Impresa Building Systems of Greenwood S.C., LLC

Quality Assurance Manual

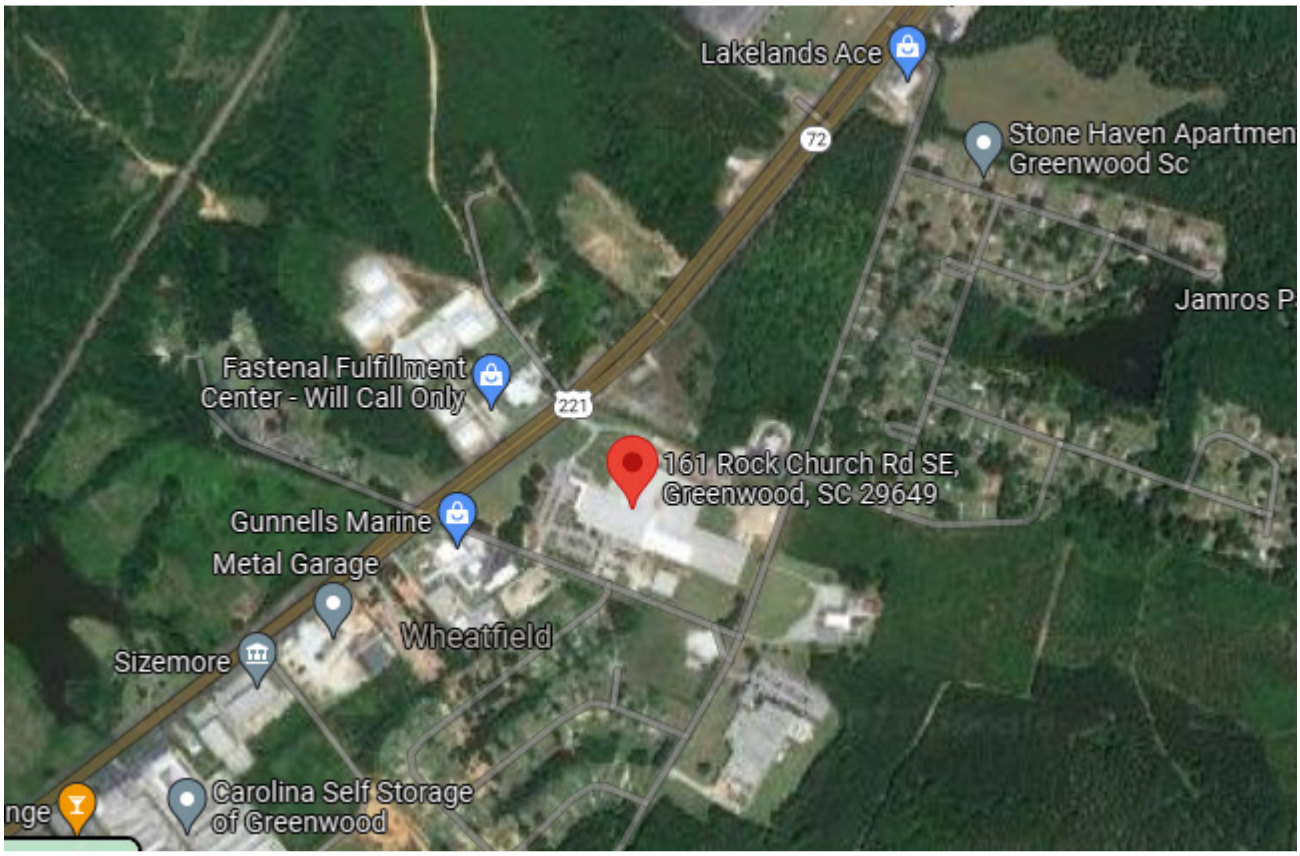
Impresa Building Systems of Greenwood S.C. LLC

Content

Impresa Building Systems of Greenwood, S.C., LLC
161 Rock Church Rd. SE,
Greenwood, S.C. 29649

Contact Person:
Dan Hobbs, President
dan.hobbs@impresamodular.com
601-291-4082

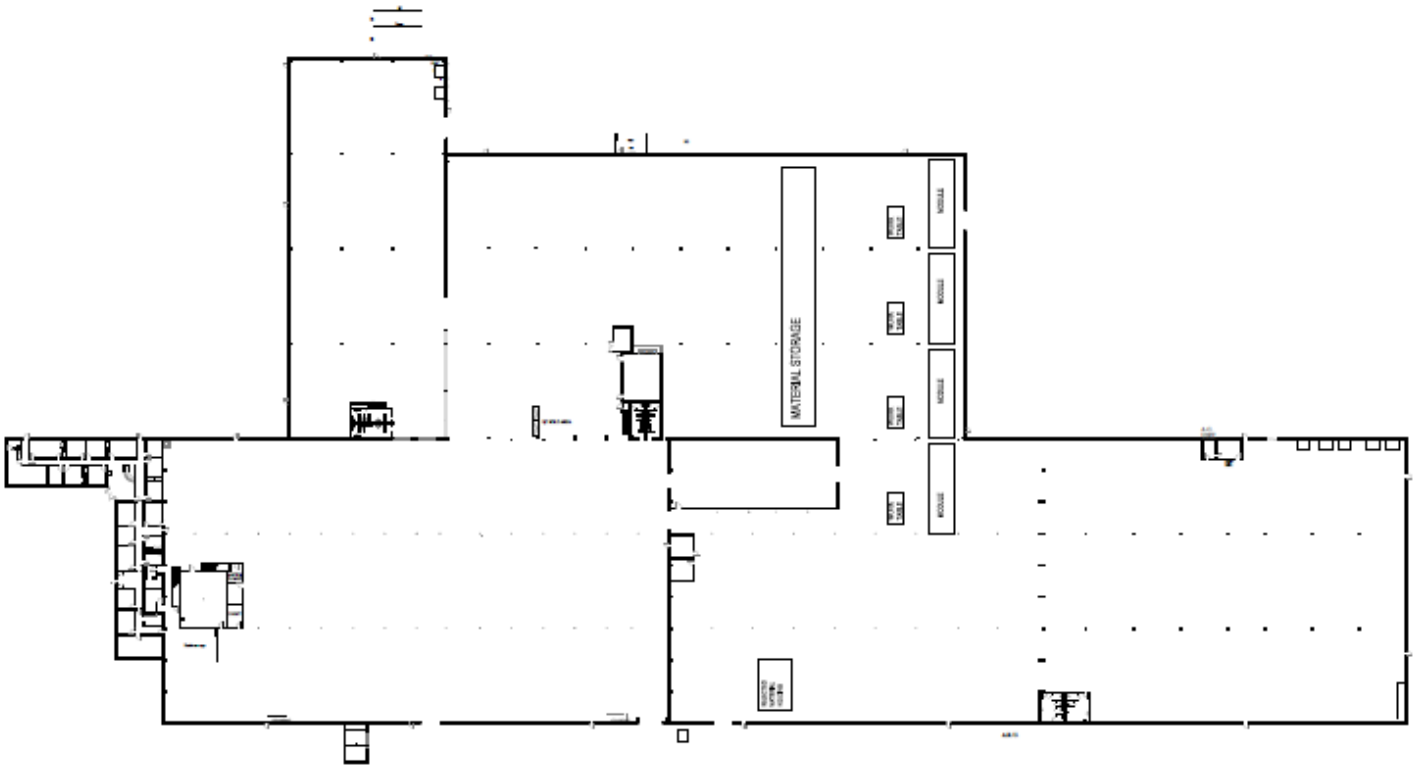
Impresa Building Systems of Greenwood, S.C., LLC.
Is located on the east side of US Hwy 221 , 4 miles Northeast of the intersection of US Hwy 178 and US Hwy 221



3rd Party
ICC NTA LLC
305 N. Oakland Ave.
P.O. Box 490
Nappanee, In. 46550
Telephone: 574.773.7975
Fax: 574.773.2732

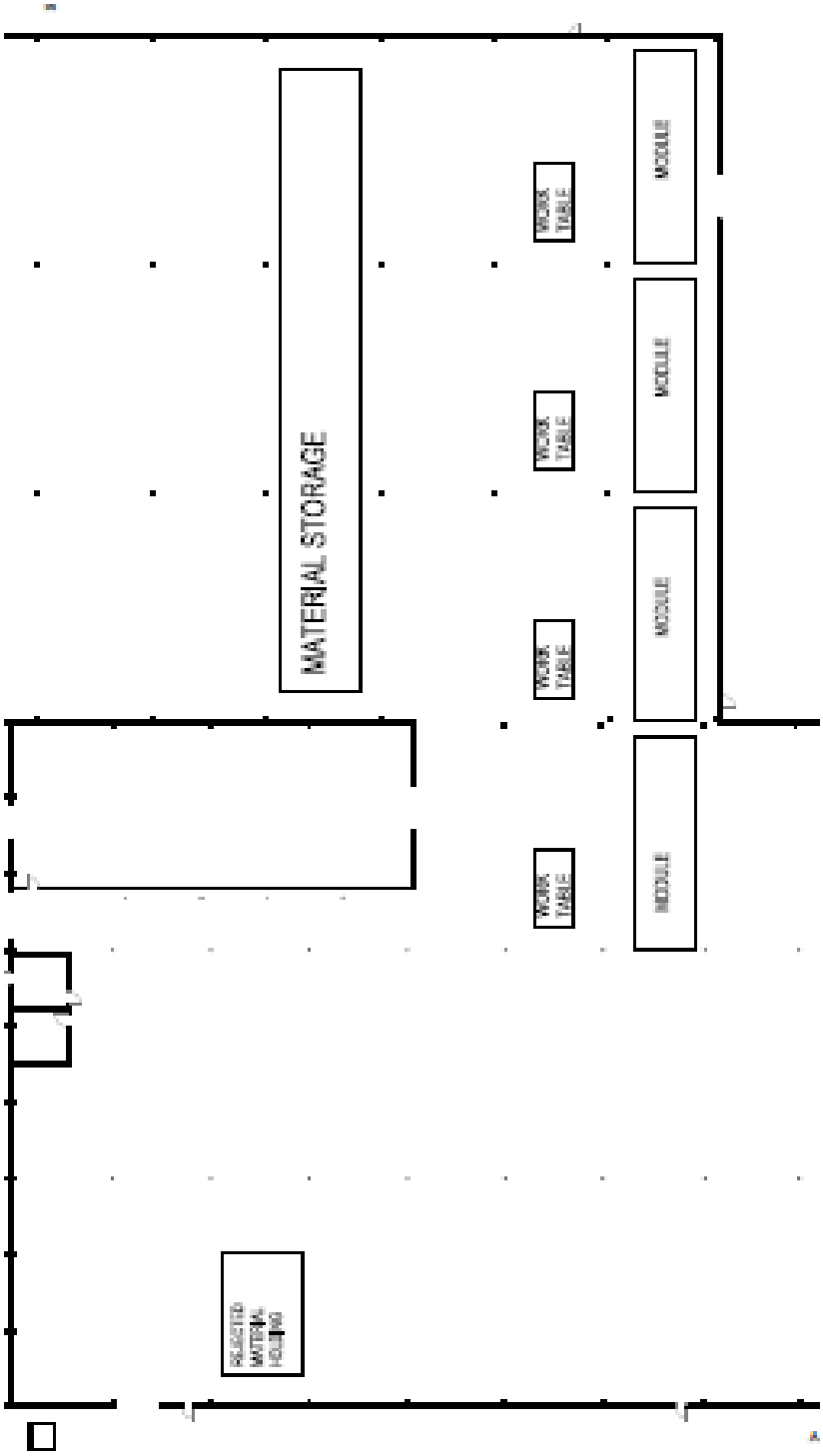
Impresa Building Systems of Greenwood S.C., LLC

PLANT LAYOUT ENTIRE BUILDING



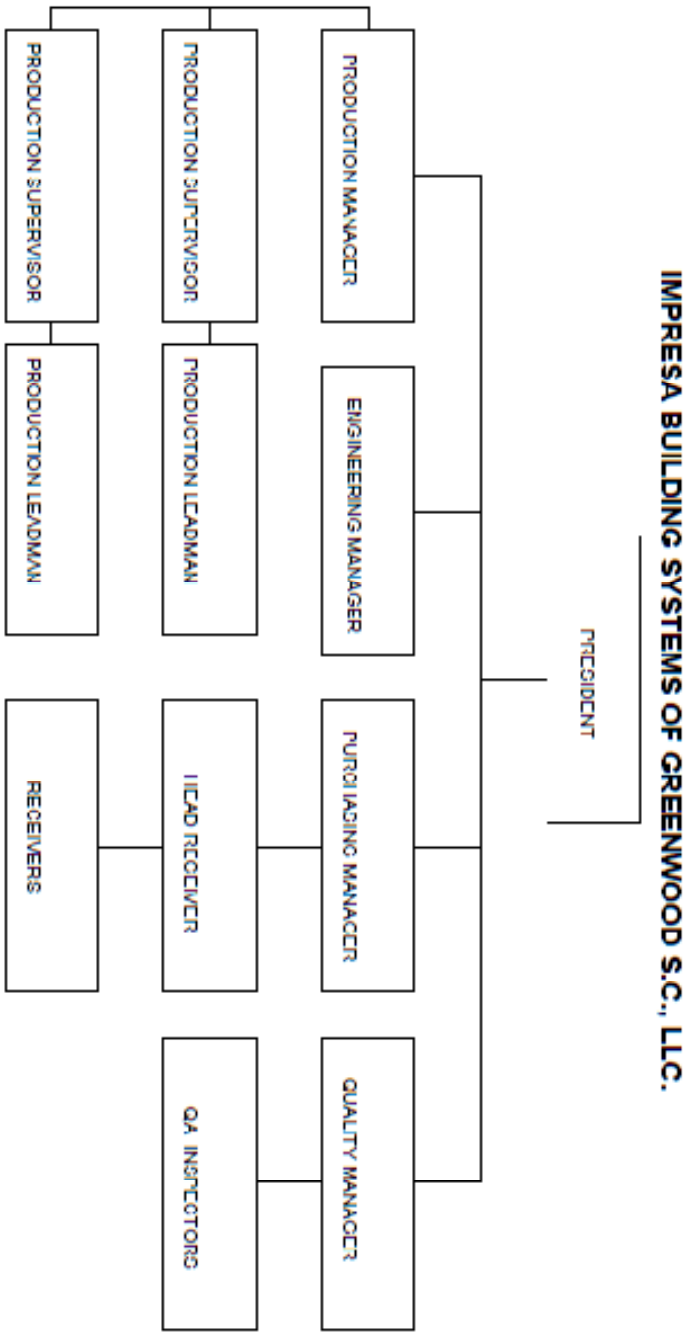
Impresa Building Systems of Greenwood S.C., LLC

PLANT LAYOUT MANUFACTURING ZONE



Impresa Building Systems of Greenwood S.C., LLC

ORGANIZATIONAL CHART



RESPONSIBLE PERSONNEL FOR THE QUALITY ASSURANCE PROCESS AT IMPRESA BUILDING SYSTEMS OF GREENWOOD, S.C., LLC

President-Dan Hobbs- 14 Years experience in running modular manufacturing facilities, Been CEO or COO at 4 successful plants.

Production Manager- - TBD

Production Superviser - TBD

Production LeadMan- - TBD

Purchasing Manager- - TBD

Purchasing Receivers - TBD

Engineering Manager - - TBD

Quality Manager- David Watkins 20 Years experience in Quality, Manufacturing and Setting of modular homes.

Quality Assurance Inspector- TBD

PRESIDENT

The President is entirely responsible for all actions taken by all members of the Impresa Building Systems of Greenwood, S.C. LLC Team. The President will have the oversight to manage the team effectively and take all actions necessary to maintain quality in the product produced by Impresa Building Systems of Greenwood, S.C. LLC.

PRODUCTION MANAGER DUTIES AND RESPONSIBILITY

The Production Manager (PM) is entirely responsible for all construction in the Impresa Building Systems of Greenwood, S.C. LLC facility.

The PM receives approved plan sets and construction details from the Engineering Manager(EM) and reviews the plans for understanding and completeness. If there is anything within the plans that needs additional explanation or interpretation the PM discusses with the EM to get clarification.

The PM oversees the actions and workmanship of the production supervisors

PRODUCTION SUPERVISORS DUTIES AND RESPONSIBILITY

The production Supervisors oversees aspects of the construction in the Impresa Building Systems of Greenwood, S.C. LLC facility.

Each supervisor receives the sections of the approved plan set and or details that pertains to the scope of work that they perform in each module. If there is anything within their plans/details that need additional explanation or interpretation they report that information back to the PM.

the Supervisors oversee the actions and workmanship of the Production Leadmen.

PRODUCTION LEADMEN DUTIES AND RESPONSIBILITY

The Production Leadmen oversee and contributes work efforts to all aspects of the a single workstation in the Impresa Building Systems of Greenwood, S.C. LLC facility. Each Leadmen receives the approved plan set and or details that pertains only to his efforts. If there is anything within their plans/details that need additional explanation or interpretation they report that information back to the Supervisor that oversees his area of the facility.

PURCHASING MANAGER

The Purchasing Manager is responsible for the acquisition of all materials used for construction and maintenance of the Impresa Building Systems of Greenwood, S.C. LLC Facility. The Purchasing Manager reports directly to the President. Through communication with other departments the Purchasing Manager understands the requirements for components, then the Purchasing Manager creates purchase orders (PO) that correctly define the component(s) to be delivered to the Impresa facility.

HEAD RECEIVER and RECEIVERS

The Head Receiver oversees all deliveries to the Impresa Building Systems of Greenwood, S.C. LLC Facility. The Head Receiver reports to the Purchasing Manager. Receivers report to the Head Receiver

The Head Receiver or Receivers receives all material and verifies against the PO that the material received is the correct material. They also inspect that material for damages. They then correctly store material.

The Receivers also move material to work stations as needed by production personnel.

ENGINEERING MANAGER

The Engineering Manager is responsible for all plans and manuals including submittal to 3rd party and states and all details for construction. The Engineering Manager reports to the President.

The Engineering Manager works with outside architects, drafting services and engineers to create a plan and elevation that meets the state or local code for which the building will be erected. Once the final plan is determined the other components are detailed. Electrical Plans, Plumbing Plans and foundation plans are completed without assistance. HVAC and Sprinkler are outsourced to professionals in their field. The plan set is compiled and forwarded to the 3rd party for their approval. From there, the construction details are created. The construction details are the framing diagrams, plumbing layouts and other intricate details to determine proper coordination of all phases of construction. These plans are then shared with the Quality Manager and the Production Manager for their review and comments.

The Engineering Manager also works closely with the Operations Manager to completely understand the processes of construction used at the Impresa Building Systems of Greenwood, S.C. LLC Facility.

QUALITY MANAGER DUTIES AND RESPONSIBILITY

The Quality Manager (QAM) is entirely responsible for accepting (or rejecting) all construction, processes and materials in the Impresa Building Systems of Greenwood, S.C. LLC facility. The Quality Manager reports directly to the Operations Manager.

The QAM receives approved plan sets and construction details from the Engineering Manager(EM) and reviews the plans for understanding and completeness. If there is anything within the plans that needs additional explanation or interpretation the QAM discusses with the EM to get clarification.

The QAM verifies through inspection that work is completed in station and with proper workmanship.

The QAM schedules all regular visits of the 3rd party for their required inspections.

The QAM keeps complete records of all units constructed. This record includes the sales order, the 3rd party approved plan set, the completed QA traveler, and a copy of the Data Plate and Labels.

QUALITY ASSURANCE INSPECTOR

The Quality Assurance (QA) Inspector inspects portions of the product as it is completed. The QA Inspector reports to the QAM.

The QA Inspector is assigned to several stations along the production line. After a unit is completed it is the responsibility of the QA Inspector to review the work performed in the station for both accuracy to the sealed plan set and that the workmanship meets the quality standard.

MATERIAL CONTROL

The purchasing of materials used in the production of complying units is the responsibility of the Purchasing Manger. The material to be purchased is the responsibility of several departments. The Engineering Department has a voice in the material decision, as the material must fit the designs. The Quality Assurance Department has a voice in the decision as

the material must comply with the codes and standards as well as Manufacturers Installation Instructions. The Receiving Department must have a voice in the decision, as it must inspect the incoming material and the Production Department must have a voice in the decision, as the material must be installed by them. All departments have but one objective, to produce a complying quality product at a competitive price on a timely basis.

RECEIVING INSPECTIONS PROCEDURE FOR BASIC MATERIALS

All material that comes into the manufacturing facility clears through a Receiving Department. All material shall be compared to a purchase order or bill of lading and is counted and inspected for damage and anticipated quality. All non-conforming material shall be returned or set aside for further review. Prior to use the leadman or Supervisor will verify the materials meet the specifications. All non-conforming material will be removed from the production area and set in a designated location. All departments work together to see that this procedure is followed and that material received conforms both in quantity and quality to that specified on the purchase order and in accordance with required State Codes. Prior to use the accountable individual, in the manufacturing plant line, shall verify the materials meet the specifications. All non-conforming materials shall be removed from the production area and set in a designated location.

MATERIAL STORAGE AND STOCK ROTATION PROCEDURE

After receiving material is stored in areas established for each type depending on possible damage from wind, sun, and rain. Material may be wrapped in plastic, stored inside, or stored outside depending upon its type. All materials will be stored and rotated per the vendor/manufacturer's instructions.

Stock is rotated by material handlers who store materials and deliver to production line. The quality assurance inspectors shall check daily, the proper materials are received and the adequate rotation of stock.

DISPOSAL OF REJECTED ITEMS

All material that is damaged, or of inferior quality, or not conforming to the appropriate codes will be tagged, removed from the product line and disposed of.

PROVISION FOR DISPOSAL OF REJECTED MATERIAL

All material that is damaged, or of inferior quality, or not conforming to the appropriate codes will be tagged, moved to a holding area and one of the following courses of action will be taken:

1. Repaired and returned to stock: If the quality assurance department feels that the damaged material may be adequately repaired to be in compliance with all codes and standards, the material will be repaired and returned to stock for use in the production process.
2. Salvage for repair parts: If the Quality Assurance Department feels that the material cannot be repaired adequately to meet the requirements, the material will be stripped of usable parts for use in the repair of future damaged materials and for use in the Service Department.
3. Return to supplier: If the Quality Assurance Department feels that material should be returned to the supplier for repair or replacement, the Purchasing Department is notified, and the supplier is contacted.
4. Scrap: If the Quality Assurance Department feels that the damaged material is unable to be disposed of by any of the three methods described above, the material may be scrapped.

DOCUMENT CONTROL

Document review and approval is imperative to the success of quality. Approval documents shall follow the following steps to ensure document compliance. Model Plans are created by the accountable individual in the Engineering Department. The accountable individual in the Sales department, Production Manager and Engineering Manager shall

compare the model plan to the sales order to ensure accuracy. After the model plans are deemed to match the sales specifications the Engineering Manager, or their designee, shall submit the plans to the Third Party or State Agency for code compliance review and approval of documents. Any non-conformances that result in a change in plans shall be discussed with the Sales Department. After approval of documents, production documents are permitted to be created to supplement the approval documents. All production documents shall be reviewed and compared to the approval documents by the Production Manager and Engineering Manager prior to release of documents to the production team.

INSPECTION TO APPROVED BUILDING SYSTEMS

The Quality Manager or Inspector shall verify, through inspection, that units or components in production are being constructed in accordance with the approved plans and the approved building system. The document shall bear the 3rd party Approval Stamp and in some instances with also carry a State Approval Stamp. All deviations in engineering drawings, specifications and other product requirements from the approved system shall be reported on the appropriate forms and the appropriate corrective action to bring into compliance undertaken.

NOTE: **When shop drawings used in the process of manufacturer are other than the approved drawings the Quality Manager shall compare the shop drawings to the approved drawings to verify that no changes have been made to the approved design and if it is determined that the approved design has not been altered the Quality Manager is to sign the shop drawings as complying with the approved design and these drawings are to be filed with unit compliance report records.**

INSPECTION PROCEDURE

The units at Impresa Building Systems of Greenwood, S.C. LLC are built in place. This means that when a module is built is rests in that location until completion of the unit when it then exits the building and is transported to the building site. The construction of the modules is completed in Stages At the end of each stage and before the commencement of the next stage two inspections of the aspects of that stage are completed. The first inspection is completed by a member of the production staff. This can either by the Leadman or a Superviser of that stage. The production staffs notes the traveler to any findings and signs off. Once their inspection is completed, a member of the Quality team, either an Inspector or the Quality Manager reads the traveler and then inspects the same elements of the completed stage and when that inspection is complete remarks the traveler.

In the event that there is something that cannot be completed the production personnel must make a notation on the traveler pertaining to the incomplete work. If the incomplete task is an engineering issue the Engineering Manager is made aware of the issue and will work towards a resolve of the issue. Once the resolve is achieved new details will be provided that the task may be completed. If the incomplete task is a result of a missing component, then the Purchasing Manager is made aware and will work towards getting the component.

When construction must move ahead and the module has an outstanding remark from Production Personnel then the Quality Manager or QA Inspector is to have a red tag placed upon it and the traveler noted as to the red tag and what the issue is that must be resolved before the red tag is removed. This red tag is to remind all that something is noted regarding this unit and it is considered for the time it carries a red tag as being a rejected unit. This unit is incomplete and not worthy of being labeled or shipped until the work is complete, inspected by both production and quality assurance and the red tag removed. Only Quality Assurance is allowed to remove the red tag.

There are certain tests (see test section pages26-29) that are performed in the process of production. These tests are performed by production personnel and witnessed by the Quality Manager or QA Inspector. When the test passes the production personnel remarks the traveler in the designated are of the traveler that the test was completed. If the test fails then the production person determines the cause of the failure, makes a notation on the traveler of the cause, makes the repair and retests the unit. Once the module clears the test then the production personnel and quality remark/sign the traveler clearing the module.

FINAL INSPECTION PROCEDURE

The final inspection shall verify that the home is complete. A final review of the traveler shows that all areas of construction are complete and any notations have been cleared. If any discrepancies to the codes and standards or to the

Impresa Building Systems of Greenwood, S.C. LLC. Quality Standards are found during this inspection, they are to be identified. The parties responsible for repairing the nonconformance are notified. After the nonconforming items are repaired, another inspection is required to verify compliance.

Once a home is complete and in compliance, the home is now ready to be labeled. After the serial number is verified that this is the home to be labeled, the Data Plate is completed and checked for accuracy. Then the data plate and labels are applied to the home by the QA Inspector or the Quality Manager. In the absence of the QA Inspector and Quality Manager only the Engineering Manager has the authority to apply a data plate and label.

ORGANIZATIONAL RESPONSIBILITIES AND AUTHORITY

All employees of the company are expected to build the modules to the proper specification and compliance. Each employee is expected to point out improper construction. Only the Quality Manager, Quality Inspectors and the President have the ultimate authority to reject defective work and carry out compliance assurance functions, notwithstanding any conflict with production department goals and needs.

CONTROL OF PRODUCTION CHANGES OR INSPECTION PROCEDURES

Any deviation from the approved production system shall be reviewed and approved by the Production Manager and Engineering Manager to insure continued compliance with the approved building system. Any change in the approved drawings or system must be approved by the Third Party and/or State agency.

Any deviation from the approved inspection procedures shall be reviewed by the Quality Assurance Manager to insure continued compliance with the approved Quality Assurance Manual. Any change in the manual must be approved by the Third Party and/or State agency.

DATA PLATE AND LABELS

Each pre-manufactured module or building component or group of components, which is certified pursuant to the act and these rules, shall have permanently attached thereto an approved date plate and label which cannot be removed without destroying the data plate and/or label. The approved data plate and label or labels shall be placed in the following areas:

Models, residential modular units
Data Plate: within the panel box.
Labels: 1 per module, one located in the panel box and the other module labels to be located within a closet readily accessible by the building officials, or as shown on the approved building system.

The approved label shall be issued by the commission or its agents in accordance with the following:

The commission and the bureau shall specify the manner in which the labels are handled
Labels shall be numbered serially
A manufacturers compliance assurance program, submitted in accordance with the applicable Rules and Regulations, shall include requirements for issuance, possession, attachment and accounting of all labels to assure that labels are attached only to units or building components manufactured pursuant to an approved building system and inspected pursuant to an approved compliance assurance program

The Commission or ICC NTA LLC shall assign labels to units or building components manufactured in accordance with the approved compliance program. The manufacturer shall not have possession of unassigned labels.

INTERNAL AUDIT PROCEDURE

On a periodic basis, depending on production schedule and duties, The Quality Manager shall review the applicable Travelers and quality documents for accuracy and repeat violations. If the same non-compliances continue, the Quality

Manager shall fill out a source and remedial action form and perform the necessary steps listed in the Procedure to assure product quality.

PROGRAM EFFECTIVENESS

The Engineering Manager, Operations Manager and PRESIDENT regularly check the operation of the Quality Assurance Program, both the paperwork involved and the actual product quality in each section. It is the responsibility of the Production Manager to take all necessary action to insure that a high degree of quality is maintained throughout the entire assembly process, thus insuring a finished product of high standards.

All Quality Assurance Personnel are those which management feels are able to judge, decipher and criticize our products with the proper knowledge of building codes and experience with modular construction.

All Quality Assurance Personnel will have had enough experience and/or education to enable them to judge correct construction.

RECORD KEEPING PROCEDURES FOR QUALITY ASSURANCE FORMS

A complete set of records for each building shall be kept for not less than 5 years. This shall include the 3rd party approved plan set and accompanying details, the completed travelers for all modules, a copy of the data plate, and the transportation documents.

SERIAL NUMBERING SYSTEM

Each living unit will be given a unique identifying 5 digit number. Each module within the building will be given a letter starting with "A" and continuing upward through the alphabet until the last module.

Serial Number example: An 4 module project
1000-A through 1000-D
1000 being the building serial number
A - D being the individual module identifiers

LABEL CONTROL

Label are purchased from the 3rd party or State Authority having jurisdiction and arrive at the Impresa Facility location by the 3rd party inspector or common carrier. The 3rd party Inspector or the Impresa Quality Manager or Engineering Manager places the labels into a locked box located in the Quality Managers office.
During the in plant 3rd party inspections the 3rd party inspector will have access to the labels and assign labels to those modules which have been inspected and accepted per the guidelines mandated by the 3rd party and other jurisdictions.
The assigned labels will be grouped together and remarked as to what module(s) they have been assigned and returned to the locked box until the final inspection has been performed on each of the modules for which the labels have been assigned.
Once the modules are completed a data plate will be created for the unit and the labels and data is applied to the unit.
Only the Quality Manager and the Engineering Manager will have access to the lock box for which labels are stored.

Impresa Building Solutions of Greenwood S.C.				North Carolina Modular Data Plate		
161 Rock Church Rd. SE				Compliance Assurance Agency - ICCNTA, LLC.		
Greenwood S.C. 29649						
Modular Model				Modular Serial #		
State Label No.(s)				Date Manufactured		
Plan Approval Date				NTA, Inc. Label No.(s)		
Date Labelled						

ELECTRICAL	Concealed Wiring Consists of Nonmetallic Sheathed Cable or Service Entrance Cable					
Service panel:	200	amp., 120/240 V., single phase, 3 wire, 60 hertz.				

Fac. Installed Appliances	Man.	Model		Man.	Model	
Washer/Dryer Stack			Disposal			
			Refrigerator			
Range			Smoke Detector			
Water Heater			Microwave			
Dishwasher						

DESIGN CONDITIONS			Distance to Lot Line	10+	ft.
Building Area		SQ. FT.	Wind Load		Vult MPH
Roof Live Load	20	PSF	Seismic Zone		
Roof Snow Load	20	PSF	Building Height		STORY
Roof Dead Load	10	PSF	Floor Live Load	40	PSF
Use Group	1 and 2 family		Floor Dead Load	10	PSF
Construction Type	5B		Exterior Wall Fire Rating:	N/A	Hour(s)

CODE COMPLIANCE - This unit is constructed in accordance with the following North Carolina State codes.

__X__1. North Carolina State Residential Code,2018 Edition

__X__2. North Carolina Electrical Code 2017 Edition

__X__3. North Carolina State Energy Conservation Code, 2018 Edition

SEE COVER SHEET OF PLANS FOR ITEMS SUBJECT TO LOCAL INSPECTION

THIS UNIT IS NOT DESIGNED FOR COASTAL HIGH HAZARD OR FLOOD HAZARD

Impresa Building Solutions of Greenwood S.C.				North Carolina Modular Data Plate		
161 Rock Church Rd. SE				Compliance Assurance Agency - ICCNTA, LLC.		
Greenwood S.C. 29649						
Modular Model				Modular Serial #		
State Label No.(s)				Date Manufactured		
Plan Approval Date				NTA, Inc. Label No.(s)		
Date Labelled						

ELECTRICAL	Concealed Wiring Consists of Nonmetallic Sheathed Cable or Service Entrance Cable					
Service panel:	200	amp., 120/240 V., single phase, 3 wire, 60 hertz.				

Fac. Installed Appliances	Man.	Model		Man.	Model	
Washer/Dryer Stack			Disposal			
			Refrigerator			
Range			Smoke Detector			
Water Heater			Microwave			
Dishwasher						

DESIGN CONDITIONS				Distance to Lot Line	10+	ft.
Building Area		SQ. FT.		Wind Load		Vult MPH
Roof Live Load	20	PSF		Seismic Zone		
Roof Snow Load	20	PSF		Building Height		STORY
Roof Dead Load	10	PSF		Floor Live Load	40	PSF
Use Group	1 and 2 family			Floor Dead Load	10	PSF
Construction Type	5B			Exterior Wall Fire Rating:	N/A	Hour(s)

CODE COMPLIANCE - This unit is constructed in accordance with the following North Carolina State codes.

__X__ 1. North Carolina State Residential Code,2018 Edition

__X__ 2. North Carolina Electrical Code 2017 Edition

__X__ 3. North Carolina State Energy Conservation Code, 2018 Edition

SEE COVER SHEET OF PLANS FOR ITEMS SUBJECT TO LOCAL INSPECTION

THIS UNIT IS DESIGNED FOR COASTAL HIGH HAZARD OR FLOOD HAZARD

Impresa Building Solutions of Greenwood S.C.				Georgia Modular Data Plate		
161 Rock Church Rd. SE				Compliance Assurance Agency - ICCNTA, LLC.		
Greenwood S.C. 29649						
Modular Model				Modular Serial #		
State Label No.(s)				Date Manufactured		
Plan Approval Date				NTA, Inc. Label No.(s)		
Date Labelled						
ELECTRICAL	Concealed Wiring Consists of Nonmetallic Sheathed Cable or Service Entrance Cable					
Service panel:	125	amp., 120/240 V., single phase, 3 wire, 60 hertz.				
Fac. Installed Appliances	Man.	Model		Man.	Model	
Washer			Disposal			
Dryer			Refrigerator			
Range			Smoke Detector			
Water Heater			Microwave			
Dishwasher						
DESIGN CONDITIONS				Distance to Lot Line	10+	ft.
Building Area		SQ. FT.		Wind Load		Vult MPH
Roof Live Load	20	PSF		Seismic Zone		
Roof Snow Load	20	PSF		Building Height		STORY
Roof Dead Load	10	PSF		Floor Live Load	40	PSF
Use Group	1 and 2 family			Floor Dead Load	10	PSF
Construction Type	5B			Exterior Wall Fire Rating:	N/A	Hour(s)
CODE COMPLIANCE - This unit is constructed in accordance with the following Georgia codes.						
__X__ 1. 2018 IRC w/ GA amendments						
__X__ 4. 2020 NEC w/ GA amendments						
__X__ 3. 2015 IECC w/ GA amendments.						
__X__ 5. 2018 IPC w/ GA amendments						
SEE COVER SHEET OF PLANS FOR ITEMS SUBJECT TO LOCAL INSPECTION						

Impresa Building Solutions of Greenwood S.C.				South Carolina Modular Data Plate		
161 Rock Church Rd. SE				Compliance Assurance Agency - ICCNTA, LLC.		
Greenwood S.C. 29649						
Modular Model				Modular Serial #		
State Label No.(s)				Date Manufactured		
Plan Approval Date				NTA, Inc. Label No.(s)		
Date Labelled						
ELECTRICAL	Concealed Wiring Consists of Nonmetallic Sheathed Cable or Service Entrance Cable					
Service panel:	200	amp., 120/240 V., single phase, 3 wire, 60 hertz.				
Fac. Installed Appliances	Man.	Model		Man.	Model	
Washer			Disposal			
Dryer			Refrigerator			
Range			Smoke Detector			
Water Heater			Microwave			
Dishwasher						
DESIGN CONDITIONS				Distance to Lot Line	10+	ft.
Building Area		SQ. FT.		Wind Load		Vult MPH
Roof Live Load	20	PSF		Seismic Zone		
Roof Snow Load	20	PSF		Building Height	1	STORY
Roof Dead Load	10	PSF		Floor Live Load	40	PSF
Use Group	1 and 2 family			Floor Dead Load	10	PSF
Construction Type	5B			Exterior Wall Fire Rating:	N/A	Hour(s)
CODE COMPLIANCE - This unit is constructed in accordance with the following South Carolina codes.						
__X__1. 2018 IRC with SC amendments						
__X__2. 2009 IECC . (Energy Conservation)						
SEE COVER SHEET OF PLANS FOR ITEMS SUBJECT TO LOCAL INSPECTION						

Impresa Building Systems of Greenwood, S.C. LLC

STAGE PRODUCTION DESCRIPTION

STAGE 1	STAGE 6
FLOOR FRAMING	**WALL CLOSE UP**
Floor Framing	Install structural sheathing
Install Insulation	Backpanel Drywall
Install Floor Decking	
STAGE 2	STAGE 7
ROUGH PLUMBING/ELECTRIC FLOOR	**WINDOWS/EXTERIOR DOORS**
Install water supply lines	Install Building paper
P-Trap/Plumbing Line Holes Cut	Install flashing materials at openings
Install DWV lines	Install windows per MII
Under Floor Ducting Installed	Install Doors per MII
Under floor Wiring	
STAGE 3	STAGE 8
WALL CONSTRUCTION/SET	**MAJOR FINISH**
Set Fiberglas Tubs / Shower base	Install Siding
Tub Protective Covers Installed	Install Cabinets
Preliminary Plumbing Test (Optional)	Install Counters
End Walls Set	Install Trim
Partition Walls Set	Install Appliances
Plumb Washer	Final Electrical Test
Complete Flooring	Final Plumbing Test
Set Long Walls	Final Cleaning
	Load Ship Loose
STAGE 4	STAGE 9
ROOF BUILD/ SET	**FINAL INSPECTIONS/LABELS**
Layout Drywall/Trusses	Quality inspections and labeling for shipping
Connect all components	Unit closed and moved to staging area
Secure Sheathing to Top Chords	
Secure Roof to Walls	
STAGE 5	
PLUMBING/ELECTRICAL	
Complete rough plumbing	
Completed rough electrical	
Test rough electrical and plumbing	
Draftstop penetrations	

Impresa Building Systems (Build In Place QA)

Serial Number _____ Module Number _____

	Process			Team Lead Initial to confirm correct	QA initial to confirm correct
Stage 1	Floor System	Lumber Species Correct		_____	_____
		Floor Rails confirmed correct length		_____	_____
		Floor Width confirmed correct		_____	_____
		Floor Diagonal Audit			
		A Diagonal Dim	_____	_____	_____
		B Diagonal Dim	_____	_____	_____
		Open Truss located per Plans and in all areas			
		Plumbing to be installed		_____	_____
		All MEP Marriage Wall Crossover accesses per plans and confirmed		_____	_____
		Framings per Plan		_____	_____
		Fastening Schedule Correct		_____	_____
		Glue beads Correct and Open time adhered		_____	_____
		Floor Decking T and G Tight		_____	_____
		Deck Fastening Correct per Schedule		_____	_____
		All Deck High Screws and or Nails Flush		_____	_____
	Notes:				
Stage 2	Under Floor MEP	All Plumbing Drops Located correctly		_____	_____
		DWV Schematic adhered and per code		_____	_____
		Water Supply Line Junction located correctly		_____	_____
		All DWV Drops located per plans for site connection		_____	_____
		All Water Lines tested at 40 LBS. PSI for 60 minutes		_____	_____
		All DWV stacks tested with 10 ft vertical stack for 60 minutes		_____	_____
	Notes:				

Impresa Building Systems (Build In Place QA)

Serial Number _____ Module Number _____

	Process			Team Lead Initial to confirm correct	QA initial to confirm correct
Stage 3	Wall System	Lumber Species Correct		_____	_____
		Plates confirmed correct length		_____	_____
		Stud Length Correct		_____	_____
		Framing R-O's Correct		_____	_____
		Fastening Schedule Correct		_____	_____
		End Wall A Diagonal Audit	_____	_____	_____
		End Wall B Diagonal Audit	_____	_____	_____
		Long Walls A Diagonal Audit	_____	_____	_____
		Long Walls B Diagonal Audit	_____	_____	_____
		Tub/Shower Set		_____	_____
	Notes				
Stage 4	Roof System	Lumber Species Correct		_____	_____
		Roof Rails confirmed correct length		_____	_____
		Truss / Rafter System are per plans and specs		_____	_____
		Roof Width confirmed correct		_____	_____
		Rafter Diagonal Audit		_____	_____
		A Diagonal Dim	_____	_____	_____
		B Diagonal Dim	_____	_____	_____
		Framings per Plan		_____	_____
		Fastening Schedule Correct		_____	_____
		Roof Sheathing Spaced per Manufactures installation instructions		_____	_____
		Sheathing Fasteners per Fastening Schedule		_____	_____
	Notes				

Impresa Building Systems (Build In Place QA)

Serial Number _____ Module Number _____

	Process			Team Lead Initial to confirm correct	QA Initial to confirm correct
Stage 5	Plumbing	DWV Correct-tested with 10 FT water head in Rough End		_____	_____
		All Supplies and DWV per Code and Plans		_____	_____
		Final Testing			
			Supply System Hydrostatic test w/ 80 LBS for 60 Minutes	_____	_____
			All DWV with Toilet Bowls and Sinks filled and tested for 60 Minutes	_____	_____
	Electrical	All R-End Boxes per Cubic Inch Capacity		_____	_____
		All Circuit's per plan and code		_____	_____
		D-Electric Test complete in Rough End		_____	_____
		All Wiring Junctions labeled		_____	_____
		Panel Box per plan, code and labeled legibly		_____	_____
		Final System Tested and Operating Correct		_____	_____
	Notes				
Stage 6	Exterior Wall Sheathing		End Wall A Diagonal Dim	_____	_____
			End Wall B Diagonal Dim	_____	_____
			Marriage Wall A Diagonal Dim	_____	_____
			Marriage Wall B Diagonal Dim	_____	_____
		Sheathing located correctly per Dim off Floor Rail and Ceiling Rail		_____	_____
		Sheathings Spaced per Manufacturer's Installation Instructions		_____	_____
		Glue beads Correct and Open time adhered		_____	_____
		Fastening Schedule Correct		_____	_____
		Housewrap installed per Manufacturer's Installation requirements and Impresa Building System SOP		_____	_____
	Notes				

Impresa Building Systems (Build In Place QA)

Serial Number _____ Module Number _____

	Process		Team Lead Initial to confirm correct	QA initial to confirm correct
Stage 7	Window Installation	Window Grid pattern per plans and specs	_____	_____
		All Housewrap prepared for window installation	_____	_____
		Rough Openings calked per Manufacturer's installation requirements	_____	_____
		Windows installed per Manufacturer's installation requirements and IBS SOP	_____	_____
		Flashing Tape installed per Manufacturer's installation requirements and IBS SOP	_____	_____
	Exterior Doors	All openings prepared per Exterior Door Pan installation	_____	_____
		Exterior Door Pans installed per Manufacturer's installation requirements	_____	_____
		Door Units installed per Manufacturer's installation requirements	_____	_____
		All Required Long Hinge Butt Screws installed	_____	_____
	Notes			

Impresa Building Systems (Build In Place QA)

Serial Number _____ Module Number _____

	Process		Team Lead Initial to confirm correct	QA initial to confirm correct
Stage 8	Siding	Siding type and location verified per Plans and Specs	_____	_____
		Starting points verified off floor rim and corners	_____	_____
		Correct Exposure / Lap verified	_____	_____
	Cabinets	Correct Fastener Type, Size, Quantity-Spacing and location confirmed per Plans and Specs	_____	_____
		Per Plans and Specs	_____	_____
		Fasteners install per Manufacturer's installation requirements	_____	_____
		All Doors and Drawers adjusted for correct use	_____	_____
		All Hardware installed	_____	_____
		All Countertops per plans and specs	_____	_____
	Trim	All Interior Doors installed per Manufacturer's installation requirements	_____	_____
		All Doors shimmed and blocked per SOP	_____	_____
		All other casings and trim installed per Fastening schedules and IBS SOP	_____	_____
		Electrical Testing	_____	_____
		Final Plumbing Test	_____	_____
	Final Finish	All Interior Finish work complete cleaned and meets or exceeds IBS Quality requirements	_____	_____
		All Appliance installations complete	_____	_____
Stage 9	Final Inspection	All work has been completed and released to ship by Quality Control	_____	_____
		Data Plate Written and Applied	_____	_____
		Labels Applied	_____	_____

Appliance Serial Numbers

Job Name: _____Serial#_____

Factory Serial # _____

	Brand Name	Serial Number
Refrigerator	_____	# _____
Range	_____	# _____
Wall Oven	_____	# _____
Downdraft	_____	# _____
Cooktop	_____	# _____
Microwave	_____	# _____
Range Hood	_____	# _____
Dishwasher	_____	# _____
Garbage Disposal	_____	# _____
Water Heater	_____	# _____
Washer	_____	# _____
Dryer	_____	# _____
Fireplace	_____	# _____
Furnace	_____	# _____
A/C Unit	_____	# _____
Spa Tub Motor	_____	# _____

***SERIAL No.*_____** CORRECTED

COMMENTS:	

Q. A. FINAL INSPECTION_____ INSPECTION DATE_____

Impresa Building Systems of Greenwood, S.C. LLC

SOURCE AND REMEDIAL ACTION FORM

SERIAL No._____
MODEL No._____

NONCONFORMANCE:		
ROOT CAUSE (SOURCE OF THE PROBLEM):		
INDICATHE METHOD OF ISOLATION USED TO DETERMINE NO OTHER UNITS ARE AFFECTED:		
ACCOUNTABILITY REPORT		
I HAVE REVIEWED THE SOURCE AND REMEDIAL ACTION AND WILL ENSURE COMPLIANCE.		
	SIGNATURE	DATE
ACCOUNTABLE PERSON:		
SUPERVISOR:		
Q.C.:		
PRODUCTION MANAGER:		
GENERAL MANAGER:		

TESTING AND INSPECTION EQUIPMENT

Test Equipment Provided by Manufacturers

Impresa Building Systems of Greenwood, S.C. LLC provides, maintains and uses Dielectric Strength Testing equipment, DWV and Water Supply Testing equipment, which are of, approved designs and specifications. The Dielectric equipment is calibrated every year to maintain accuracy with a calibrated backup on hand in case of failure or in emergency. (2) Gauges, checked once a month, are used for all water pressure tests.

Dielectric Withstand Test of Electrical System

One dielectric strength testing machine, the output of which can be varied and suitable voltmeter to measure output voltage for either AC or DC

Continuity Test of Grounding System

An Ohm meter or buzzer signaling system with suitable length test leads with probes.

Optional Test of Electrical System

No special equipment required.

Leakage Test of Gas Piping and Gas Appliances

1. Compressed air supply with necessary controls to limit the delivery pressure to the valves specified under "Tests to be conducted by manufacturers."
2. Pressure gauge or mercury manometer calibrated in 1/10th pounds per square inch.
3. Shutoff valve and interconnecting piping and fittings.

Leakage Test of Water Piping

Equipment same as specified above for "leakage test of gas piping and gas appliances" except source of water at 50 PSI may be substituted for the compressed air. The pressure gauge must be one that is capable of being read directly to 1.0 PSI, if the test is run to less than 50 PSI.

Leakage Test of Drainage System

No special equipment required, except for stoppers for all drains. When test is conducted during freezing weather or the unit is likely to be stored in or transported to an area where freezing temperatures are likely to be encountered, care shall be taken to free all traps, fixtures and piping or water after completion of test or anti-freeze used.

TESTS CONDUCTED BY MANUFACTURER

DIELECTRIC TEST

Purpose

Each unit's Electrical System shall be subjected to a one (1) second 1080 volt test A.C. or minimum 1527 volts D.C. The test shall be performed after all branch circuits are complete and after all fixtures are installed.
NOTE: Listed fixtures or appliance shall not be required to withstand the dielectric strength test.

Procedure

A. Clear unit of all personnel.
B. All breakers of fuses in the main panel must be on, and all interior switches of the unit must be in the "on" position.
C. Disconnect furnace blower and all major appliances. Fluorescent lights and smoke detector will also be disconnected.
D. Connect power source to step-up transformer to desired voltage. (1080 volts or 1527 volts)
F. Switch transformer to "on".
G. Test transformer for operation by checking indicator light and touching electrodes for spark.
H. With electrodes of transformer, make the contact in panel box.

1. Ground (bare copper) to black (HOT)
2. Ground (bare copper) to red (HOT)
3. Ground (bare copper) to white (NEUTRAL)
4. Neutral (white) to black (HOT)
5. Neutral (white) to red (HOT)
6. Black (HOT) to red (HOT) 220 volt only

I. Indicator light on transformer will blink and arcing at electrodes may occur if a short circuit is found.
J. Disconnect high voltage transformer.
K. After a short circuit is repaired, steps 1 through 6 above must be repeated.

NOTE: When dielectric tester does not have a built-in voltmeter, a separate voltmeter must be wired across the test electrodes. Dielectric tester must be calibrated at least once a year and a copy of the records showing the date of calibration will be kept on file.

ADDENDUM TO DIELECTRIC STRENGTH TEST:

A. 3-WAY SWITCHES
Any circuit which has 3-way switches must have the following additional test conducted. After completing the dielectric strength test as previously described on all circuits, those circuits containing 3-way switches must have 2 additional tests performed as follows:

1. Flip one 3-way switch in each set to the opposite pole and rerun the dielectric strength test on the circuit(s) between the hot of the circuit(s) and the ground buss at the panel board.

2. Flip the other 3-way switch in each set in the circuit(s) and rerun the dielectric strength test on the circuit(s) between the hot of the circuit(s) and the ground buss at the panel board.

GROUND FAULT RECEPTACLES

If a circuit has a ground fault receptacle in which the GFI receptacle provides GFI protection for additional receptacles (on the supply side), the GFI receptacle shall be totally removed from the circuit and the neutral, hot, and grounding conductors tied together respectively so the circuit may be properly dielectric strength tested. An example of this would be a GFI receptacle installed over the bathroom lavatory, which also provides the GFI protection for the outside receptacles.
If however, the GFI receptacle were at the end of the line, it would not have to be removed, only tripped prior to testing.

CONTINUITY TEST

A. TEST EQUIPMENT

1. Ohm meter
2. Buzzer signaling system with test leads and probes.
3. Flashlight with continuity tester.

B. PROCEDURE

1. Check bond between all metallic parts to assure all parts are properly bonded.

NOTE: On painted items the paint must be penetrated.

OPERATIONAL TO POLARITY PROCEDURE

1. Using a polarity tester.
2. Plug probe pig-tail into 100 receptacle to check polarity between hot and neutral. Light on probe will come on if polarity is correct.
3. Flip switch on probe to check polarity between hot and ground. Light on probe will come on if polarity is correct.
4. Insert probe in light fixture. Check polarity between hot and neutral. Meter moves to the right if polarity is correct.
5. Flip switch on probe to check polarity between hot and ground. Meter moves to right if polarity is correct.
6. Repair any improperly wired receptacles or light fixtures.
7. Retest any receptacles or light fixture after it has been rewired.
8. Remove 12-volt power source.
9. Connect 110-volt power source.
10. Test all 110-volt appliances.
11. Remove 110-volt power source.
12. Replace and retest any inoperable appliances.

Test for polarity on outlets other than lamp holders and receptacles such as the solid wire connections at the furnace, water heater, fluorescent lights and exhaust fans which do not have combination lamp holders, cross over leads for multiple width units, wires terminating at a junction box such as for an on-site installation of an air conditioner, heat pump, or water pump, transformer connections, etc.

After all receptacles and lamp holders have been checked for polarity and found to be okay, check all other outlets (examples shown above) by using the continuity tester described elsewhere in this manual.

Remove all access covers and junction box covers. Visually check to see that the white lead wire is connected to the white fixture or appliance wire or terminal. In the same manner visually inspect for the proper color coding of the unidentified conductors (black, red, blue, etc.) Using the continuity tester, connect one lead to the neutral connection and the other lead to a known neutral such as from a tested receptacle. The tester should show circuit continuity. If not, repair the circuit and retest until the tester shows the circuit is properly wired. If the outlet is at an exhaust fan, fluorescent light, gas furnace or other 115-volt appliance or piece of equipment, the black wire would not have to be tested as the operational test would indicate the black wire is properly connected. However, if the black wire is simply terminated as for multiple width unit crossover connection or at a junction box for field installed equipment, fixtures, etc. the unidentified conductor of the 115-volt circuits can be checked by using the neon glow-lamp tester shown above, by connecting one lead of the tester to the neutral wire and the other lead to the black wire. The neon lamp will glow if the circuit is properly wired. If not, rewire the circuit and retest until the tester indicates the circuit is properly wired. The continuity of the ground wire is to be checked using the continuity tester by connecting one lead of the tester to a known ground (such as the ground slot of a previously tested receptacle, or metal exterior, or metal frames, etc.) and touching the other lead to the metal enclosure (Junction Box) or directly to the ground wire if it terminates in other than a metal enclosure (such as a plastic junction box or termination in air such as the cross-over wire.)

The polarity of the "hot" conductors of the 240 volt circuit are to be checked using the neon glow-lamp tester by connecting one lead to a known neutral and the other lead to the hot wire to be checked. If the light glows, the circuit is okay. If not, the circuit must be repaired and retested until the tester shows the circuit is okay.

Both hot wires of a 240V circuit are to be checked in the same manner.

SMOKE DETECTORS

Smoke Detectors shall be tested in accordance with manufacturer's instructions.

GAS PIPING AND APPLIANCE TEST

The gas piping system and appliance connections of each unit shall be tested for leaks. The test shall consist of two parts as follows:

STEP 1 (High Pressure Test)

A. Before appliances are connected; or if appliances have been connected to the gas line, they must be disconnected; of if a gas valve is installed in the line, it must be turned to the "off" position.
B. Connect air supply to gas piping system
C. Pressurize the system to 10 PSI and then isolate or disconnect the air supply.
D. This pressure is held on the system for 15 minutes without any loss.
E. If a leak is indicated, check the system by applying a water and soap solution at joints.
F. All defective pipe, fittings, etc. will be replaced.
G. After a leak is repaired, steps B through D are repeated.

STEP 2 (High Pressure Test)

A. All gas appliances shall be connected to their branch lines and all shut-off valves are in the open position.

B. Air pressure is applied continuously to the system at no more that 14" water column (1/2 PSI) or no less that 10" water column.
C. All connections from the appliance outlet (shut-off valves) to the appliances are checked with soapy solution.
D. Leaks, if any, shall be repaired and retested as described above.

NOTE: Gas appliances shall not be subjected to pressure greater than 1/2 PSI.

LEAKAGE TEST OF WATER SYSTEM

All water piping in distribution system shall be subjected to water pressure of 80 PSI for not less than 30 minutes without leakage or loss of pressure, applicable to plastic pipe if permitted by individual states.

Test Procedure

A. Close all faucets and secure ball float in stool tank in the raised position.
B. Attach water line to water inlet.
C. Apply 80 PSI for not less than 30 minutes.
D. A drop in pressure indicates a leak. After the leak is located, the piping, fitting, etc., shall be replaced or repaired.
E. After leak is repaired, repeat steps A through C.

METHOD OF TESTING DWV SYSTEM

A. Rough Plumbing -DWV systems shall be tested upon completion of the rough piping installation by water or air with no evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough piping has been installed, as follows:

1. Water Test - Each section shall be filled with water to a point no less than 10 feet above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for at least 15 minutes before inspection. The system shall prove leak free by visual inspection.

B. Finished Plumbing - After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved water-tight as follows:

Watertightness - Each fixture shall be filled and then drained. Traps and fixture connections shall be proven watertight by visual inspection.

WORKMANSHIP

Workmanship is perhaps the single most important factor in construction of anything, including factory built modular structures. The quality of workmanship usually determines whether a customer will be completely satisfied with their new home and whether or not they will recommend a factory manufactured structure as opposed to conventional construction. Workmanship also affects how the employees feel about their job and the finished product.

In order to have good, quality workmanship in a home, there are four steps to implementing a program that will judge what is good workmanship is, and what it is not. The first step is establishing standards of workmanship. Second is implementing the standards. The third step is monitoring and maintaining the goals, and the fourth and final step is reassessing the standard of workmanship to see what may need changed.

The first step is to establish standards of workmanship. These standards need to come from a variety of places, some of which are applicable codes and standards, aesthetic concerns, and feasibility. First and foremost, the product needs to meet all codes and standards to which the finished home must comply with. If the product does not meet all codes and standards, then a high standard of workmanship cannot be obtained.

Another concern is the aesthetic beauty of the home. This is the part that the final homeowner is going to see. If the home is aesthetically pleasing to the end user, they will be happier with the home, which will lead to fewer problems in the future. The problem with aesthetics is that every person has a different opinion on what they like. To combat this, many people will be involved in the process of setting the standards of workmanship, from the line worker all the way up to the president of the company.

The second step to the process of workmanship is implementing the standards. To do this, each and every worker is trained in the codes and standards, and asked one simple question: "Would you want your home like this?" As there are differing levels of skill and experience among the people constructing these homes, those who have more experience will pass their knowledge on to the newer, less experienced people. This way, every person involved in the construction of the homes will receive the guidance of those who have already been trained in the standards.

The third step is closely related to both the second and fourth step. It is monitoring the goals of the standards of workmanship. This is where the finished product (whether it is finally finished, or a portion of it is finished) is critiqued to see whether or not it has met the standards of workmanship set out in the first step of this program. It starts first with the person performing the work. He or she needs to look at what they have completed and be able to say that it has been done correctly and meets all the standards set forth. Next, the group leader, foreman, and quality assurance will look at what has been completed to see whether or not they feel it meets all standards. Salespeople and engineering will also look at the home to see whether it meets the standards of workmanship. The final person to judge whether it meets all the standards of workmanship is the final end owner of the home. Even if he or she does not know what the codes or standards of workmanship might be, he or she will be able to look at their home and see that it has quality built into it, not just a patina of "good looks" placed on top of less than quality work.

The fourth and final step is to reassess the standard of workmanship. Looking at a variety of sources does this. New employees, dealer and homeowner comments, and the construction process may all show items that need consideration. Perhaps it is something so simple that everyone previously overlooked it. The

old standards of workmanship are then reassessed and the new ideas are incorporated into the standard. This new standard is then entered into the process, and it then continues to repeat itself.

While everyone would like to have a perfect program with perfect workmanship, there are always unexpected interruptions to everything. However, if the entire manufacturing process is working together as a team, these interruptions become minor nuisances rather than major dilemmas that threaten the manufacturing process.

Perhaps the largest problem is new workers with less experience than the person they are replacing, or increases in production that require additional employees. When these employees begin, the other employees that they work with must properly train them. Without this training, a new employee will not know what high standards of workmanship are required of him or her are. Extra attention must be placed on new employees until they can show that they understand what the standards of workmanship are and are able to at least meet the standards of workmanship, if not surpass them entirely.

Another potential problem with the standards of workmanship is the human factor. Everyone has days in which they do not perform as well as they do on other days. On these days, it is the responsibility of the other people around each other to make sure that the standards of workmanship continue to be met day after day.

Related to this are days in which a person may be out sick from work or on vacation. Through cross training of employees, several people will know how to perform the duties of an individual who may not be at work for a day. This will assure that a constant, consistent standard of workmanship is maintained, regardless of what happens.

Through constant training, monitoring, and reassessment of the goals of the standard of workmanship, homes of the highest quality will be constructed. By doing this, each and every person employed will be pleased about the job that they are performing, and the end homeowner is happy about his or her new home. Word of mouth will spread about the high degree of quality workmanship will be built into the homes, and sales will increase creating a high demand for the product, which is the ultimate goal of every manufacturer.

TRAINING OF ACCOUNTABLE INDIVIDUALS

All employees of the company are expected to build the modules to the proper specification and compliance. Production personnel shall be trained to preform job functions. Training shall be performed by an experienced individual qualified in the applicable job functions. All personnel must be capable of producing compliant product. Training shall be performed on all new hire employees, when incorporating or changing materials or standard specifications, or when non-conformances are found as result of personnel.

STORAGE, TRANSPORTATION, AND SITE WORK

All completed units are stored in the yard awaiting shipment or are immediately shipped to the construction site. All open areas of the building not protected by a finished exterior are protected from damage by direct exposure to weather with 6-Mil plastic.

PACKING, PACKAGING AND SHIPPING

Completed homes are closed with a visqueen type material to resist the elements. Components required for the completion of the home when it arrives at the final destination site are carefully loaded into the home to prevent any damage to the interior of the home. A load list verification is then performed to verify all essential parts are loaded.

TRANSPORTATION

Completed units are transported to the erection site using independent companies specializing in the transportation of oversized loads. The drivers of the units must pass all DOT laws governing safety. The route is chosen by the authority responsible for executing a permit. Every care is taken to assure that the units will arrive safely to their destination. When the completed unit reaches the site, the set-up crew is given a copy of the list of necessary components and the list is verified. All reports are made available to the local inspector upon request.

REVISIONS TO MANUAL

Currency of the Quality Assurance Manual is essential for the quality of the manufactured building or component and the effectiveness of the Quality Assurance Program. Any change in personnel, production methods, individual job descriptions, plant layout, materials and other changes can influence the quality of the home. For this reason, any change to this manual must be submitted to the appropriate Third Party and State Agencies within ten (10) days of the desired change.

PERMISSION FOR INSPECTION

Impresa Building Systems of Greenwood, S.C. LLC has retained ICC NTA LLC. as its independent third party inspection agency for plan review/ approval and inspections/audits. Impresa Building Systems of Greenwood, S.C. LLC authorizes and grants ICC NTA LLC. and its representatives the right to enter the manufacturing facility during normal business hours with or without notice for the purpose of regular inspections and special times requested by Impresa Building Systems of Greenwood, S.C. LLC.

ALTERNATIVE MATERIALS

EVALUATION REPORT Number: 501

Originally Issued: 03/31/2017 Revised: 05/21/2021 Valid Through: 04/30/2022

ALLEGHENY STRUCTURAL COMPONENTS, INC.
3778 Oneida Valley Road
Emlenton, Pennsylvania 16373
(724) 867-1100
AlleghenyStructural.com

OPEN JOIST 2000® WOOD TRUSSES

CSI Sections:

06 11 00 Wood Framing
06 11 13 Engineered Wood Products
06 17 00 Shop Fabricated Structural Wood
06 17 53 Shop-Fabricated Wood Trusses

1.0 RECOGNITION

Allegheny Structural Components, Inc., Open Joist 2000® Wood Trusses have been evaluated for use as joists in floor and roof assemblies. The trusses have been evaluated for structural performance. The Open Joist 2000® trusses described in this report are recognized as alternatives to the framing prescribed in the following codes and regulations:

- 2018, 2015, 2012, and 2009 International Building Code® (IBC)
- 2018, 2015, 2012, and 2009 International Residential Code® (IRC)

Open Joist 2000® Wood Trusses complies with the requirements for wood trusses in IBC Section 2303.4 and IRC Sections R502.11 and R802.10.

2.0 LIMITATIONS

Use of Open Joist 2000® Wood Trusses recognized in this report is subject to the following limitations:

2.1 Use of the Open Joist 2000® Wood Trusses shall comply with the provisions of the applicable codes, the manufacturer's published installation instructions, and this report. Where conflicts occur in these provisions, the most restrictive shall govern.

2.2 Designs and details for building assemblies incorporating Open Joist 2000® Wood Trusses shall be submitted to the building official for approval.

2.3 Open Joist 2000® Wood Trusses shall not be cut, notched, spliced or otherwise altered except as specifically allowed by this report, the manufacturer's published installation instructions, or as approved by the registered design professional. Broken or damaged trusses shall not be used.

2.4 Open Joist 2000® Wood Trusses and connections shall not be exposed to wet service conditions in use.

2.5 Open Joist 2000® Wood Trusses have not been evaluated for use with fire-retardant treated wood or in fire-resistance rated assemblies under the scope of this report.

2.6 Use of the trusses as part of the lateral load resisting system has not been evaluated.

2.7 The trusses recognized in this report are produced by Allegheny Structural Components, Inc in Emlenton, PA.

3.0 PRODUCT USE

3.1 Design: The appropriate trusses for the project shall be chosen using the allowable uniform live load tables in this report corresponding to the design dead load, maximum deflection criteria, joist span, joist depth, and joist spacing. The tables are for use with joists in a simple-span support configuration. A joist depth and on-center spacing shall be chosen from the tables, that corresponds to the design live load to provide adequate support capacity for the design loading. The design tables provide maximum allowable uniform live loads for three or more members installed parallel, with top chord sheathing installed.

The trusses shall be designed to meet or exceed minimum ASD loading requirements specified in the applicable building code. Design drawings of Open Joist 2000® Wood Trusses shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

3.2 Installation:

Open Joist 2000® Wood Trusses shall be installed in accordance with the manufacturer's published installation instructions and design drawings required by Section 2303.4.1.1 of the IBC, or Sections R502.11.4 or R802.10.1 of the IRC, as applicable. The trusses shall be fastened to the sill or wall plates and anchorage shall be provided as required by the IBC or IRC. When fastening Open Joist 2000® Wood Trusses, care shall be taken to avoid splitting wooden truss members. Strong backs, gussets, and bearing blocks shall be provided for bracing, cantilever, and point load bearing as required by the truss design. Any required strong back bridging shall be installed prior to floor sheathing. When using joist hangers, the hanger manufacturers' nailing instructions shall be followed.

The trusses shall be covered with minimum $^{5}/_{8}$-inch-thick (15.9 mm) sheathing installed according to IBC or IRC using fasteners and adhesive. Minimum bearing length shall be $1^{1}/_{2}$-inch (38.1 mm) unless noted otherwise in the truss designs or manufacturer's instructions. Draft stopping, and fire blocking shall be installed in accordance with the IBC or IRC.

AM1

4.0 PRODUCT DESCRIPTION

Open Joist 2000® Wood Trusses are engineered wood joists with dimension lumber flanges, diagonal and vertical web members, and trimmable ends. The members are joined using glued finger-joined connections. The lumber used to manufacture the trusses is kiln-dried to a moisture content of 19 percent or less before processing.

The trusses are non-destructively machine-load-tested in accordance with the Open Joist 2000®quality control procedures to verify their ability to support the allowable loads indicated in this report.

Open Joist 2000® Wood Trusses are available in lengths up to 32 feet (9.8 m). and in nominal joist depths of $9^3/_8$, $11^1/_4$, $11^7/_8$, 13, 14, 16, 18, and 20 inches (238, 286, 302, 330, 356, 406, 457, and 508 mm, respectively). See tables for lengths for each model.

4.1 Chords: The top and bottom flange members of the trusses are nominally 2-by-3 or 2-by-4 lumber oriented flatwise and grooved to receive the web members. The finger-jointed chords are grade-marked No.2 SPF, MSR 2100, or MSR 2400 lumber depending on the joist depth and model.

4.2 Webs: The diagonal web members are nominally 2-by solid lumber optimally sized to handle the panel design loads, and oriented upright to fit into the grooves in the flanges. Vertical webs are installed at each end and at the edges of mechanical chases. The webs are joined to the chords and to each other with glued finger-joinery.

4.3 Trimmable-Ends: The vertical webs at the ends of each truss are solid sawn lumber designed to be trimmed to the proper joist length where necessary as shown in Figure 1 of this report.

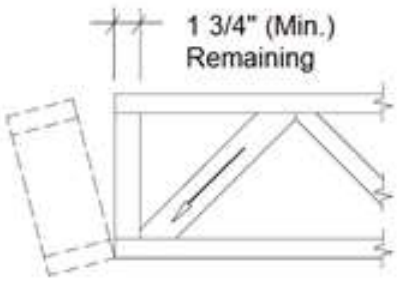


FIGURE 1 - ALLOWABLE TRUSS END TRIM

4.4 Adhesive: The adhesive used to glue the chord end joints and the finger-joined node connections is water-proof resorcinol resin meeting ASTM D2559, and ASTM D7247 for performance at elevated temperatures.

5.0 IDENTIFICATION

Open Joist 2000® Wood Trusses are identified by the manufacturer's name (Allegheny Structural Components) and phone number, the Open Joist 2000® trademark, the product model number, the date of manufacture, and evaluation report number (ER-501). The identification also includes the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as follows:

or

IAPMO UES ER-501

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Parallel Chord Wood Trusses (AC224), approved October 2018.

6.2 Manufacturer's descriptive literature and installation instructions. Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Open Joist 2000® Wood Trusses to assess their conformance to the codes shown in Section 1.0 of this report and documents the product's certification. The wood trusses are produced at locations noted in Section 2.7 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org

AM2

TABLE 1A (15DL-L/360) - ALLOWABLE UNIFORM FLOOR LIVE LOADS (psf)

Joist Clear Span	15 LB. DEAD LOAD - L/360 LIVE LOAD DEFLECTION															
	9 1/4" & 9 3/8" Depth				11 1/4" Depth				11 7/8" Depth				13" & 14" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	183	134	109	84	187	136	112	87	212	155	127	99	241	177	145	113
11'-1"	147	110	92	73	165	121	99	77	188	137	112	87	212	155	127	99
12'-1"	115	86	72	58	144	105	85	66	164	119	97	75	188	137	112	87
13'-1"	94	71	59	47	128	92	75	57	145	105	85	65	169	123	100	77
14'-1"	77	58	48	38	106	79	66	50	120	90	75	57	137	99	80	61
15'-1"	64	48	40	32	90	68	56	43	102	77	64	49	128	93	75	57
16'-1"	86	65	54	43	77	58	48	38	88	66	55	43	105	75	60	45
17'-1"	72	54	45	36	85	61	48	36	91	65	51	38	90	64	51	38
18'-1"	61	46	38	30	74	52	41	31	84	59	47	35	99	71	56	42
19'-1"	53	40	33	26	82	62	51	38	92	65	52	39	88	62	49	37
20'-1"					69	52	43	34	78	59	49	38	80	56	44	33
21'-1"					59	44	37	30	67	50	42	34	83	62	51	38
22'-1"									59	44	37	30	74	56	44	33
23'-1"													64	48	40	29
24'-1"													58	43	36	29

Joist Clear Span	15 LB. DEAD LOAD - L/360 LIVE LOAD DEFLECTION											
	16" Depth				18" Depth				20" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	241	177	145	113	347	259	215	171	341	256	213	171
11'-1"	212	155	127	99	318	237	196	156	313	235	196	156
12'-1"	188	137	112	87	293	218	181	144	289	217	180	144
13'-1"	169	123	100	77	271	202	167	133	268	201	168	134
14'-1"	153	111	90	69	253	188	156	124	250	188	156	125
15'-1"	145	105	85	65	237	176	146	116	235	176	147	117
16'-1"	142	103	83	63	222	165	137	108	221	166	138	110
17'-1"	169	123	100	77	210	156	129	102	209	156	130	104
18'-1"	161	117	95	73	198	147	122	96	198	148	123	99
19'-1"	128	92	74	57	188	140	116	91	188	141	117	94
20'-1"	148	107	87	67	179	133	110	87	179	134	112	89
21'-1"	121	87	70	53	171	127	105	82	171	128	107	85
22'-1"	127	91	74	56	137	103	85	68	142	105	87	68
23'-1"	104	78	65	52	131	98	82	65	136	101	83	65
24'-1"	96	72	60	47	126	94	79	62	130	96	79	62
25'-1"	83	62	52	42	121	91	76	60	125	92	76	60
26'-1"	83	62	52	42	109	81	66	52	111	82	67	53
27'-1"	75	56	47	38	105	78	64	50	107	78	64	50
28'-1"	64	48	40	32	101	75	61	48	103	76	62	49
29'-1"	56	42	35	28	77	58	48	38	99	73	60	47
30'-1"					75	56	47	37	72	53	43	33
31'-1"									70	51	41	32

For S.I.: 1 inch = 25.4 mm; 1 lbf = 4.4 N; 1 psf = 47.9 Pa

1) Table is based on repetitive member use installed in a floor or roof system with minimum 5/8-inch-thick sheathing attached to the top flanges.

2) No increase for repetitive member use or duration of load allowed.

3) Allowable load values in the table shall be reduced if repetitive member conditions are not achieved (20 percent for 3x2 and 13 percent for 4x2).

4) Loads noted in the table are limited by live load deflection and total load deflection as noted in the table.

5) Manufactured length refers to overall length that includes the possibility of a 5 1/2-inch bearing on both ends. To calculate the allowable "clear span" subtract 11 inches from the tabulated manufactured length.

AM3

TABLE 1B (25DL-L/360) - ALLOWABLE UNIFORM FLOOR LIVE LOADS (psf)

Joist Clear Span	25 LB. DEAD LOAD - L/360 LIVE LOAD DEFLECTION															
	9 1/4" & 9 3/8" Depth				11 1/4" Depth				11 7/8" Depth				13" & 14" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	173	124	99	74	178	128	103	78	202	145	117	89	231	167	135	103
11'-1"	147	107	85	63	157	112	90	68	178	127	102	77	202	145	117	89
12'-1"	115	86	72	55	136	96	77	57	154	109	87	65	178	127	102	77
13'-1"	94	71	59	45	119	84	66	48	135	95	75	55	159	113	90	67
14'-1"	77	58	48	37	105	73	57	41	119	83	65	47	127	89	70	51
15'-1"	64	48	40	31	90	62	48	34	102	71	55	39	119	83	65	47
16'-1"	86	65	50	35	77	54	41	29	88	61	47	33	95	65	50	35
17'-1"	72	54	45	36	77	52	40	27	81	55	41	28	80	54	41	28
18'-1"	61	46	37	25	65	43	33	22	74	49	37	25	89	61	46	32
19'-1"	53	40	33	23	81	55	42	29	82	55	42	29	78	52	39	27
20'-1"					69	48	37	26	78	55	41	28	70	46	34	23
21'-1"					59	43	33	22	67	49	37	25	80	54	41	28
22'-1"									59	43	31	20	70	46	34	23
23'-1"													63	41	30	19
24'-1"													58	43	32	21

Joist Clear Span	25 LB. DEAD LOAD - L/360 LIVE LOAD DEFLECTION											
	16" Depth				18" Depth				20" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	231	167	135	103	343	255	211	167	341	256	213	171
11'-1"	202	145	117	89	314	233	193	152	313	235	196	156
12'-1"	178	127	102	77	289	214	177	140	89	217	180	144
13'-1"	159	113	90	67	268	198	164	129	268	201	168	134
14'-1"	143	101	80	59	249	184	152	120	250	188	156	125
15'-1"	135	95	75	55	233	172	142	112	235	176	147	116
16'-1"	132	93	73	53	219	162	133	105	221	166	138	109
17'-1"	159	113	90	67	206	152	125	98	209	156	130	102
18'-1"	151	107	85	63	195	144	118	93	198	148	123	97
19'-1"	118	82	64	47	184	136	112	88	188	141	116	91
20'-1"	138	97	77	57	175	129	106	83	179	134	110	86
21'-1"	111	77	60	43	167	123	101	79	171	128	105	82
22'-1"	117	81	64	46	137	101	83	64	138	101	83	64
23'-1"	94	70	59	42	131	97	79	61	132	97	79	61
24'-1"	84	63	53	37	126	93	76	59	127	93	76	59
25'-1"	73	55	46	32	121	89	72	56	121	89	72	56
26'-1"	73	55	46	32	106	77	63	48	107	78	63	49
27'-1"	65	49	41	29	102	74	60	46	103	75	61	47
28'-1"	64	48	40	27	98	71	58	44	99	72	58	45
29'-1"	56	42	35	23	77	57	46	35	95	69	56	43
30'-1"					75	54	44	33	68	49	39	29
31'-1"									66	47	38	28

For S.I.: 1 inch = 25.4 mm; 1 lbf = 4.4 N; 1 psf = 47.9 Pa

1) Table is based on repetitive member use installed in a floor or roof system with minimum 5/8-inchthick sheathing attached to the top flanges.

2) No increase for repetitive member use or duration of load allowed.

3) Allowable load values in the table shall be reduced if repetitive member conditions are not achieved (20 percent for 3x2 and 13 percent for 4x2).

4) Loads noted in the table are limited by live load deflection and total load deflection as noted in the table.

5) Manufactured length refers to overall length that includes the possibility of a 5 1/2-inch bearing on both ends. To calculate the allowable "clear span" subtract 11 inches from the tabulated manufactured length.

AM4

TABLE 1C (15DL-L/480) - ALLOWABLE UNIFORM FLOOR LIVE LOADS (psf)

Joist Clear Span	15 LB. DEAD LOAD - L/480 LIVE LOAD DEFLECTION															
	$9^1/_4$" & $9^3/_8$" Depth				$11^1/_4$" Depth				$11^7/_8$" Depth				13" & 14" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	139	104	87	70	187	136	112	87	212	155	127	99	241	177	145	113
11'-1"	110	83	69	55	158	118	99	77	179	134	112	87	212	155	127	99
12'-1"	86	65	54	43	124	93	77	62	141	106	88	70	171	128	107	86
13'-1"	70	53	44	35	101	76	63	51	115	86	72	58	142	107	89	71
14'-1"	58	43	36	29	79	59	49	40	90	67	56	45	114	86	71	57
15'-1"	48	36	30	24	68	51	42	33	77	58	48	38	96	72	60	48
16'-1"	66	49	41	33	58	43	36	29	66	49	41	33	80	60	50	40
17'-1"	54	41	34	27	69	52	43	34	78	59	49	38	66	51	43	34
18'-1"	46	35	29	23	59	44	37	30	67	50	42	34	80	60	50	40
19'-1"	40	30	25	20	62	47	39	31	70	53	44	35	69	52	43	35
20'-1"					52	39	33	26	59	44	37	30	60	45	38	30
21'-1"					45	33	28	23	51	38	32	26	62	47	39	31
22'-1"									45	34	28	23	56	42	35	28
23'-1"													48	36	30	24
24'-1"													43	32	27	22

Joist Clear Span	15 LB. DEAD LOAD - L/480 LIVE LOAD DEFLECTION											
	16" Depth				18" Depth				20" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	241	177	145	113	273	205	171	137	249	186	155	124
11'-1"	212	155	127	99	251	188	157	125	228	171	142	114
12'-1"	188	137	112	87	231	174	145	116	210	158	131	105
13'-1"	169	123	100	77	215	161	134	107	195	146	122	98
14'-1"	153	111	90	69	201	150	125	100	182	137	114	91
15'-1"	145	105	85	65	188	141	118	94	171	128	107	85
16'-1"	142	103	83	63	177	133	111	88	161	121	101	80
17'-1"	169	123	100	77	167	125	104	84	152	114	95	76
18'-1"	144	108	90	73	158	119	99	79	144	108	90	72
19'-1"	128	92	74	57	150	113	94	75	137	103	85	68
20'-1"	112	84	70	56	143	107	90	72	130	98	81	65
21'-1"	88	66	55	44	137	103	85	68	124	93	78	62
22'-1"	80	60	50	40	98	74	61	49	110	82	69	55
23'-1"	75	56	47	38	94	71	59	47	105	79	66	53
24'-1"	70	52	44	35	90	68	57	45	101	76	63	51
25'-1"	64	48	40	32	87	65	54	44	97	73	61	49
26'-1"	60	45	38	30	79	59	49	39	85	64	53	43
27'-1"	54	40	34	27	76	57	47	38	82	62	51	41
28'-1"	48	36	30	24	73	55	46	37	79	60	50	40
29'-1"	41	31	26	21	58	44	36	29	77	58	48	38
30'-1"					57	42	35	28	62	46	39	31
31'-1"									60	45	37	30

For S.I.: 1 inch = 25.4 mm; 1 lbf = 4.4 N; 1 psf = 47.9 Pa

1) Table is based on repetitive member use installed in a floor or roof system with minimum 5/8-inch sheathing attached to the top flanges.

2) No increase for repetitive member use or duration of load allowed.

3) Allowable load values in the table shall be reduced if repetitive member conditions are not met (20 percent for 3x2 and 13 percent for 4x2).

4) Loads noted in the table are limited by live load deflection and total load deflection noted.

5) Manufactured length refers to overall length that includes the possibility of a $5^1/_2$-inch bearing on both ends. To calculate the allowable "clear span" subtract 11 inches from the tabulated manufactured length.

AM5

TABLE 1D (25DL-L/480) - ALLOWABLE UNIFORM FLOOR LIVE LOADS (psf)

Joist Clear Span	25 LB. DEAD LOAD - L/480 LIVE LOAD DEFLECTION															
	9 1/4" & 9 3/8" Depth				11 1/4" Depth				11 7/8" Depth				13" & 14" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	139	104	87	70	178	128	103	78	202	145	117	89	231	167	135	103
11'-1"	110	83	69	55	157	112	90	68	178	127	102	77	202	145	117	89
12'-1"	86	65	54	43	124	93	77	57	141	106	87	65	171	127	102	77
13'-1"	70	53	44	35	101	76	63	48	115	86	72	55	142	107	89	67
14'-1"	58	43	36	29	79	59	49	40	90	67	56	45	114	86	70	51
15'-1"	48	36	30	24	68	51	42	33	77	58	48	38	96	72	60	47
16'-1"	66	49	41	33	58	43	36	29	66	49	41	33	80	60	50	35
17'-1"	54	41	34	27	69	52	40	27	78	55	41	28	68	51	41	28
18'-1"	46	35	29	23	59	43	33	22	67	49	37	25	80	60	46	32
19'-1"	40	30	25	20	62	47	39	29	70	53	42	29	69	52	39	27
20'-1"					52	39	33	26	59	44	37	28	60	45	34	23
21'-1"					45	33	28	22	51	38	32	25	62	47	39	28
22'-1"									45	34	28	20	56	42	34	23
23'-1"													48	36	30	19
24'-1"													43	32	27	21

Joist Clear Span	25 LB. DEAD LOAD - L/480 LIVE LOAD DEFLECTION											
	16" Depth				18" Depth				20" Depth			
	O.C. Spacing				O.C. Spacing				O.C. Spacing			
	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
10'-1"	231	167	135	103	273	205	171	137	249	186	155	124
11'-1"	202	145	117	89	251	188	157	125	228	171	142	114
12'-1"	178	127	102	77	231	174	145	116	210	158	131	105
13'-1"	159	113	90	67	215	161	134	107	195	146	122	98
14'-1"	143	101	80	59	201	150	125	100	182	137	114	91
15'-1"	135	95	75	55	188	141	118	94	171	128	107	85
16'-1"	132	93	73	53	177	133	111	88	161	121	101	80
17'-1"	159	113	90	67	167	125	104	84	152	114	95	76
18'-1"	139	103	85	63	158	119	99	79	144	108	90	72
19'-1"	118	82	64	47	150	113	94	75	137	103	85	68
20'-1"	112	84	70	56	143	107	90	72	130	98	81	65
21'-1"	88	66	55	43	137	103	85	68	124	93	78	62
22'-1"	80	60	50	40	98	74	61	49	110	82	69	55
23'-1"	75	56	47	38	94	71	59	47	105	79	66	53
24'-1"	70	52	44	35	90	68	57	45	101	76	63	51
25'-1"	64	48	40	32	87	65	54	44	97	73	61	49
26'-1"	60	45	38	30	79	59	49	39	85	64	53	43
27'-1"	54	40	34	27	76	57	47	38	82	62	51	41
28'-1"	48	36	30	24	73	55	46	37	79	60	50	40
29'-1"	41	31	26	21	58	44	36	29	77	58	48	38
30'-1"					57	42	35	28	62	46	39	29
31'-1"									60	45	37	28

For S.I.: 1 inch = 25.4 mm; 1 lbf = 4.4 N; 1 psf = 47.9 Pa

1) Table is based on repetitive member use installed in a floor or roof system with minimum 5/8-inch-thick sheathing attached to the top flanges.

2) No increase for repetitive member use or duration of load allowed.

3) Allowable load values in the table shall be reduced if repetitive member conditions are not achieved (20 percent for 3x2 and 13 percent for 4x2).

4) Loads noted in the table are limited by live load deflection and total load deflection as noted in the table.

5) Manufactured length refers to overall length that includes the possibility of a 5 1/2-inch bearing on both ends. To calculate the allowable "clear span" subtract 11 inches from the tabulated manufactured length.

AM6

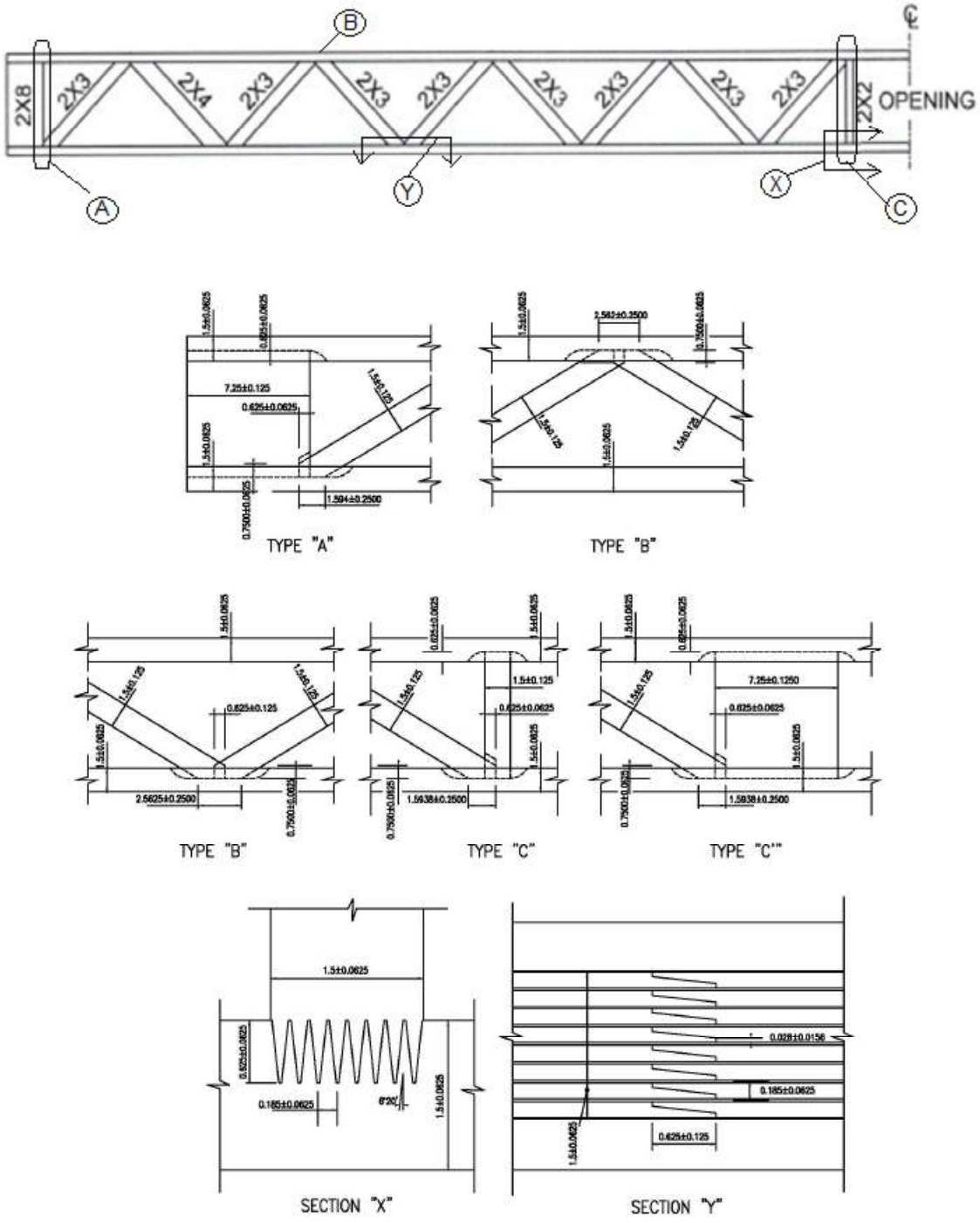
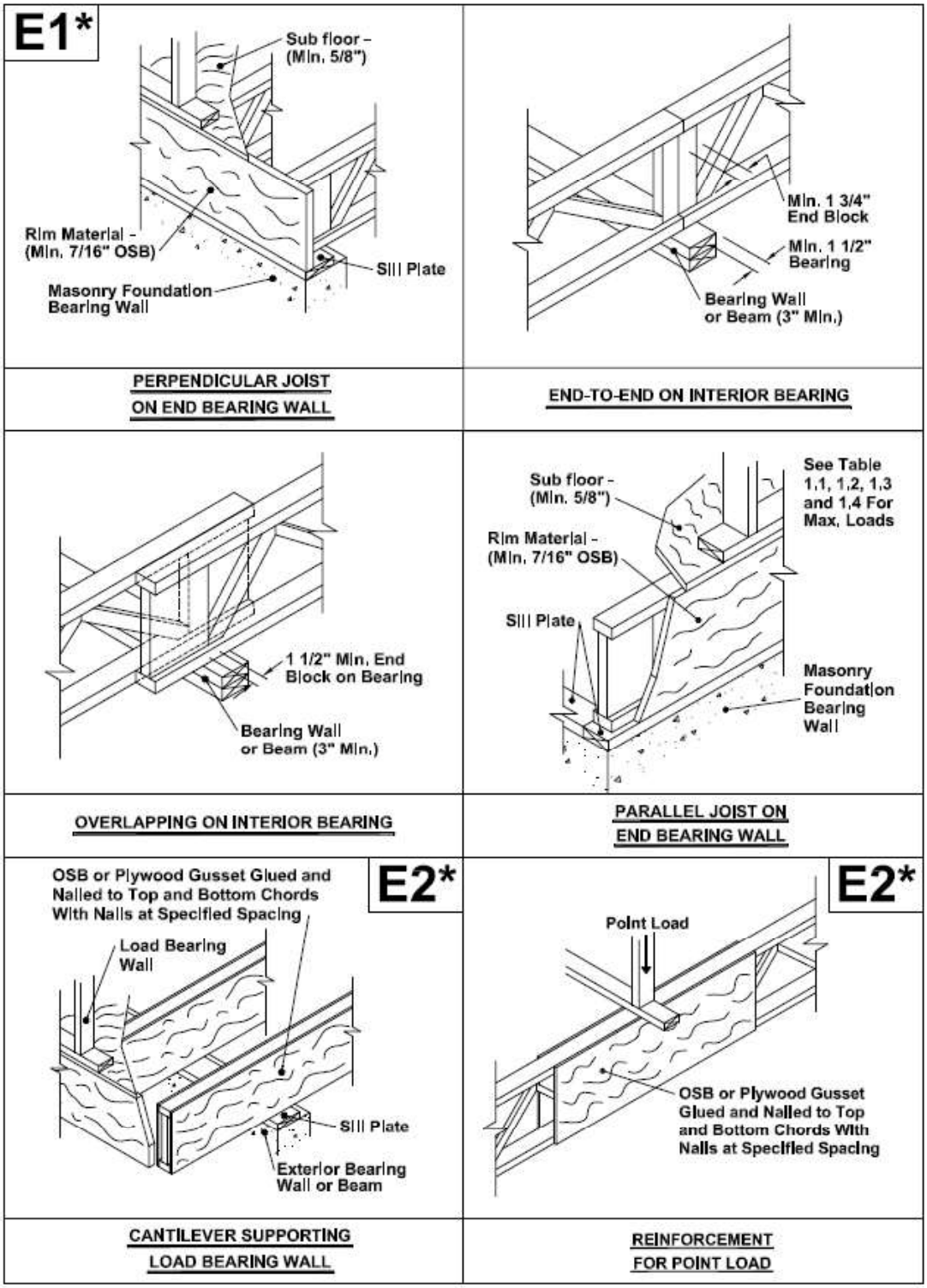


FIGURE 2 – TYPICAL OPEN JOIST 2000 WOOD TRUSS AND DETAILS
(MEMBER SIZES VARY)

AM7



E1* = Engineering required to determine the thickness of rim material.
E2* = Engineering required to determine the length and thickness of gusset material.

FIGURE 3 – MOST COMMONLY USED DETAILS
(See OJ 2000 Installation Instructions for more details)

AM8

ICC-ES Evaluation Report

ESR-1035

Reissued April 2020

This report is subject to renewal April 2022.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 53—Shop-Fabricated Wood Trusses

REPORT HOLDER:

BARRETTE STRUCTURAL DISTRIBUTION, INC.

EVALUATION SUBJECT:

OPEN JOIST 2000—ENGINEERED WOOD PRODUCT

ADDITIONAL LISTEE:

ALLEGHENY STRUCTURAL COMPONENTS

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012 2009 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

Structural

1.2 Evaluation to the following green code(s) and/or standards:

- 2019 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2015, 2012 and 2008 ICC 700 *National Green Building Standard*™ (ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 3.1.

2.0 USES

The Open Joist 2000 parallel chord trusses are used as structural repetitive members in roof or floor assemblies.

3.0 DESCRIPTION

3.1 General:

The Open Joist 2000 is a parallel chord truss, consisting of solid-sawn lumber top and bottom chords and diagonal and vertical web members. Chord members are continuous and are fabricated with finger-joints located along the joist. The minimum distance between chord finger-joints is 24 inches (610 mm). Web members are continuous, with no finger-joints. Each end of the web member is finger-joined into the top and bottom chords and glued with a resorcinol adhesive. Chord and web dimensions and grade are dependent upon joist depth, span and design loads. Open Joist 2000 trusses are manufactured to depths of $9^3/_8$, $11^7/_8$, 13, 14 and 16 inches (238, 301, 330, 356 and 406 mm). See Figures 2 and 3 for configuration details.

Grade-stamped lumber used to fabricate the trusses is reinspected at the manufacturing plant prior to its use. The moisture content is verified and individual lumber pieces are machined to pattern and redried to a moisture content of less than 16 percent.

The attributes of the wood trusses have been verified as conforming to the provisions of (i) CALGreen Sections A4.404.3 for efficient framing techniques; (ii) ICC 700-2015 Section 608.1(b), 11.608.1(b) and 12.1.(A).606.1(b); ICC 700-2015 Section 608.1(b), 11.608.1(b) and 12.1.(A).606.1(b); ICC 700-2012 Section 608.1(2), 11.608.1(2) and 12(A).608.1 for resource-efficient materials; and (iii) ICC 700-2008 Section 607.1(2) for resource-efficient materials. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.2 Materials:

3.2.1 Chord Members: Top and bottom chords are made of nominal 2-by-3 or 2-by-4, visually graded spruce-pine-fir (SPF), No. 2 or higher, or machine-stress-rated (MSR) SPF 2100f-1.8E or MSR SPF 2400f-2.0E.

3.2.2 Diagonal Web Members: Diagonal webs are made of nominally 2-by-2, 2-by-3 or 2-by-4 visually graded lumber in accordance with the approved quality control manual.

3.2.3 Vertical Web Members: Both ends of the truss are manufactured with solid vertical web members made of nominal 2-by-8 SPF, No. 2 or higher, or a laminated wood panel manufactured from SPF solid-sawn lumber meeting the requirements specified in the approved quality control manual for the fabrication of Open Joist 2000 trusses.

3.2.4 Adhesive: The adhesive used to fabricate the Open Joist 2000 trusses is two-component modified resorcinol

formaldehyde, complying with ANSI A190.1, CSA 0112.7-M, ASTM D2559, Section 5.4.3 of ASTM D5055-16 and requirements listed in the approved quality control manual.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The Open Joist 2000 trusses must be designed to resist loading requirements as specified in the tables shown in this report. Details for rim joists, bridging and blocking at the joist ends, to prevent roll-over and to transfer lateral and vertical loads, must be provided in accordance with the design drawings and calculations submitted to the building official.

Tables 1, 2, 3, 4 and 5 of this report provide design live load tables for truss depths of $9^3/_8$, $11^7/_8$, 13, 14 and 16 inches (238, 301, 330, 356 and 406 mm), respectively. The tables are applicable only to uniformly loaded, simple-span joists, installed as repetitive members in floor or roof assemblies, where minimum $^5/_8$-inch-thick (15.9 mm) sheathing is attached to the top flanges in accordance with the applicable code. The repetitive member factor, C_r, equals 1.0 when the Open Joist 2000 trusses are installed in accordance with this report.

4.2 Installation:

Open Joist 2000 trusses must be delivered to the jobsite with an assembly plan and a set of installation instructions published by the manufacturer.

Trusses must be installed in an assembly of repetitive trusses, spaced not more than 24 inches (610 mm), not less than three in number, and joined by minimum $^5/_8$-inch-thick (15.9 mm) sheathing attached to the top flanges in accordance with the applicable code.

Required bearing length must be the longer of the bearing length calculated based on the bearing capacity of the supports, or 1.5 inches (38 mm). The ends of the joist member are permitted to be field-cut to the desired length to a maximum adjustment of $5^1/_2$ inches (140 mm) (see Figure 1, Detail B) at each end.

Maximum bearing permitted is such that the inside face of the bearing does not extend beyond 11 inches (279 mm) into the span from the end of an uncut joist (see Figure 1, Detail A), or beyond $5^1/_2$ inches (140 mm) into the span from the end of a joist that has its end cut to the maximum allowed (see Figure 1, Detail B).

Manufacturer's recommendations relating to rim joists, bridging, blocking, and other framing details, that are not within the scope of this report, must be verified by engineering analysis.

5.0 CONDITIONS OF USE

The Open Joist 2000 trusses described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The trusses are installed in accordance with this report and the manufacturer's published installation instructions. The provisions of this report must govern should there be any conflict with the manufacturer's published installation instructions. Manufacturer's recommendations relating to rim joists, bridging or blocking that are not within the scope of this report must be verified by engineering analysis.

5.2 Design calculations, drawings, and details for specific applications, demonstrating compliance with this report, must be submitted to the code official. The calculations, drawings and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Design must be in accordance with Tables 1 through 5 of this report and the applicable code.

5.3 Damaged or defective joists must not be used.

5.4 Open Joist 2000 trusses must be used in covered, dry conditions. Dry conditions of use are those conditions of use represented by sawn lumber in which the moisture content is less than 19 percent.

5.5 Cutting or notching of any member of the joist is prohibited, except that up to $5^1/_2$ inches (140 mm) is permitted to be removed from each end of the joist (closed end).

5.6 Fire-retardant-treated or preservative-treated wood must not be used in the manufacture of these products.

5.7 Evaluation of the use of Open Joist 2000 trusses as a component of fire-resistance-rated roof or floor assemblies is outside the scope of this report.

5.8 Joists are produced by Open Joist 2000 Inc. or one of the additional listees specified in this report, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Parallel Chord Wood Trusses (AC224), dated October 2005 (editorially revised November 2018).

6.2 Data on adhesive heat durability in accordance with ASTM D7247.

7.0 IDENTIFICATION

7.1 The Open Joist 2000 must be identified with a stamp noting the name or logo of the report holder (Distribution Open Joist 2000 Inc.) or one of the additional listees specified in this report, and the plant location or identifier; the product name; the production date; and the evaluation report number (ESR-1035).

7.2 The report holder's contact information is the following:

BARRETTE STRUCTURAL DISTRIBUTION, INC.
555 RANG SAINT-MALO
TROIS-RIVIERES, QUEBEC G8V 0A8
CANADA
(819) 374-6061
www.openjoist2000.com

7.3 The Additional Listee's contact information is the following:

ALLEGHENY STRUCTURAL COMPONENTS
3778 ONEIDA VALLEY ROAD
EMLENTON, PENNSYLVANIA 16373
(724) 867-1100
www.alleghenystructural.com

FIGURE 1—BEARING POSITION ALLOWED AND MAXIMUM FIELD CUT

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TABLE 1 - ALLOWABLE LIVE LOAD (PSF) FOR OPEN JOIST 2000 (1) (4)

TABLE 1a $\Delta L = L / 360$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 9 3/8"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	209	153	125	97	204	148	120	92	199	143	115	87	194	138	110	82
3 x 2	SPF #2	11'-0"	183	134	109	84	178	129	104	79	173	124	99	74	168	119	94	69
3 x 2	SPF #2	12'-0"	147	110	92	73	147	110	90	68	147	107	85	63	146	102	80	58
3 x 2	SPF #2	13'-0"	115	86	72	58	115	86	72	58	115	86	72	55	115	86	70	50
3 x 2	SPF #2	14'-0"	94	71	59	47	94	71	59	47	94	71	59	45	94	71	58	40
3 x 2	SPF #2	15'-0"	77	58	48	38	77	58	48	38	77	58	48	37	77	58	48	32
3 x 2	SPF #2	16'-0"	64	48	40	32	64	48	40	32	64	48	40	31	64	48	40	26
4 x 2	SPF #2	17'-0"	70	53	44	35	70	53	44	35	70	53	44	31	70	53	40	26
4 x 2	SPF 2100f-1.8E	18'-0"	72	54	45	36	72	54	45	36	72	54	45	31	72	54	40	26
4 x 2	SPF 2100f-1.8E	19'-0"	61	46	38	30	61	46	38	30	61	46	37	25	61	44	32	20
4 x 2	SPF 2100f-1.8E	20'-0"	53	40	33	26	53	40	33	26	53	40	33	23	53	40	30	18

TABLE 1b $\Delta L = L / 480$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 9 3/8"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	179	134	112	90	179	134	112	90	179	134	112	87	179	134	110	82
3 x 2	SPF #2	11'-0"	139	104	87	70	139	104	87	70	139	104	87	70	139	104	87	69
3 x 2	SPF #2	12'-0"	110	83	69	55	110	83	69	55	110	83	69	55	110	83	69	55
3 x 2	SPF #2	13'-0"	86	65	54	43	86	65	54	43	86	65	54	43	86	65	54	43
3 x 2	SPF #2	14'-0"	70	53	44	35	70	53	44	35	70	53	44	35	70	53	44	35
4 x 2	SPF #2	15'-0"	78	59	49	39	78	59	49	39	78	59	49	39	78	59	49	39
4 x 2	SPF #2	16'-0"	66	49	41	33	66	49	41	33	66	49	41	33	66	49	41	32
4 x 2	SPF 2100f-1.8E	17'-0"	66	49	41	33	66	49	41	33	66	49	41	33	66	49	41	30
4 x 2	SPF 2100f-1.8E	18'-0"	54	41	34	27	54	41	34	27	54	41	34	27	54	41	34	26
4 x 2	SPF 2100f-1.8E	19'-0"	46	35	29	23	46	35	29	23	46	35	29	23	46	35	29	20
4 x 2	SPF 2100f-1.8E	20'-0"	40	30	25	20	40	30	25	20	40	30	25	20	40	30	25	18

(1) Table is based on the assumption multiple joists (repetitive members) are installed in a floor or roof system with minimum 5/8-inch sheathing attached to the top flanges. No increase in allowable load for repetitive member use or duration of load allowed.

(2) Allowable load values in the table shall be reduced if repetitive member conditions are not met (20 percent for 3x2 and 13 percent for 4x2)

(3) Loads noted in the table are limited by live load deflection (ΔL) and total load deflection (Δt)

(4) " Manufactured length" refers to overall length which includes the possibility of a 5 1/2-inch bearing on both ends. To compute the allowable "clear span" substract 11 inches from the tabulated manufactured length.

(5) SI conversions : 1 inch = 25,4 mm 1 foot = 304,8 mm 1 psf = 47,9 N / m^2

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TABLE 2 - ALLOWABLE LIVE LOAD (PSF) FOR OPEN JOIST 2000 (1) (4)

TABLE 2a $\Delta L = L / 360$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 11 7/8"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	11'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	12'-0"	188	137	112	87	183	132	107	82	178	127	102	77	173	122	97	72
3 x 2	SPF #2	13'-0"	164	119	97	75	159	114	92	70	154	109	87	65	149	104	82	60
3 x 2	SPF #2	14'-0"	145	105	85	65	140	100	80	60	135	95	75	55	130	90	70	50
3 x 2	SPF #2	15'-0"	120	90	75	57	120	88	70	52	119	83	66	47	114	78	60	42
3 x 2	SPF #2	16'-0"	102	77	64	49	102	76	60	44	102	71	55	39	98	66	50	34
3 x 2	SPF #2	17'-0"	88	66	55	43	88	66	52	38	88	61	47	33	85	56	42	28
4 x 2	SPF #2	18'-0"	97	69	55	41	92	64	50	36	87	59	45	31	82	54	40	26
4 x 2	SPF #2	19'-0"	84	59	47	35	79	54	42	30	74	49	37	25	69	44	32	20
4 x 2	SPF 2100f-1.8E	20'-0"	93	70	58	43	93	68	53	38	92	63	48	33	87	58	43	28
4 x 2	SPF 2100f-1.8E	21'-0"	78	59	49	39	78	59	47	34	78	55	42	29	77	50	37	24
4 x 2	SPF 2100f-1.8E	22'-0"	67	50	42	34	67	50	42	30	67	49	37	25	67	44	32	20
4 x 2	SPF 2100f-1.8E	23'-0"	59	44	37	30	59	44	37	28	59	44	35	23	59	42	30	18

TABLE 2b $\Delta L = L / 480$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 11 7/8"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	11'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	12'-0"	179	134	112	87	179	132	107	82	178	127	102	77	173	122	97	72
3 x 2	SPF #2	13'-0"	141	106	88	70	141	106	88	70	141	106	87	65	141	104	82	60
3 x 2	SPF #2	14'-0"	115	86	72	58	115	86	72	58	115	86	72	55	115	86	70	50
3 x 2	SPF #2	15'-0"	90	67	56	45	90	67	56	45	90	67	56	45	90	67	56	42
3 x 2	SPF #2	16'-0"	77	58	48	38	77	58	48	38	77	58	48	38	77	58	48	34
3 x 2	SPF #2	17'-0"	66	49	41	33	66	49	41	33	66	49	41	33	66	49	41	28
4 x 2	SPF #2	18'-0"	78	59	49	39	78	59	49	36	78	59	45	31	78	54	40	26
4 x 2	SPF #2	19'-0"	67	50	42	34	67	50	42	30	67	49	37	25	67	44	32	20
4 x 2	SPF 2100f-1.8E	20'-0"	70	53	44	35	70	53	44	35	70	53	44	33	70	53	43	28
4 x 2	SPF 2100f-1.8E	21'-0"	59	44	37	30	59	44	37	30	59	44	37	29	59	44	37	24
4 x 2	SPF 2100f-1.8E	22'-0"	51	38	32	26	51	38	32	26	51	38	32	25	51	38	32	20
4 x 2	SPF 2100f-1.8E	23'-0"	45	34	28	22	45	34	28	22	45	34	28	22	45	34	28	18

(1) Table is based on the assumption multiple joists (repetitive members) are installed in a floor or roof system with minimum 5/8-inch sheathing attached to the top flanges. No increase in allowable load for repetitive member use or duration of load allowed.

(2) Allowable load values in the table shall be reduced if repetitive member conditions are not met (20 percent for 3x2 and 13 percent for 4x2)

(3) Loads noted in the table are limited by live load deflection (ΔL) and total load deflection (Δt)

(4) " Manufactured length" refers to overall length which includes the possibility of a 5 1/2-inch bearing on both ends. To compute the allowable "clear span" substract 11 inches from the tabulated manufactured length.

(5) SI conversions : 1 inch = 25,4 mm 1 foot = 304,8 mm 1 psf = 47,9 N / m^2

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TABLE 3 - ALLOWABLE LIVE LOAD (PSF) FOR OPEN JOIST 2000 (1) (4)

TABLE 3a $\Delta L = L / 360$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 13"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	273	201	165	129	268	196	160	124	263	191	155	119	258	186	150	114
3 x 2	SPF #2	11'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	12'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	13'-0"	188	137	112	87	183	132	107	82	178	127	102	77	173	122	97	72
3 x 2	SPF #2	14'-0"	169	123	100	77	164	118	95	72	159	113	90	67	154	108	85	62
3 x 2	SPF #2	15'-0"	150	109	88	67	145	104	83	62	140	99	78	57	135	94	73	52
3 x 2	SPF #2	16'-0"	128	93	75	57	124	88	70	52	119	83	65	47	114	78	60	42
3 x 2	SPF #2	17'-0"	106	79	65	49	106	76	60	44	103	71	55	39	98	66	50	34
3 x 2	SPF #2	18'-0"	91	68	57	43	91	66	52	38	90	61	47	33	85	56	42	28
4 x 2	SPF #2	19'-0"	102	73	58	43	97	68	53	38	92	63	48	33	87	58	43	28
4 x 2	SPF #2	20'-0"	91	64	51	38	86	59	46	33	81	54	41	28	76	49	36	23
4 x 2	SPF #2	21'-0"	80	59	47	35	79	54	42	30	74	49	37	25	69	44	32	20
4 x 2	SPF 2100f-1.8E	22'-0"	83	62	52	39	83	62	48	34	83	57	43	29	79	52	38	24
4 x 2	SPF 2100f-1.8E	23'-0"	74	55	46	36	74	55	44	31	74	52	39	26	72	47	34	21
4 x 2	SPF 2100f-1.8E	24'-0"	64	48	40	32	64	48	40	28	64	47	35	23	64	42	30	18
4 x 2	SPF 2100f-1.8E	25'-0"	58	43	36	29	58	43	36	26	58	43	32	21	58	38	27	16

TABLE 3b $\Delta L = L / 480$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 13"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	273	201	165	129	268	196	160	124	263	191	155	119	258	186	150	114
3 x 2	SPF #2	11'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	12'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	13'-0"	171	128	107	86	171	128	107	82	171	127	102	77	171	122	97	72
3 x 2	SPF #2	14'-0"	142	107	89	71	142	107	89	71	142	107	89	67	142	107	85	62
3 x 2	SPF #2	15'-0"	114	85	71	57	114	85	71	57	114	85	71	57	114	85	71	52
3 x 2	SPF #2	16'-0"	96	72	60	48	96	72	60	48	96	72	60	47	96	72	60	42
3 x 2	SPF #2	17'-0"	80	60	50	40	80	60	50	40	80	60	50	39	80	60	50	34
3 x 2	SPF #2	18'-0"	69	52	43	34	69	52	43	34	69	52	43	33	69	52	42	28
4 x 2	SPF #2	19'-0"	80	60	50	40	80	60	50	38	80	60	48	33	80	58	43	28
4 x 2	SPF #2	20'-0"	69	52	43	34	69	52	43	33	69	52	41	28	69	49	36	23
4 x 2	SPF 2100f-1.8E	21'-0"	72	54	45	36	72	54	45	36	72	54	45	33	72	54	43	28
4 x 2	SPF 2100f-1.8E	22'-0"	64	48	40	32	64	48	40	32	64	48	40	29	64	48	38	24
4 x 2	SPF 2100f-1.8E	23'-0"	56	42	35	28	56	42	35	28	56	42	35	26	56	42	34	21
4 x 2	SPF 2100f-1.8E	24'-0"	48	36	30	24	48	36	30	24	48	36	30	23	48	36	30	18
4 x 2	SPF 2100f-1.8E	25'-0"	43	32	27	22	43	32	27	22	43	32	27	21	43	32	27	16

(1) Table is based on the assumption multiple joists (repetitive members) are installed in a floor or roof system with minimum 5/8-inch sheathing attached to the top flanges. No increase in allowable load for repetitive member use or duration of load allowed.

(2) Allowable load values in the table shall be reduced if repetitive member conditions are not met (20 percent for 3x2 and 13 percent for 4x2)

(3) Loads noted in the table are limited by live load deflection (ΔL) and total load deflection (Δt)

(4) " Manufactured length" refers to overall length which includes the possibility of a 5 1/2-inch bearing on both ends. To compute the allowable "clear span" substract 11 inches from the tabulated manufactured length.

(5) SI conversions : 1 inch = 25,4 mm 1 foot = 304,8 mm 1 psf = 47,9 N / m^2

TABLE 4 - ALLOWABLE LIVE LOAD (PSF) FOR OPEN JOIST 2000 (1) (4)

TABLE 4a $\Delta L = L / 360$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 14"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	273	201	165	129	268	196	160	124	263	191	155	119	258	186	150	114
3 x 2	SPF #2	11'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	12'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	13'-0"	188	137	112	87	183	132	107	82	178	127	102	77	173	122	97	72
3 x 2	SPF #2	14'-0"	169	123	100	77	164	118	95	72	159	113	90	67	154	108	85	62
3 x 2	SPF #2	15'-0"	150	109	88	67	145	104	83	62	140	99	78	57	135	94	73	52
3 x 2	SPF #2	16'-0"	128	93	75	57	124	88	70	52	119	83	65	47	114	78	60	42
3 x 2	SPF #2	17'-0"	106	79	65	49	106	76	60	44	103	71	55	39	98	66	50	34
3 x 2	SPF #2	18'-0"	91	68	57	43	91	66	52	38	90	61	47	33	85	56	42	28
4 x 2	SPF #2	19'-0"	102	73	58	43	97	68	53	38	92	63	48	33	87	58	43	28
4 x 2	SPF #2	20'-0"	91	64	51	38	86	59	46	33	81	54	41	28	76	49	36	23
4 x 2	SPF #2	21'-0"	80	59	47	35	79	54	42	30	74	49	37	25	69	44	32	20
4 x 2	SPF 2100f-1.8E	22'-0"	83	62	52	39	83	62	48	34	83	57	43	29	79	52	38	24
4 x 2	SPF 2100f-1.8E	23'-0"	74	55	46	36	74	55	44	31	74	52	39	26	72	47	34	21
4 x 2	SPF 2100f-1.8E	24'-0"	64	48	40	32	64	48	40	28	64	47	35	23	64	42	30	18
4 x 2	SPF 2100f-1.8E	25'-0"	58	43	36	29	58	43	36	26	58	43	32	21	58	38	27	16

TABLE 4b $\Delta L = L / 480$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 14"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"	12"	16"	19.2"	24"
3 x 2	SPF #2	10'-0"	273	201	165	129	268	196	160	124	263	191	155	119	258	186	150	114
3 x 2	SPF #2	11'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	12'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	13'-0"	171	128	107	86	171	128	107	82	171	127	102	77	171	122	97	72
3 x 2	SPF #2	14'-0"	142	107	89	71	142	107	89	71	142	107	89	67	142	107	85	62
3 x 2	SPF #2	15'-0"	114	85	71	57	114	85	71	57	114	85	71	57	114	85	71	52
3 x 2	SPF #2	16'-0"	96	72	60	48	96	72	60	48	96	72	60	47	96	72	60	42
3 x 2	SPF #2	17'-0"	80	60	50	40	80	60	50	40	80	60	50	39	80	60	50	34
3 x 2	SPF #2	18'-0"	69	52	43	34	69	52	43	34	69	52	43	33	69	52	42	28
4 x 2	SPF #2	19'-0"	80	60	50	40	80	60	50	38	80	60	48	33	80	58	43	28
4 x 2	SPF #2	20'-0"	69	52	43	34	69	52	43	33	69	52	41	28	69	49	36	23
4 x 2	SPF 2100f-1.8E	21'-0"	72	54	45	36	72	54	45	36	72	54	45	33	72	54	43	28
4 x 2	SPF 2100f-1.8E	22'-0"	64	48	40	32	64	48	40	32	64	48	40	29	64	48	38	24
4 x 2	SPF 2100f-1.8E	23'-0"	56	42	35	28	56	42	35	28	56	42	35	26	56	42	34	21
4 x 2	SPF 2100f-1.8E	24'-0"	48	36	30	24	48	36	30	24	48	36	30	23	48	36	30	18
4 x 2	SPF 2100f-1.8E	25'-0"	43	32	27	22	43	32	27	22	43	32	27	21	43	32	27	16

(1) Table is based on the assumption multiple joists (repetitive members) are installed in a floor or roof system with minimum 5/8-inch sheathing attached to the top flanges. No increase in allowable load for repetitive member use or duration of load allowed.

(2) Allowable load values in the table shall be reduced if repetitive member conditions are not met (20 percent for 3x2 and 13 percent for 4x2)

(3) Loads noted in the table are limited by live load deflection (ΔL) and total load deflection (Δt)

(4) " Manufactured length" refers to overall length which includes the possibility of a 5 1/2-inch bearing on both ends. To compute the allowable "clear span" substract 11 inches from the tabulated manufactured length.

(5) SI conversions : 1 inch = 25,4 mm 1 foot = 304,8 mm 1 psf = 47,9 N / m^2

TABLE 5 - ALLOWABLE LIVE LOAD (PSF) FOR OPEN JOIST 2000 (1) (4)

TABLE 5a $\Delta L = L / 360$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 16"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19,2"	24"	12"	16"	19,2"	24"	12"	16"	19,2"	24"	12"	16"	19,2"	24"
3 x 2	SPF #2	10'-0"	281	207	170	133	276	202	165	128	271	197	160	123	266	192	155	118
3 x 2	SPF #2	11'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	12'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	13'-0"	188	137	112	87	183	132	107	82	178	127	102	77	173	122	97	72
3 x 2	SPF #2	14'-0"	169	123	100	77	164	118	95	72	159	113	90	67	154	108	85	62
3 x 2	SPF #2	15'-0"	153	111	90	69	148	106	85	64	143	101	80	59	138	96	75	54
3 x 2	SPF #2	16'-0"	145	105	85	65	140	100	80	60	135	95	75	55	130	90	70	50
3 x 2	SPF #2	17'-0"	142	103	83	63	137	98	78	58	132	93	73	53	127	88	68	48
4 x 2	SPF #2	18'-0"	169	123	100	77	164	118	95	72	159	113	90	67	154	108	85	62
4 x 2	SPF #2	19'-0"	161	117	95	73	156	112	90	68	151	107	85	63	146	102	80	58
4 x 2	SPF #2	20'-0"	154	112	91	70	149	107	86	65	144	102	81	60	139	97	76	55
4 x 2	SPF #2	21'-0"	148	107	87	67	143	102	82	62	138	97	77	57	133	92	72	52
4 x 2	SPF #2	22'-0"	137	99	80	61	132	94	75	56	127	89	70	51	122	84	65	46
4 x 2	SPF 2100f-1.8E	23'-0"	127	91	74	56	122	86	69	51	117	81	64	46	112	76	59	41
4 x 2	SPF 2100f-1.8E	24'-0"	104	78	65	52	102	76	64	47	94	70	59	42	86	64	54	37
4 x 2	SPF 2100f-1.8E	25'-0"	96	72	60	47	92	69	58	42	84	63	53	37	76	57	48	32
4 x 2	SPF 2100f-1.8E	26'-0"	83	62	52	42	81	61	51	37	73	55	46	32	65	49	41	27
4 x 2	SPF 2400f-2.0E	27'-0"	83	62	52	40	81	61	49	35	73	55	44	30	65	49	39	25
4 x 2	SPF 2400f-2.0E	28'-0"	75	56	47	36	73	55	44	31	65	49	39	26	60	45	34	21
4 x 2	SPF 2400f-2.0E	29'-0"	64	48	40	32	64	48	39	27	64	46	34	22	56	41	29	17
4 x 2	SPF 2400f-2.0E	30'-0"	56	42	35	28	56	42	35	24	56	41	30	19	48	36	25	14

TABLE 5b $\Delta L = L / 480$ $\Delta t = L / 240$ (3)

JOIST DEPTH : 16"			DEAD LOAD = 15				DEAD LOAD = 20				DEAD LOAD = 25				DEAD LOAD = 30			
CHORDS		MANUF	SPACING o.c.				SPACING o.c.				SPACING o.c.				SPACING o.c.			
SIZE	SPECIES / GRADE	LENGTH	12"	16"	19,2"	24"	12"	16"	19,2"	24"	12"	16"	19,2"	24"	12"	16"	19,2"	24"
3 x 2	SPF #2	10'-0"	281	207	170	133	276	202	165	128	271	197	160	123	266	192	155	118
3 x 2	SPF #2	11'-0"	241	177	145	113	236	172	140	108	231	167	135	103	226	162	130	98
3 x 2	SPF #2	12'-0"	212	155	127	99	207	150	122	94	202	145	117	89	197	140	112	84
3 x 2	SPF #2	13'-0"	188	137	112	87	183	132	107	82	178	127	102	77	173	122	97	72
3 x 2	SPF #2	14'-0"	169	123	100	77	164	118	95	72	159	113	90	67	154	108	85	62
3 x 2	SPF #2	15'-0"	153	111	90	69	148	106	85	64	143	101	80	59	138	96	75	54
3 x 2	SPF #2	16' 0"	145	105	85	65	140	100	80	60	135	95	75	55	130	90	70	50
3 x 2	SPF #2	17'-0"	142	103	83	63	137	98	78	58	132	93	73	53	127	88	68	48
4 x 2	SPF #2	18'-0"	169	123	100	77	164	118	95	72	159	113	90	67	154	108	85	62
4 x 2	SPF #2	19'-0"	144	108	90	73	144	108	90	68	139	103	85	63	134	98	80	58
4 x 2	SPF #2	20'-0"	128	96	80	64	128	96	80	64	128	96	80	60	123	91	75	55
4 x 2	SPF #2	21'-0"	112	84	70	56	112	84	70	56	112	84	70	56	112	84	70	52
4 x 2	SPF #2	22'-0"	88	66	55	44	88	66	55	44	88	66	55	44	88	66	55	44
4 x 2	SPF 2100f-1.8E	23'-0"	80	60	50	40	80	60	50	40	80	60	50	40	80	60	50	40
4 x 2	SPF 2100f-1.8E	24'-0"	75	56	47	38	75	56	47	38	75	56	47	38	75	56	47	37
4 x 2	SPF 2100f-1.8E	25'-0"	70	52	44	35	70	52	44	35	70	52	44	35	70	52	44	32
4 x 2	SPF 2100f-1.8E	26'-0"	64	48	40	32	64	48	40	32	64	48	40	32	64	48	40	27
4 x 2	SPF 2400f-2.0E	27'-0"	60	45	38	30	60	45	38	30	60	45	38	30	60	45	38	25
4 x 2	SPF 2400f-2.0E	28'-0"	54	40	34	27	54	40	34	27	54	40	34	26	54	40	34	21
4 x 2	SPF 2400f-2.0E	29'-0"	48	36	30	24	48	36	30	24	48	36	30	22	48	36	29	17
4 x 2	SPF 2400f-2.0E	30'-0"	41	31	26	21	41	31	26	21	41	31	26	19	41	31	25	14

(1) Table is based on the assumption multiple joists (repetitive members) are installed in a floor or roof system with minimum 5/8-inch sheathing attached to the top flanges. No increase in allowable load for repetitive member use or duration of load allowed.

(2) Allowable load values in the table must be reduced if repetitive member conditions are not met (20 percent for 3x2 and 13 percent for 4x2)

(3) Loads noted in the table are limited by live load deflection (ΔL) and total load deflection (Δt)

(4) " Manufactured length" refers to overall length which includes the possibility of a 5 1/2-inch bearing on both ends. To compute the allowable "clear span" substract 11 inches from the tabulated manufactured length.

(5) SI conversions : 1 inch = 25,4 mm 1 foot = 304,8 mm 1 psf = 47,9 N / m^2

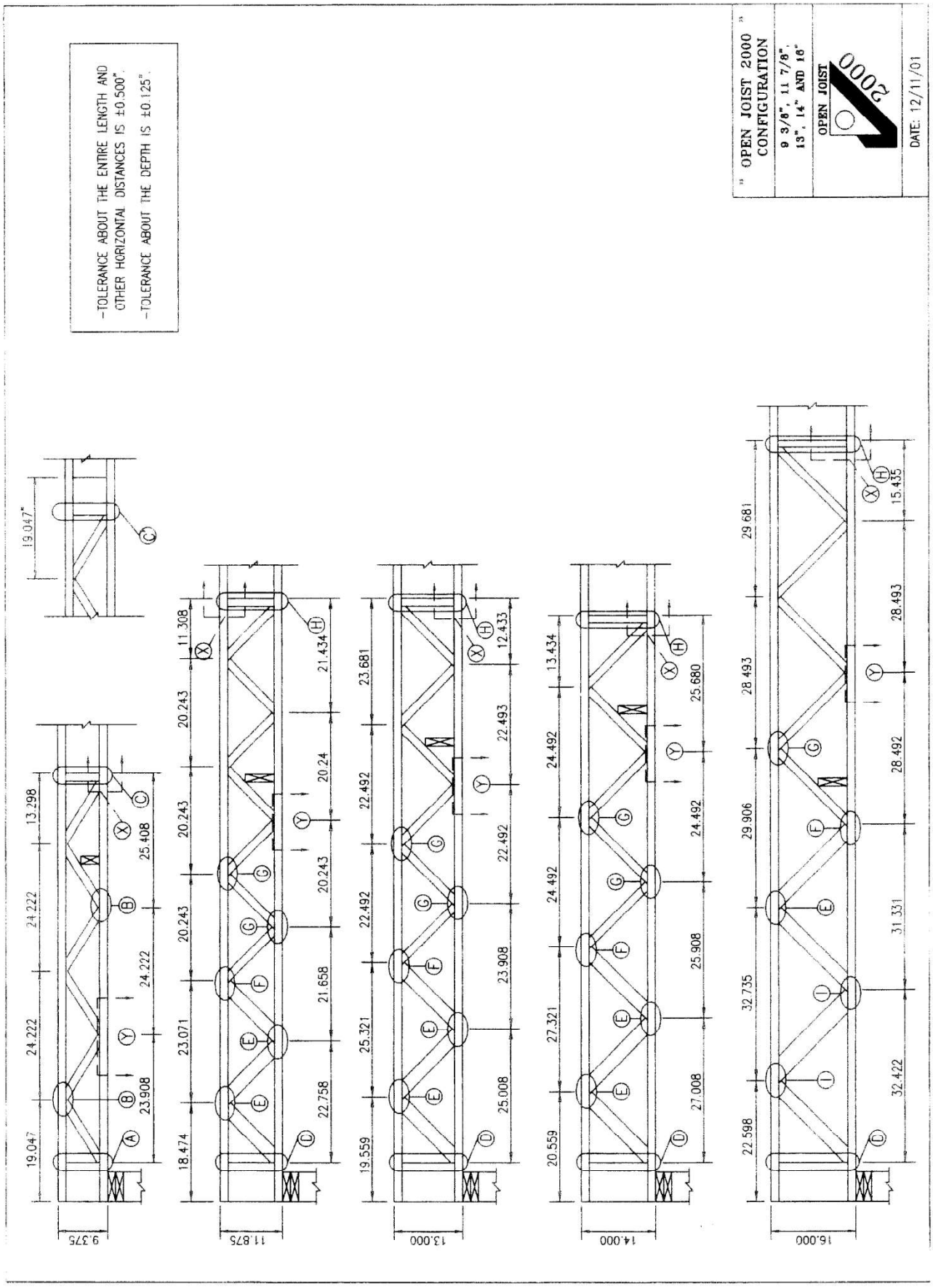

FIGURE 2—TYPICAL TRUSSES

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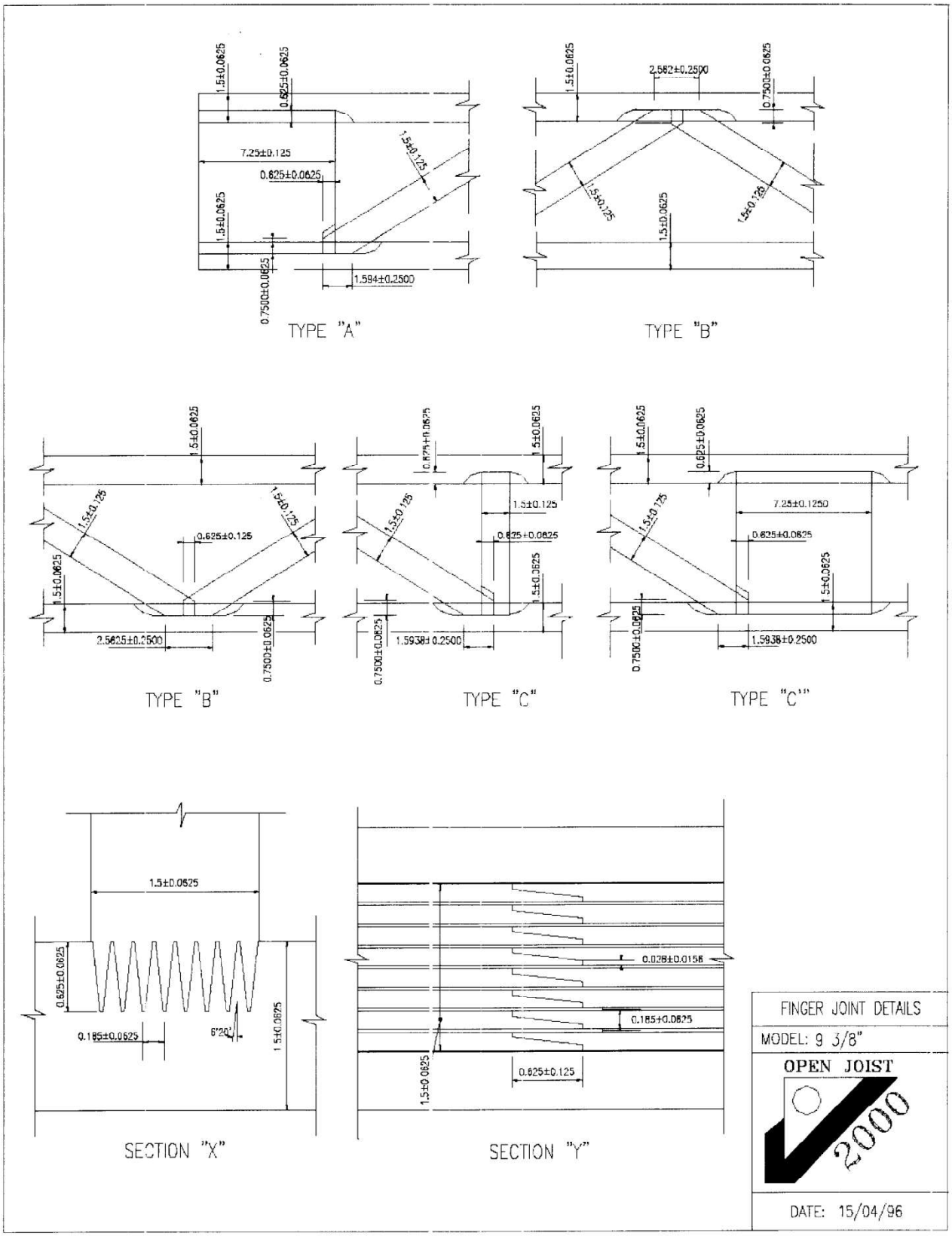

FIGURE 3—TYPICAL TRUSS DETAILS

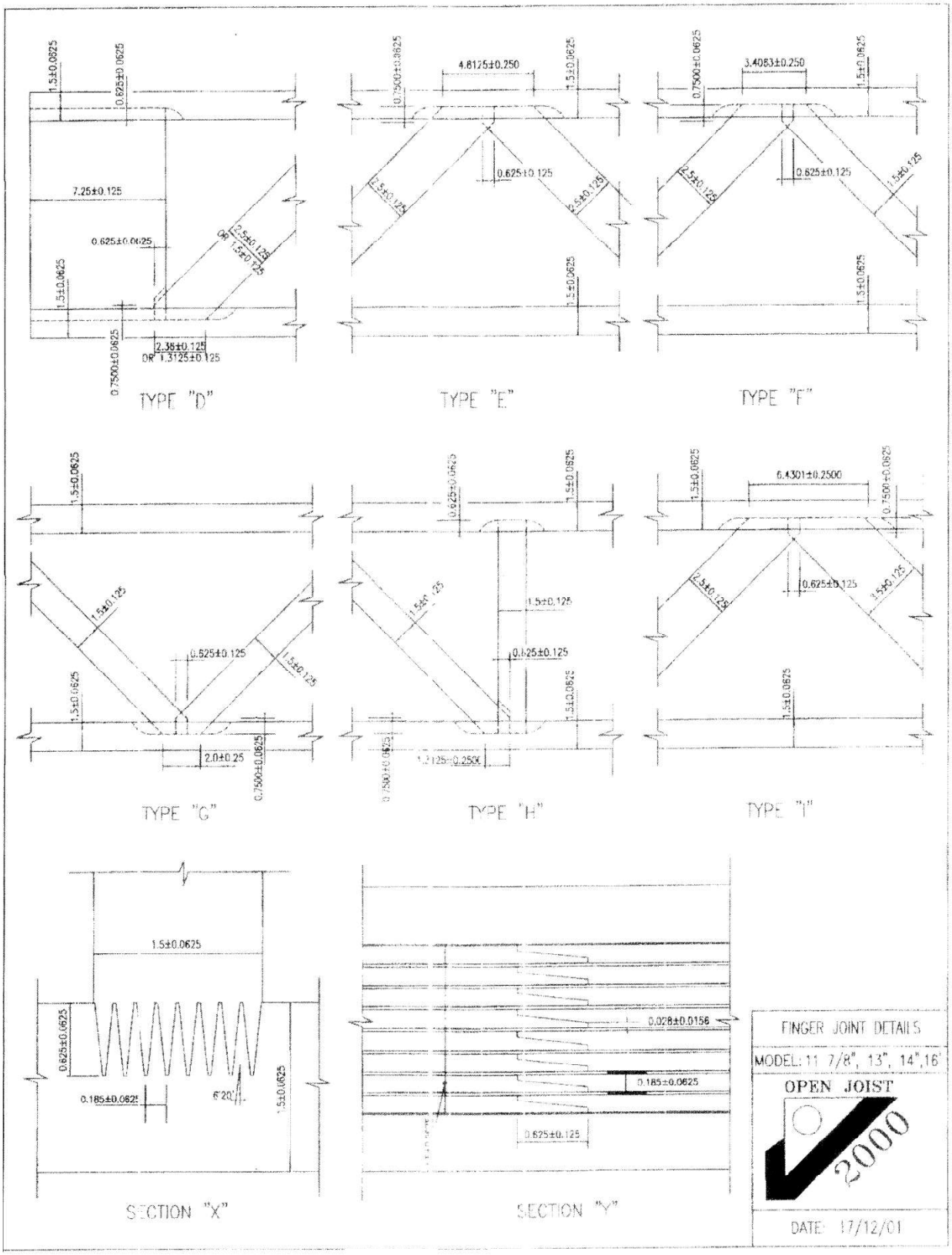

FIGURE 3—TYPICAL TRUSS DETAILS (Continued)