) the fastener pattern, B) the spacing, and C) that the correct number of fasteners are used. The inspector will check the top and bottom of the stud, the headers being connected to the wall panel, and that multiple studs or tracks are fastened together correctly.

Question 18 is concerned with the fasteners being tight and not stripped. Stripped screws are not allowed, but if a screw is stripped then an additional screw can be installed to make up for the damaged screw. The AISI specifies that screws shall extend through the steel connection a minimum of three exposed threads.

Question 19 looks at the size and type of fasteners used. The inspector will make sure that the proper fasteners are used including the type of fastener, size and length of the fastener, and characteristic of the fastener (e.g., stainless, galvanized).

Question 20 pertains to welded connections specifically. Three items need to be checked, do the welded connections: 1) match the design shop drawing, 2) meet the AWS (American Welders Society) specification and 3) if required are the connections spray painted to repair the damage to the zinc.

Question 21 targets the fastening of the bracing. The inspector must verify the bracing is fastened correctly.

Last, to verify all studs have the correct number of fasteners the inspection asks for the required and actual fasteners per stud (e.g., 2 per 2x4 or 2 per 2x6).

Sheathing

Sheathing is the structural wood panel covering, usually OSB or plywood, fastened to the outside of a wall panel. The sheathing section only applies to exterior wall panels. The first question (21) asks if the sheathing placement is correct. In other words, are the sheets of sheathing where they need to be and is the offset from the edge of the studs correct? That sheathing placement along the edge could be setback on the inside of the edge, square to the perimeter of the wall panel, or overhanging from the edge of the wall panel perimeter stud. Additional items you could include in this question are if the sheathing has the correct orientation, and if the routing around windows and doors is accurate.

It is very important that the sheathing is properly fastened to the wall panel. The next sheathing question (22) is on the fastener pattern and fastener spacing on both the field of the sheathing and the edge or perimeter of the sheathing. The inspection asks the inspector to verify the specified and actual field and edge spacing. The spacing is important but it is negated when fasteners aren't hitting the studs or the fasteners are either not fastened tightly or are stripped. It is also important to make sure the sheathing is fully attached to the studs and tracks of the wall panel.

Next, the inspector can check that the correct sheathing materials and correct fasteners are used. Is it OSB or plywood? What is the thickness of the wall panel and is it the same as specified on the drawing? What kind of fastener is used? Are they the right length, size, and type?

The last question (27) in this section has to do with house wrap. House wrap is the vapor, protective barrier material that is fastened to the sheathing of the wall panel. The inspector should make sure the house is applied or attached correctly. Is the house wrap covering the entire wall panel? Is it adequately attached? When the wall panel is being shipped to the jobsite will the house wrap remain attached?

If the wall panel is not an exterior or your plant does not sheath exterior wall panels please circle N/A (non-applicable) for those questions.

III. Software Use

Software Requirements

To use the **CFSC QC Wall Panel** software and the presentation materials on the CD, specific hardware and software are required. For this list of requirements place your “CFSC QC Wall Panel” CD in the CD-ROM drive and select “FIRST TIME SET-UP” from the menu. Directions and links to the updates are provided there and are also listed below:

Please verify that you have the following minimum hardware configuration:

1. A “PC” compatible computer
2. Processor power, at least AMD or Intel Pentium III (300mhz) or better
3. RAM Memory, at least 32mb of memory or better
4. Sound Card with speakers.
5. Desktop/Screen Setting to 1024x768 resolution and at least 16-bit color.

Please verify that you have the following minimum software configuration:

1. MS Windows: XP, 2000 Service Pack 4 (will not run on Windows 95, 98, ME, NT or Mac)
2. The latest version of Microsoft DirectX 8.1 (multimedia drivers)

Note: Windows XP has DirectX 8.1 installed.

To determine your current version of DirectX, use the DirectX Diagnostic Tool follow these steps:

Click Start, and then click Run.

Type dxdiag, and then click OK.

On the System tab, note the version of DirectX displayed on the DirectX Version line.

When you are finished, click Exit.

If Windows cannot find the dxdiag program, or if an earlier version than DirectX 8.1 install the current version of DirectX

[Click Here to Install DirectX 8.1](#)

3. The latest version of the Office-XP run-time.

If you have Office-XP PowerPoint installed go to next step, if not;

[Click Here to Install Office-XP run-time](#)

4. The latest version of Microsoft Internet Explorer (IE 6.0):

To determine your current version, start Explorer and click “Help/About”

Note: All versions of Netscape will not work.

[Click Here to Download and Install Internet Explorer 6.0](#)

5. Printed Materials require Adobe® Acrobat®

[Click Here to Install Acrobat®](#)

Software Set-Up

1. Insert the “CFSC QC Wall Panel” CD. The main menu should pop up (*Figure 6*). If the main menu does not pop up, double click on “My Computer” and then “CFSC QC Wall Panel” or right click on your CD drive, go to explore, and double click the “autorun.exe”.
2. Click “FIRST TIME SET-UP” and go through the list of requirements for your system, make updates as necessary.
3. For the next step select “INSTALL 1.0” from the main menu. If you are installing the database program over the top of an existing install first make sure you save your main data CWALLDATA10.mdb file.
4. Close all programs, after the first pop-up window shows the program is preparing to install the “Welcome to the InstallShield Wizard for CFSC QC Wall Panel” window will appear (*Figure 7*). Select “Next” to continue. Enter your information in the “Customer Information” window and select “Next”.
5. The next window shows “Installing CFSC QC Wall Panel” (*Figure 8*), after this is done select “Next”. The last window will show “InstallShield Wizard Complete”, select “Finish” and wait until the hourglass disappears and the window closes.
6. To run the **CFSC QC Wall Panel** program select the “start” button, “Programs” and then “CFSC QC Wall Panel”. You can also double click the “CFSC QC Wall Panel” shortcut on your desktop. The program will start, and the first time you run the program, you will be asked for your company name. After the first time opening the program it will take you to the main menu.

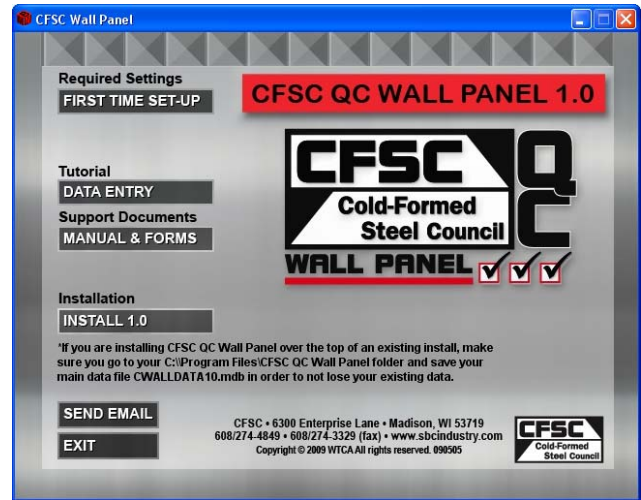


Figure 6



Figure 7

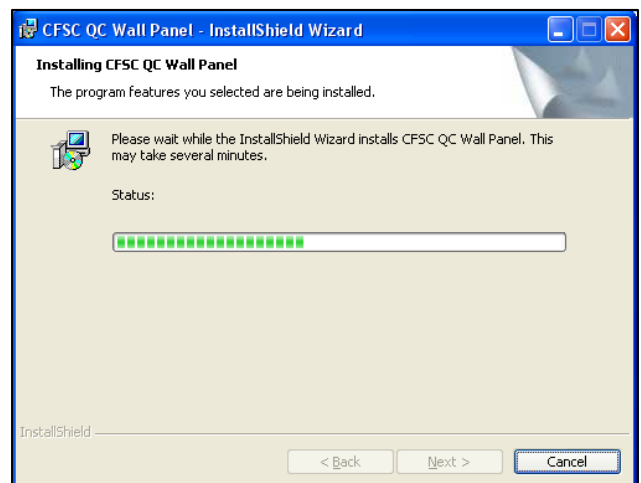


Figure 8

Networking the Software

The **CFSC QC Wall Panel** program is made up of two files, a program file and data file. The program file (CFSCQCWALLPROG.mdb) has been hardcoded to point by default to the data file (CWALLDATA10.mdb) specifically on the C:\Program Files\CFSC QC Wall Panel location. To successfully network the **CFSC QC Wall Panel** program please follow these steps:

1. Install the 1.0 program on each computer needing access using the CD-ROM CFSC sent, according to the manual (refer to page 21 for instructions).
2. Go to the network drive where you have determined you will store your main data file CWALLDATA10.mdb and create the folder(s) under that network drive (e.g., the CFSCQC folder on your W:\ drive).
3. Go to the user's C:\Program Files\ CFSC QC Wall Panel folder (the user who has entered information like crews and inspectors, etc.), and copy the CWALLDATA10.mdb file.
4. Go to the network folder where you have determined you will store your main data file CWALLDATA10.mdb (e.g., W:\CFSCQC) and paste the CWALLDATA10.mdb from the user's computer into that folder.
5. Open the 1.0 program on each computer where it is installed. Select "Edit Options" from the "Main Menu" and select "Change Data File Path" (Figure 9).

Note: You must copy and paste your main data file CWALLDATA10.mdb into your network folder otherwise you will not be able to complete the process of networking.

6. Go to your network folder (e.g., W:\CFSCQC) and select the main data file CWALLDATA10.mdb. The program will verify your path and then pop up a message that communicating the networking was successful.

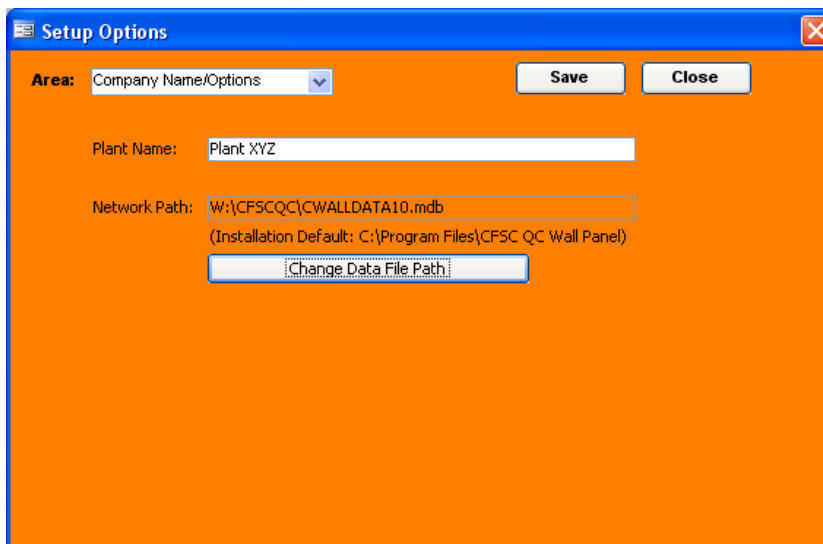


Figure 9

After this is done, when you open the 1.0 program from any computer, they will all point to the same data file on your network.

Note: When the "Select Data File Location" window comes up after opening the database program this is because there is no main data file CWALLDATA10.mdb in the network path you have set up. If this is the case then you will need to select the new folder location of the main data file CWALLDATA10.mdb so it can relink the tables to your main data.

Customizing Options

*Note: You MUST set up options such as Inspector, Line, and Crew before you can begin to enter inspections into the database. To do this, you must read this section. **CFSC QC Wall Panel** allows you to enter customized values that pertain to your panel plant. Press the Edit Options button on the menu, or select Options, Edit Options from the upper left drop down menu. The Setup Options dialog box is shown in Figure 10.*



Figure 10

Begin by selecting the Area where you want to add values. Do this by pressing the down arrow to the right of the Area combo box. A list will drop down. Then select the area you wish to view. The areas where you can add values are Crew, Inspector, and Line.

To add new values, click into the Value text box and enter the value, as shown above right, and press the Add button. Your new value will show up in the list. To edit a value (for instance, change “CRRew 1” to “Crew 1”), click on that value and it will appear in the Value text box. Edit the value, and then press the Change button. The changed value will show up in the list.

Entering Inspections into Database

In order to simplify data entry, the inspection input screens are designed to look like the inspection forms used in the plant to collect the data.

Entering Header Information

Note: Again, before you can begin entering inspections into the database, read the previous section in the manual on how to set up options for Inspector, Line, and Crew. Only those values marked “In Use” in the Options dialog box will be available.

Open the **CFSC QC Wall Panel** program, from the main menu select the “Main Wall Panel Inspection” button, or from the menu you can select Inspection, Open, then enter the appropriate inspection. A new blank inspection opens on the screen; begin by entering the header information (Figure 11). After entering data in a data box, press “Enter” or “Tab” on the keyboard to go to the next data box.

Note: When entering data into combo boxes that have a finite number of choices, it is not necessary to drop the combo box. Type the first few letters of the value, until the program identifies the option you want from the drop-down list. When you move (tab) to the next field, the computer will complete the entry. Also, you can type ahead of what you see on the screen; that is, you can enter several fields of information separated by tabs before the program catches up. The computer retains what is being entered, even if it is not yet visible on the screen. This will allow you to go as fast as possible, provided no mistakes in entry are made.

Figure 11

Enter the Date and then the Time. When tabbing to the Time field, the program automatically enters 7:00am. The following shortcuts have been built into the program, when the cursor is within the date or time data boxes, be sure to utilize these:

- *Date:* Press “t” for current date, “+” to increase or “-” to decrease days.
- *Time:* Press “n” for current time, “+” to increase or “-” to decrease minute

Next, select an option from the Inspector combo box, select a Line where the wall panel was manufactured, select First, Second, or Third from the Shift combo box, and then choose a Crew or the group of fabricators who built the wall panel. Moving over to the next column enter the Job Number (or Drawing Number) and enter the Panel Number. Next fill in the Panel Type. Pressing 1 will autofill Exterior, 2 will autofill Interior, and 3 will autofill Special. After Panel Type, enter the Inspection Number selected for that individual wall panel by choosing the number 1-10 or by typing in something more specific to fit your need.

If the inspection identifies a manufacturing problem, you will need to enter a specific, clear, and concise cause and remedy in the Comments section every time. In order for an out of conformance panel to be “Ok’d” by the program you must enter initials in the Initials-Errors Fixed field. This is done only when you have verified the repair was properly completed. Any time a wall panel is repaired, for a wall panel to be “OK’d” by the program rather than be listed as an error by the program, enter initials in the Initials – Errors Fixed field. See page 34 for examples of correct documentation.

Tab Design

When selecting the button to save the header, a series of tabs will appear. To go from one tab to another, click on the title of the tab, such as “Dimensions / Studs and Tracks / Header” (Figure 12). Beginning with the “Dimensions / Studs and Tracks / Header” tab, each tab will be gone over in detail so that by the end the user should understand how to enter an inspection from start to finish.

Dimensions / Studs and Tracks / Header

Enter the data from the wall panel inspection form by answering the ten dimension, steel, and header questions “Yes”, “No”, or “N/A”. Also enter in the specified and actual span and height dimensions. Remember, the inspection will not be complete until all questions are answered and dimensions are entered. If the wall panel includes a header also enter the length, height, and depth.

Note: Anytime a question in the program has the choices “No”, “Yes”, or “N/A” the number pad on the keyboard can also be used, press “0” for “No”, “1” for “Yes”, and “2” for “N/A”.

If a question is answered “No,” for Questions 1-10 a message box will pop-up. When a message box appears on the screen, carefully read the message. In this case, a “No” answer means the panel needs to be fixed and initials entered before the inspection will be “OK’d.” If the wall panel is an interior type, checking the square is optional it is fine to enter N/A (non-applicable).

Component	Specified	Actual
Length	8' 0" 0 /16	8' 0" 0 /16
Overall Height	8' 0" 0 /16	8' 0" 0 /16
Identification	Specified	Actual
Stud	600 S 162-54	600 S 162-54
Track	600 S 162-54	600 S 162-54
Component	Specified	Actual
Length		
Height		
Depth		

Figure 12

Window and Door Openings / Placement Tab

The second tab for entering wall panel inspections is for the rough openings and placement (Figure 13). Answer the six questions “Yes”, “No”, or “N/A”. Also enter the measurements and stud spacing. Again, if a question is answered “No,” for Questions 11-16 a message box will pop-up. When a message box appears on the screen, carefully read the message. In this case, a “No” answer means the panel needs to be fixed and initials entered before the inspection will be “OK’d.”

Component	Specified	Actual
Rough Opening Length		
Rough Opening Height		
Sill Plate Height		
Component	Specified	Actual
Stud Spacing	2' 0" "	2' 0" "

Figure 13

Fastening/Sheathing Tab

The third and last tab for entering wall panel inspections focuses on fastening and sheathing (Figure 14). Answer the eleven questions “Yes”, “No”, or “N/A”. Also enter the fasteners per stud and sheathing spacing (exteriors only). Again, if a question is answered “No,” for Questions 17-27 a message box will pop-up. When a message box appears on the screen, carefully read the message. In this case, a “No” answer means the panel needs to be fixed and initials entered before the inspection will be “OK’d.” If the wall panel is an interior questions 22-27 (for exteriors only) will be automatically filled in as “N/A”.

Component	Specified	Actual
Fasteners Per Stud	2	2
Component	Specified	Actual
Field Spacing		
Edge Spacing		

Figure 14

Completing Inspections

Inspections will be flagged as not ok or not complete for two reasons:

1) Out of Conformance: If there is a manufacturing problem making the inspection out of conformance you will be prompted with a message box that the inspection is out of conformance. To address this situation enter a comment as to what the problem in the inspection was and how it was fixed as well as initials verifying the repair was done properly.

2) Data Entry: If there is a problem with data entry you will be prompted with a message box that data entry is not complete. To address this situation fix the specific problem with data entry. The specific problem will be in the message box but it will be because of one of these reasons:

Inspector Tools

1) Averages: Besides saving time on inspections, it is also important for the inspector to know how many inspections they are performing for a given week or month per crew. A tool is available for the inspector on the Main Menu by selecting the Averages button. When the form pops up (*Figure 15*) you can select the date range and then select the Press for Averages button. When you do this you will get an average inspections per week, inspection equivalent based on production volume, total inspections, inspections per type, and average length and height. On the bottom of the form it will list the number of inspections for each crew. There are also options to print the form or to print a pre-populated inspection log.

2) Sending Data to CFSC: The next tool created for the inspector is found on the Main Menu by selecting the Zip Data button. This is an easy way for inspectors to email or send data to CFSC. When you select this button it will ask if you want to zip and send your data to CFSC or create a zip file in your default data file location. If you select "Yes" *Figure 16* will appear. After you enter your production information and any other comments you can select Press To Email and Send Data. In order to press "Yes" and email your data straight to CFSC you must have an email address and internet access on your computer. If you select "No" it will zip your data and a message box will let you know where the zip file is being saved. This will be saved in your default data file path location.

Frequency and Crew Checker

Start Date: 4/27/2009 End Date: 5/8/2009

[Press for Averages]

Inspections Per Week: 5
 Inspection Equivalent: 1500 lineal feet per week
 Total Inspections: 9
 Exteriors: 3 of 9 (33.3%)
 Interiors: 6 of 9 (66.7%)
 Special: 0 of 9 (0.0%)
 Average Length: 8.2 feet
 Average Height: 8.2 feet

Crew Name	Total Inspections
Crew 1	9

Print Screen
 Print Inspection Log
 Close

Figure 15

Zip Data and Send Email

TO: tpiek@qualtim.com

ATTACHMENT: CWALLDATA10.zip

SUBJECT: Sending Quarterly CFS Wall Panel QC DATA - Plant XYZ

PLEASE ENTER:

PLANT NAME: Plant XYZ

LINEAL FEET OF PRODUCTION AVERAGED PER WEEK: 4500

EXTERIOR/INTERIOR/SPECIAL PRODUCTION %: 45/45/10

LIST ANY OTHER PERTINENT INFORMATION HERE:

Press To Email and Send Data

Close

Figure 16

Deleting Records

An entire inspection can be deleted by pressing the record selector on the left for the entire page, and pressing delete, or by selecting Inspection, Delete from the upper left menu (Figure 17).

Warning: Be careful when deleting entries, as this cannot be undone.

Note: Press escape to get out of the record. Any data entered or changed in a line will be lost when you press escape. However, if you are stuck, it may be best to press escape!

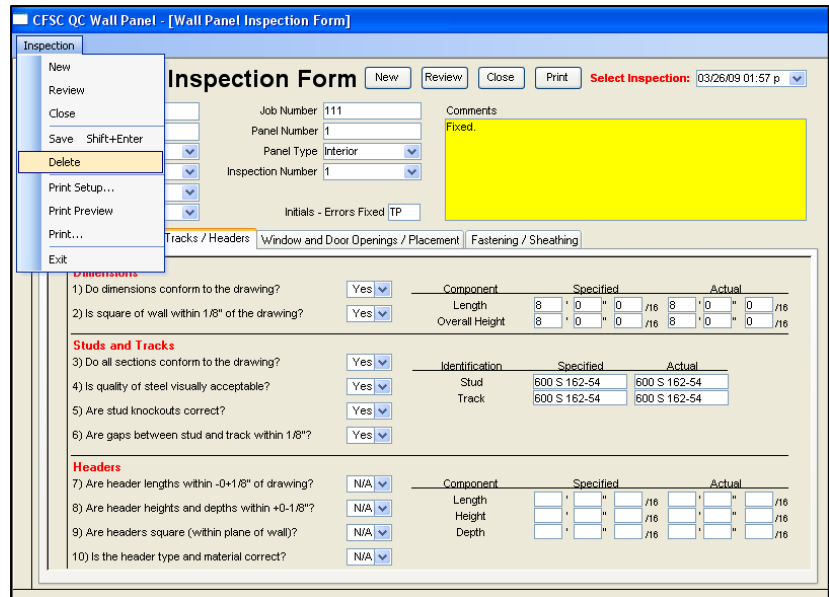


Figure 17

Saving Records

Data is saved to the database as you enter values. The header information is saved when you move to a subform (by clicking on the large Save button), and records in the subforms are saved when you move to a new line. You can tell a record (or line) is saved when the icon in the record selector to its left is a triangle (▶). When the record or line is currently being modified, the triangle becomes a pencil (✎).

Reviewing Inspections

To review old inspections, press the Review button on the form, or select Inspection, Review from the menu bar. The Inspection Selection drop down box will appear at the top right corner of the window. Drop down the list by pressing the down arrow to display the inspections (Figure 19). The most recent inspections will be listed at the top; press “Page Down” on your keyboard to scroll through inspections.

Select Inspection:		Date	Time	DataComplete	Conformance	Corrected	Job
05/01/09 03:17 p		05/06/09	09:23 a	Yes	Yes		123456789
		05/06/09	09:14 a	Yes	Yes		123456
		05/06/09	09:04 a	Yes	Yes		12345
		05/06/09	08:45 a	Yes	Yes		1234567
		05/06/09	08:20 a	Yes	Yes		12345678
		05/06/09	07:45 a	Yes	Yes		1234
		05/05/09	08:25 a	Yes	Yes		123
		05/02/09	03:21 p	Not Complete	Yes		12
		05/01/09	03:17 p	Yes	No	No Initials	1
		04/28/09	01:57 p	Yes	Yes		4
		04/27/09	08:00 a	Yes	Yes		45

Figure 18

The columns from left to right in Figure 18 show the date and time of the inspection. If the data entry is not complete it will be marked “Not Complete”. If the inspection is out of conformance it will be marked “No”. If the inspection is out of conformance but has been corrected and initials entered it will be marked “Yes”. If the inspection is out of conformance and has not been corrected and initials have not been entered it will be marked as “No Initials”. Last, the job number for the inspection is listed. Ideally all inspections will be marked as complete one of two ways, either (1) DataComplete “Yes” and Conformance “Yes” or (2) DataComplete “Yes”, Conformance “No”, and Corrected “Yes”.

Closing Inspections

To close the active inspection form, press the Close button on the toolbar, or select Inspection, Close from the menu.

Printing Inspections

To print the inspection on the screen, select Inspection, Print from the menu or click on the Print button at the top of the form. The inspection will be printed, and errors will be clearly marked. Single inspections can only be printed when they are selected from the Review inspection selection combo box.

Reports

The **CFSC QC Wall Panel** program allows you to take data from the inspection forms and represent it in a graphical format, to show relative performance, and trends over time. Press the Create Report button from the main menu. The main reports are shown in the Report Type drop down box in *Figure 19*.

To create any of the reports, you must first select the Report Type from the drop down box at the top of the form. Next, select the date range or Date Selection you want the report to cover. The next step will vary depending on the type of report selected. For some reports, such as the “Summary Report,” after selecting the date range you can create the report by pressing OK. However, for other reports, such as “Comment Summary” or “Dimensions”, after selecting the date range you will be able to select more options before creating the report. For example, you can select a certain “Crew” or “Line” (*Figure 20*) or enter in your own dimension tolerances. If no additional criteria is selected the report will reflect all inspections.

The image shows a 'Report Options' dialog box with an orange background. At the top, there is a 'Select Report Type' section with a 'Report Type:' dropdown menu. The menu is open, showing options: 'Comment Summary', 'Dimensions', 'Summary Report' (highlighted), 'Summary By Crew', 'Summary By Line', 'Summary By Shift', 'Summary By Line/Shift', and 'Weekly Summary'. Below this is a 'Date Selection' section with 'Start' and 'End Date' text boxes. At the bottom, there is a 'Create Report' section with 'OK' and 'Close' buttons.

Figure 19

The image shows the 'Report Options' dialog box with 'Comment Summary' selected in the 'Report Type:' dropdown. The 'Date Selection' section has 'Start Date' set to 4/1/2009 and 'End Date' set to 4/30/2009, with a 'Clear Values' button to the right. Below this are dropdown menus for 'Inspector:', 'Line:' (set to 'Line 1'), 'Shift:', and 'Crew:'. There is also a 'Panel Type:' dropdown and a checkbox labeled 'Check here to list all comments: (default only lists comments for non-passing inspections)'. At the bottom, there is a 'Create Report' section with 'OK' and 'Close' buttons.

Figure 20

After you have created the report and it pops up on the screen; print the report by selecting Report, Print from the menu. To close the report, click on the button on the floating toolbar near the bottom right of the screen.

The next section will discuss what reports are available, report options, and keys to understanding each report.

Summary Report

To create the summary report, select “Summary Report” from the Report Type drop down box on the previous page (Figure 19). Then select the date range or Date Selection. Click “OK” to create the report. Please be patient as the program needs time to generate the report. A report similar to Figure 21 will be generated. The summary includes information for the Overall QC inspection data and then breaks down all the overall data into exterior, interior, and special wall panels. Remember, the goal of the Summary Report is to give a “snapshot” of performance for the dates selected. All inspection areas are combined into a one-page report that illustrates a plant’s overall performance in each area.

Total Number Inspected – gives the number for all wall panel inspections.

Number Out of Conformance – notes how many nonconforming wall panels were found.

% Out of Conformance – gives the out of conformance percentage (“Number Out of Conformance” divided by “Total Number Inspected”).

To the right of the overall statistics is a pie graph of passing versus non-passing wall panel inspections. The percentage listed is the percentage of inspections not meeting the inspection criteria.

Each individual wall panel has 27 inspection questions. Each individual wall panel is scored based on how many of the 27 questions passed. The score shown in the report is the average score per wall panel.

This section breaks down the wall panel dimensions, steel, and header information.

The left side includes the type of problem found in the wall panel inspection: 1) Dimensions – walls with out of tolerance length or height. 2) Square of Wall – exteriors outside tolerance. 3) Section Type – walls with wrong stud or track material. 4) Quality of Steel – walls with visually unacceptable steel quality. 5) Stud Knockouts – walls with knockouts not lining up or bearing wall knockouts closer than 10” from edge of stud. 6) Member Gaps – walls with a space greater than 1/8” between stud and track. 7) Header Lengths – walls having incorrect header lengths. 8) Header Height/Depth – walls having incorrect header height (top to bottom) and depth (front to back) 9) Square Headers – walls with headers that are not squared.

The right side includes a break down of the type of out of conformance in terms of the inspection criteria, number of problems, and % that problem was of the total inspections.

This section breaks down the rest of the wall panel header information as well as rough openings, placement, and fastening.

The left side includes the type of problem found in the wall panel inspection: 9) Header Materials – walls with incorrect header materials. 10) Rough Openings – walls with incorrect rough opening measurements for windows or doors. 11) Sill Plate Heights – walls with incorrect window sill heights. 12) Window Cripples – walls with unacceptable number of cripples. 14) Stud Placement – walls with incorrect stud placement or orientation. 15) T/B Track Placement – walls having incorrect top or bottom track placement. 16) Blocking/Bracing – walls having incorrect blocking or bracing. 17) Fastening Pattern – walls with incorrect fastening pattern or spacing. 18) Fasteners Tight – walls with incorrect fastening (stripped or not tight).

The right side includes a break down of the type of out of conformance in terms of the inspection criteria, number of problems, and % that problem was of the total inspections.

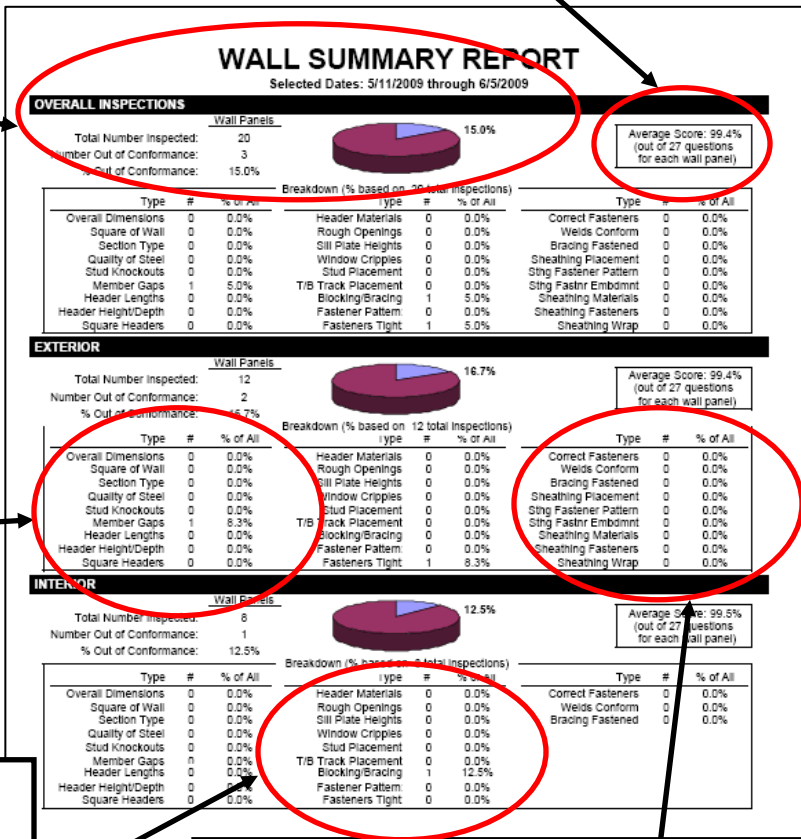


Figure 21

This section breaks down the wall panel fastening and sheathing information.

The left side includes the type of problem found in the wall panel inspection: 19) Correct Fasteners – walls with incorrect fasteners. 20) Welds Conform – walls with incorrect welded connections. 21) Bracing Fastened – walls with incorrect fastened bracing. 22) Sheathing Placement – walls with incorrect sheathing placement or orientation. 23) Sheathing Fastener Pattern – walls with incorrect fastener pattern or spacing. 24) Sheathing Fastener Embedment – walls with fastener embedment problems on sheathing. 25) Sheathing Materials – walls having incorrect sheathing materials. 26) Sheathing Fasteners – walls having incorrect sheathing fasteners. 27) Sheathing Wrap – walls having incorrect sheathing wrap.

The right side includes a break down of the type of out of conformance in terms of the inspection criteria, number of problems, and % that problem was of the total inspections.

Summary By Group Reports

There are several other summary reports available that analyze the data differently than the base summary report. These options include the Summary By Crew, Summary By Line, Summary By Shift, and Summary By Line/Shift which are located in the Report Type drop down box (Figure 19). Figure 22 shows an example of a Summary By Crew report. If your crews are set up correctly this report will allow you to create a quality report for each crew.

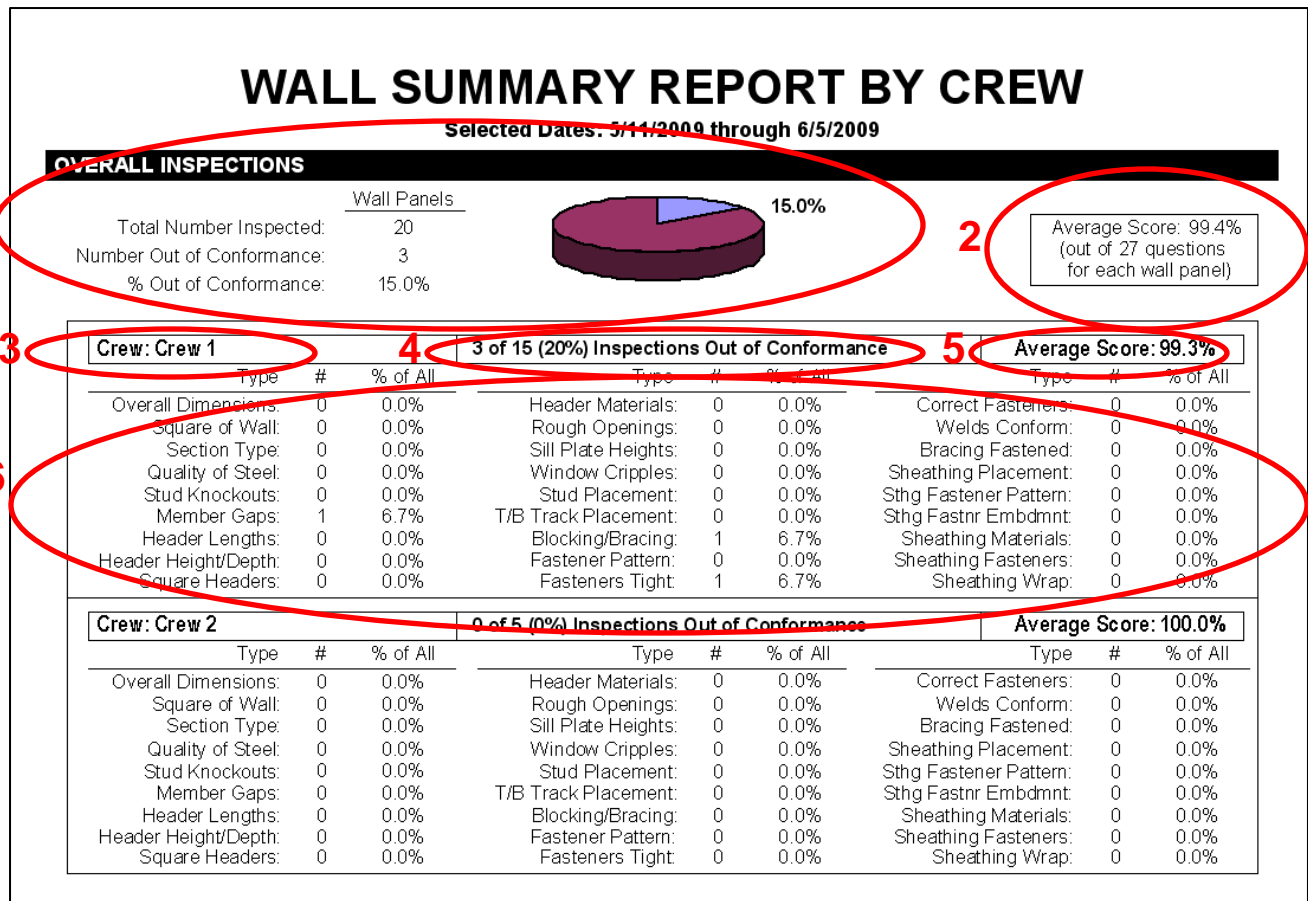


Figure 22

- 1) Similar to the basic summary report, the top section lists the total number, number out of conformance, and % out of conformance for wall panels.
- 2) Each individual wall panel has 27 inspection questions. Each individual wall panel is scored based on how many of the 27 questions passed. The score shown in the report is the average score per wall panel.
- 3) In this example "Crew 1" is circled. This output report shows Crew 1 and Crew 2.
- 4) For Crew 1, the data shows that 3 of 15 inspections were found to be out of conformance.
- 5) This shows the average wall panel score for each crew.
- 6) Of the 15 wall panels out of conformance 1 had a member gap problem, 1 had a blocking or bracing problem, and 1 had a problem due to fasteners not being tight or stripped.

Weekly Summary

The Weekly Summary report is another type of overall summary report located in the Report Type drop down box (Figure 19). For the date range selected you will get a report showing your statistics by week. This can be extremely helpful when trying to track your quality control level from week to week. Figure 23 below shows an example of 4 weeks or a 1 month stretch of inspections. It shows how many wall panels were inspected each week, how many were out of conformance, and the % of out of conformance panels. Working to the right the next sections show if problems were found in the dimensions, studs and tracks, headers, rough openings, placement, fastening, or sheathing sections. The last column shows the average score for the group of wall panels inspected each week.

Below the week by week breakdown is a graph that shows the overall percentage of passing inspections regarding over time. The graph, in this case, shows that the % of passing inspections for overall inspections is increasing more each week.

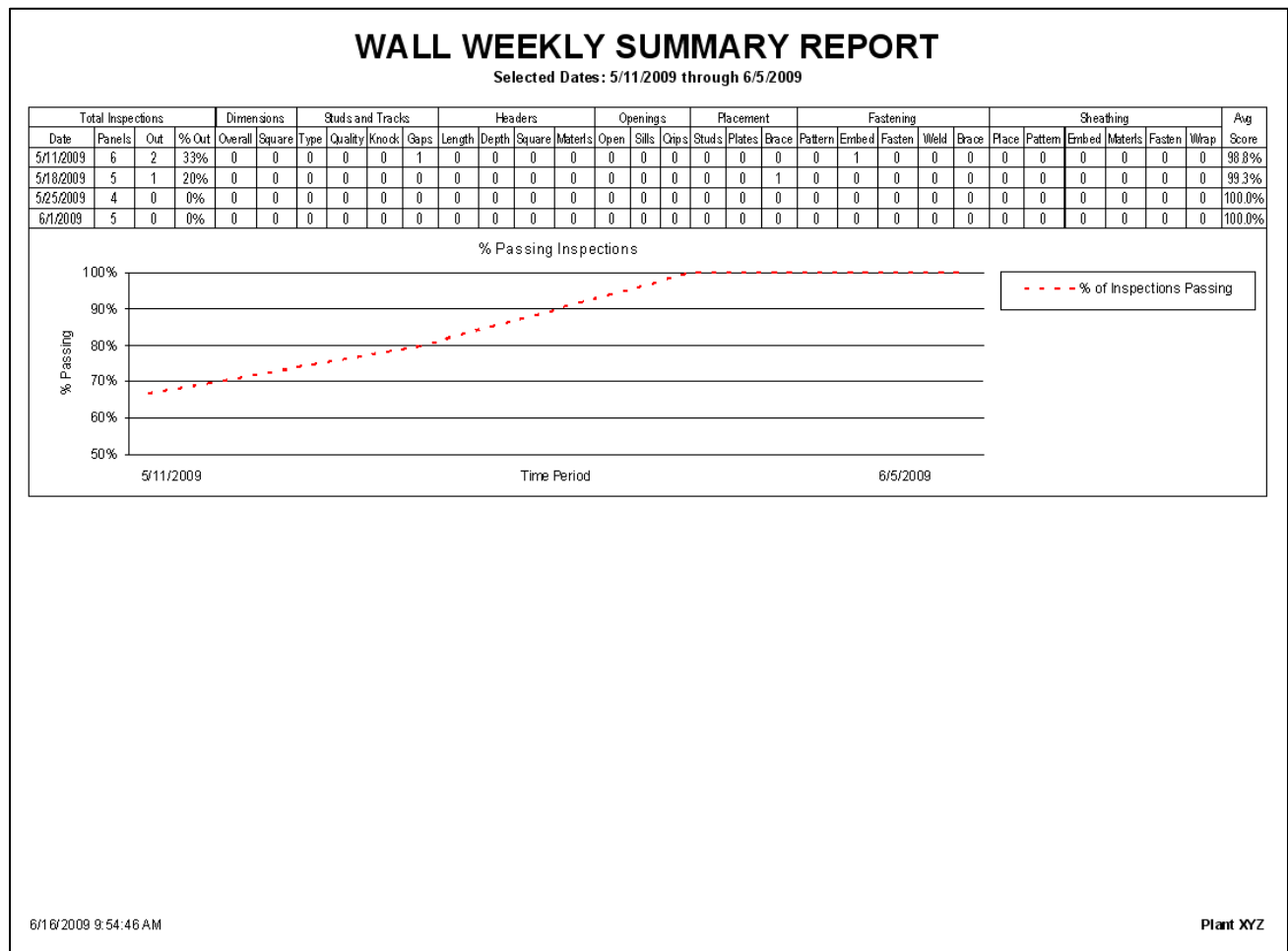


Figure 23

Dimensions Report

Length and height measurements are required for each inspection. The standard tolerance for length and height is 1/8". Some plants may have their own in-plant tolerances. The Dimensions report in the Report Type drop down box (Figure 19) allows you to create a report to see the quality level of your wall panel dimensions. Figure 24 shows that you can enter a specific in-plant length and height tolerance. The default values unless changed are 1/8". Figure 25 shows an example of a dimensions report. You will see:

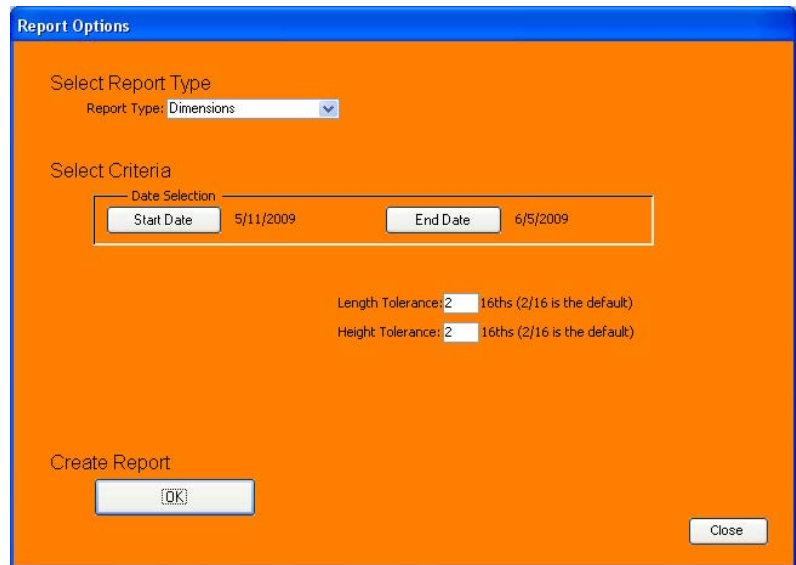


Figure 24

- 1) Overall inspection summary which has been explained previously.
- 2) Number of inspections, number of wall panel lengths outside of the standard 1/8" tolerance, and % of inspections outside the standard tolerance. A pie graph of the passing and non-passing inspections is below the numbers.
- 3) Number of inspections, number of lengths outside the customized in-plant tolerance (in this case 1/8"), and % of inspections outside the customized in-plant tolerance. A pie graph of the passing and non-passing inspections is below the numbers.
- 4) Breakdown of the % of inspections having a length matching the design (perfect length), and an average measurement from the designed or specified length.
- 5) Number of inspections, number of heights outside of the standard 1/8" tolerance, and % of inspections outside the standard tolerance. A pie graph of the passing and non-passing inspections is below the numbers.
- 6) Number of inspections, number of heights outside the customized in-plant tolerance (in this case 1/8"), and % of inspections outside the customized in-plant tolerance. A pie graph of the passing and non-passing inspections is below the numbers.
- 7) Breakdown of the headers and rough openings, specifically how many header or rough opening dimensions were inside or outside the tolerance, the % of inspections having a perfect dimension, and an average measurement from the designed or specified height.

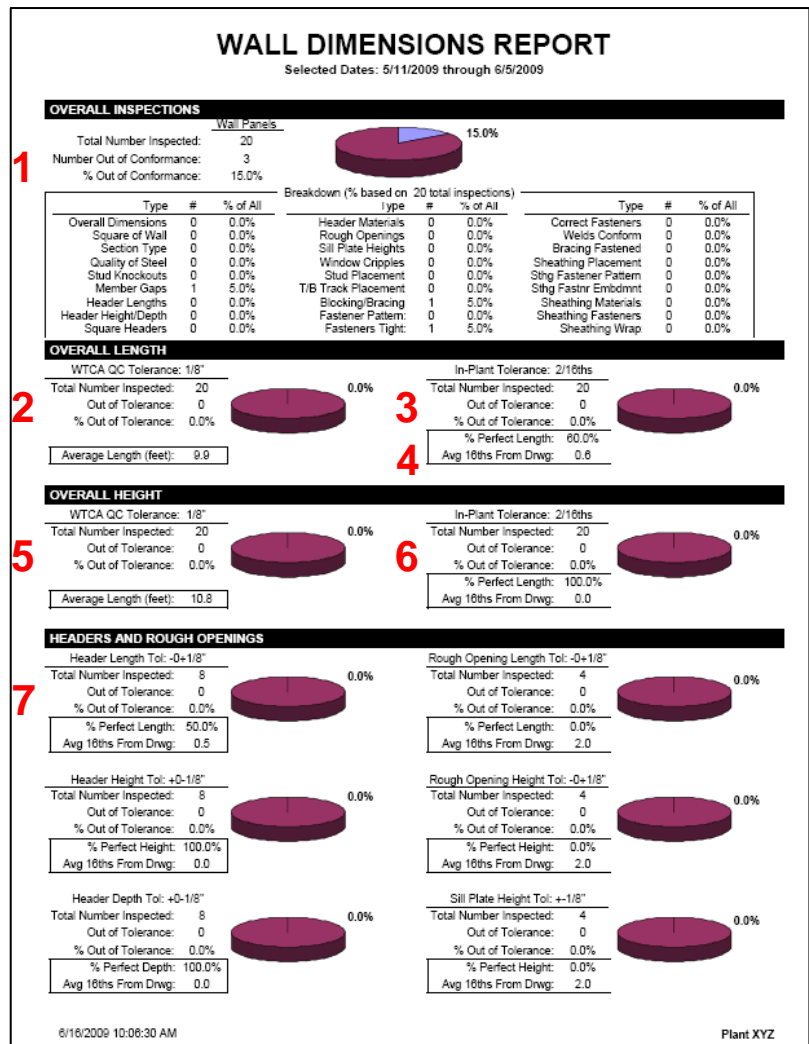


Figure 25

Comment Summary

If an inspection is marked out of conformance you are required to enter a comment detailing what was wrong with the wall panel and how it was fixed. This report is a great tool to view and use these comments in an effort to correct the manufacturing problems that are occurring. To create a comment summary report, select Comment Summary from the Report Type drop down box (Figure 19).

Figure 26

WALL COMMENT REPORT			
Selected Dates: 5/11/2009 through 6/5/2009			
05/12/2009 09:45 am Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 1	Inspection #: 1 Job #: Jackson 1 Panel # W 20 X	Panel Type: Exterior Fixed Initials: TP Inspection Status: No
The knockouts in one steel stud did not line up with the others. The stud was removed and replaced.			
05/13/2009 01:00 pm Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 2	Inspection #: 1 Job #: 12 Panel # 1	Panel Type: Exterior Fixed Initials: TP Inspection Status: No
In the left window rough opening one of the window cripples was missing. The cripple was added to the wall panel.			
05/15/2009 09:45 am Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 1	Inspection #: 2 Job #: Jackson 3 Panel # W 20 X	Panel Type: Exterior Fixed Initials: TP Inspection Status: No
Two studs are too wavy, these were removed and replaced.			
05/22/2009 03:30 pm Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 1	Inspection #: 1 Job #: 1234 Panel # 3	Panel Type: Interior Fixed Initials: TP Inspection Status: No
The header was not square to the rest of wall panel. The header was adjusted so it was within the plane of the wall.			
05/29/2009 02:30 pm Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 2	Inspection #: 1 Job #: 12345 Panel # 5	Panel Type: Interior Fixed Initials: TP Inspection Status: No
The bottom knockout on a stud was not fully punched. The knockout was punched out, and this took care of the problem.			
06/03/2009 10:30 am Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 1	Inspection #: 1 Job #: 1234888 Panel # 8	Panel Type: Interior Fixed Initials: TP Inspection Status: No
Three studs were oriented incorrectly and the open faces were in the wrong direction. The studs were fixed making sure the orientation was correct.			
06/05/2009 03:30 pm Inspector: Gadget	Line: Line 1 Shift: First Crew: Crew 1	Inspection #: 1 Job #: 1234 Panel # 10	Panel Type: Exterior Fixed Initials: TP Inspection Status: No
The 7/16" sheathing was oriented in the wrong direction. The sheathing was removed and replaced.			

A sample comment report is listed in Figure 27. This is an example of actual comments you can use. Note that for each one, the header information from the inspection is listed. This is so you are aware of the time and date, or what crew or line the inspection took place on and therefore you can utilize the comment report to summarize inspection problems and to find the root of production problems.

The default is setup to print only the inspections that have been marked as out of conformance. Check the box "Click here to list all comments" (Figure 26) if you want to see all comments. Some plants use this tool to record different manufacturing notes from inspections even if they pass inspection.

Figure 27

IV. CFSC QC Wall Panel Certification Program

Introduction

CFSC offers a certification program to members currently using **CFSC QC Wall Panel** who wish to get even more value out of this program. Certification is 100% voluntary. Certified companies will enjoy the following benefits:

- The ability to use the **CFSC QC Wall Panel** logo and create marketing tools to show current and potential customers your commitment to producing high quality wall panels.
- Use of this program may be an asset when field framing inspections are performed, by providing the inspector with confidence that your plant is part of a comprehensive in-plant quality control program.
- The ability to send your QC inspection data to CFSC to offer an objective review from a body outside your plant.

Steps to Certification

1. Be a member of CFSC.
2. Purchase **CFSC QC Wall Panel**.
3. Carefully read the **CFSC QC Wall Panel** manual. Also have the inspector meet with the wall panel designer on how to read the wall panel drawing and its different components.
4. Perform inspections at the required weekly inspection frequency and enter the data into the **CFSC QC Wall Panel** database for at least one month.
6. Contact CFSC to enroll in the **CFSC QC Wall Panel** certification program; pricing is found in the **Certification Pricing** section on page 36.
7. Send data file to CFSC for review (see page 26) no sooner than one month after receiving the program. CFSC will review your data and provide insight on how your company can improve in order to meet the certification requirements. When data complies with the **Requirements for Maintaining Certification** (page 36) and the plant meets step 8, CFSC can then certify that company.

Note: CFSC will require a minimum of two data reviews before a plant can be certified. If a plant sends data one month after first starting to use the program and another month after the initial review the soonest the plant can be certified is two months.

8. Sign certification agreement and return to CFSC. After successful certification in the program, you will receive a certificate stating that you are a certified member of **CFSC QC Wall Panel** and in good standing.

Requirements for Maintaining Certification

For a plant to remain in good standing with the program, the criteria listed below must be met. These criteria are subject to change at the sole discretion of CFSC. Changes to the criteria will be made if CFSC believes the criteria are either so stringent as to be impossible to attain, or because they are so lenient as to be of little value. Any changes to the program's criteria will be announced in writing to certified plants.

- Certified plants will send data to CFSC quarterly based on the calendar year that contains inspection data for that quarter (see page 26).
- CFSC reserves the right to use summaries of inspection data in the interest of furthering its mission. However, the identity of the company from which any summary data is shown will be held in strict confidence, and will not be known by anyone outside of CFSC staff, including CFSC officers.
- CFSC will review data files for the following:
 - 1) Wall panel inspections are performed in accordance to the frequency and specifications in this manual.
 - 2) Wall panel inspections are representative of what is manufactured. The number of exterior, interior, and special wall panel inspections should be proportionate or close to the actual exterior, interior, and special wall panel percentage of your manufacturing.
 - 3) Inspection procedures are being followed according to this manual, and that inspections are being recorded accurately and entered into the database completely giving detailed information. Thorough inspections are performed and the detailed information (e.g., wall panel length and height, header details, door and window opening details, stud spacing, nailing, and sheathing) is recorded and entered.
 - 4) Verification that any errors found in manufacturing were corrected. Any wall panel inspection not passing the inspection criteria must be repaired. All out of conformance inspections must be corrected; specific comments and initials are entered for each that document what the problem was and how it was repaired.
 - 5) Certified plants will need to maintain the nominal yearly licensing fee.

Certification Pricing

Plants will pay an annual license fee based on the number of years they have been certified or involved with the program. As plants maintain their certification for a longer period of time, the cost goes down. Plants

Length of Certification	Annual Fee	Quarterly Fee	Monthly Fee
Pre-Certification	\$540	\$135	\$45
Year 1 of Certification	\$540	\$135	\$45
Year 2 of Certification	\$480	\$120	\$40
Year 3 of Certification	\$420	\$105	\$35
Year 4 and beyond	\$360	\$90	\$30

Figure 28

will be billed on a quarterly basis. A plant must enroll in **CFSC QC Wall Panel** and submit a quarterly payment before CFSC can review their data. In order for CFSC to continue to review data for a certification-in-progress plant, quarterly payments must be made. If a pre-certified plant discontinues payment and then decides to re-enter the program, the payment for the current quarter and next quarter must be made before CFSC can perform the next data file review. As seen above, plants will pay an annual license fee based on the number of years they have been certified or involved with the program (*Figure 28*).

Use of CFSC QC Wall Panel Logo

Upon certification and as long as the Panel Manufacturer's certification is in good standing it has permission from CFSC to use the **CFSC QC Wall Panel** logo. As stated on the licensing agreement, the Panel Manufacturer agrees to the following:

- The **CFSC QC Wall Panel** logo will be used exactly as it appears as offered by CFSC, unless permission for changes is given by CFSC. This includes both shape and color. Any changes to the logo other than size are strictly prohibited.
- The **CFSC QC Wall Panel** logo is trademarked, remains the sole property of CFSC and is used only with CFSC's permission. Upon resignation, decertification or rescinding of the license, the Panel Manufacturer agrees to cease using all media as described above that display the **CFSC QC Wall Panel** logo, or any claim to involvement in the program.

Decertification

A plant can be decertified for any of the reasons listed in the previous section. Any company placed on probation or decertified from the **CFSC QC Wall Panel** program will receive written notice of that status. A company that is decertified will lose its right to use the **CFSC QC Wall Panel** logo. Use after decertification will not be allowed.

Recertification

A company who was previously certified in the **CFSC QC Wall Panel** program and is decertified may reapply for certification no sooner than 90 days after decertification. To be recertified, the company will follow the steps outlined in **Steps to Certification**. The first quarter after recertification, the company will be automatically placed on probation.

It is CFSC's wish that everyone who requests certification receives and maintains that status. At the same time, minimum criteria must be maintained in the form of performance levels, so that there is value to *having* that status. Thus, it is important that there be consequences when these criteria are not met. CFSC is committed to doing everything realistic within its power to support companies in achieving, maintaining or regaining their certification status.