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## Code of Standard Practice for Cold-Formed Steel Structural Framing, 2011 Edition

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AISI S202-11



# **AISI** STANDARD

## **Code of Standard Practice for Cold-Formed Steel Structural Framing**

2011 Edition

Endorsed by  
Association of the Wall and Ceiling Industry  
Structural Building Components Association  
Steel Framing Alliance  
Steel Framing Industry Association  
Steel Stud Manufacturers Association



## DISCLAIMER

The material contained herein has been developed by the American Iron and Steel Institute Committee on Framing Standards. The Committee has made a diligent effort to present accurate, reliable, and useful information on trade practices for fabrication and installation of cold-formed steel structural framing. The Committee acknowledges and is grateful for the contributions of the numerous engineers, manufacturers, contractors and others who have contributed to the body of knowledge on the subject. Specific references are included in the *Code of Standard Practice* document.

With anticipated improvements in understanding of the behavior of cold-formed steel framing and the continuing development of new technology, this material will become dated. It is anticipated that AISI will publish updates of this material as new information becomes available, but this cannot be guaranteed.

No conflict between this *Code of Standard Practice* and any legal building regulation is intended. This *Code of Standard Practice* is intended only to supplement and amplify such legal building regulations and laws.

The materials set forth herein are for general purposes only. They are not a substitute for competent professional advice. Application of this information to a specific project, particularly if included as part of a contract, should be reviewed by competent legal counsel. Anyone making use of the information set forth herein does so at their own risk and assumes any and all liability arising there from.

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## PREFACE

The American Iron and Steel Institute Committee on Framing Standards has developed this *Code of Standard Practice for Cold-Formed Steel Structural Framing (Code of Standard Practice)* to address trade practices for design, fabrication and installation of *cold-formed steel structural framing* products.

This *Code of Standard Practice* is intended to serve as a state-of-the-art guide as well as a voluntary model for establishing contractual relationships between various parties in a construction project where *cold-formed steel* structural materials, components, or assemblies are used. It is not intended to take precedence over the *contract, construction documents* or the use of good judgment for specific construction projects and conditions. However, these provisions are considered suitable for reference or inclusion in *contracts* or *construction documents* and serve as a model for that purpose.

This *Code of Standard Practice* is not applicable to *non-structural members*, including but not limited to interior drywall framing, which is addressed by ASTM C645 and C754, or *structural steel*, structural steel joists, steel deck, *metal building systems* or rack structures, which are addressed by AISC, SJI, SDI, MBMA and RMI, respectively.

The purpose of the Commentary is to provide a record of the reasoning behind and the justification for the various provisions of this *Code of Standard Practice*. The Commentary is included as non-mandatory background to provide a series of explanations, illustrations, and interpretations for the *owner's representatives, registered design professionals, contractors, suppliers, manufacturers, installers* and others.

The readers who wish to have more complete information, or who may have questions which are not answered by the abbreviated presentation of the Commentary, should refer to the Referenced Documents listed in Section A3.

The Committee acknowledges and is grateful for the numerous engineers, manufacturers, contractors and others who have contributed to the body of knowledge on the subject. The Committee wishes to also express its appreciation for the support of the Association of the Wall and Ceiling Industry (AWCI), Structural Building Components Association (SBCA), Steel Framing Alliance (SFA), Steel Framing Industry Association (SFIA), and Steel Stud Manufacturers Association (SSMA).

The first edition of this *Code of Standard Practice* was published in 2005. The 2006 Edition included new provisions on *revisions*, the *RFI* process, contract price adjustment and scheduling. This 2011 Edition has incorporated the truss responsibilities that were published in *Supplement 2 to the North American Standard for Cold-Formed Steel Framing – Truss Design, 2007 Edition*.

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## CODE OF STANDARD PRACTICE FOR COLD-FORMED STEEL STRUCTURAL FRAMING

### A. GENERAL

#### A1 Scope

The practices in this *Code of Standard Practice* are a model to address the design, fabrication and installation of *cold-formed steel (CFS) structural framing*.

When adopted wholly or in part by a *contract* or *construction documents*, the trade practices that are defined in this *Code of Standard Practice* shall govern the design, fabrication and installation of *CFS structural framing*.

In addition to the requirements in Chapters A through H, Chapter I of this standard shall apply to *CFS component assemblies*.

#### **Commentary:**

The practices defined in this *Code of Standard Practice* are the commonly accepted standards of custom and usage for the fabrication and installation of *CFS structural framing*, which generally represent the most efficient approach. This *Code of Standard Practice* is not intended to define a professional standard of care for the *owner's representatives* and *building designer* or change the duties and responsibilities of the *owner, contractor, registered design professional* (e.g., architect or structural engineer-of-record) from those set forth in the *contract* or *construction documents*. Nor does it assign to the *owner* or *registered design professionals* any duty or authority to undertake responsibility inconsistent with the provisions of the *contract* or *construction documents*.

#### **Commentary:**

This *Code of Standard Practice* is not applicable to *non-structural members*, including but not limited to interior drywall framing, which is addressed by ASTM C645 and C754, or *structural steel*, structural steel joists, steel deck, *metal building systems* or rack structures, which are addressed by AISC, SJI, SDI, MBMA and RMI, respectively. An extended list of non-applicable items is given in Section B2.

#### A2 Definitions

Where terms appear in this standard in italics, such terms shall have meaning as defined in AISI S200 unless as defined herein. Terms included in square brackets are specific to *LSD* terminology. Terms not italicized shall have ordinary accepted meaning in the context for which they are intended.

*AISC*. American Institute of Steel Construction.

*AISI*. American Iron and Steel Institute.

*Approved*. Acceptable to the code official or authority having jurisdiction.

*Bracing*. Structural elements that are installed to provide restraint or support or both to other framing members so that the complete assemblies form a stable structure.

*Building Designer*. *Owner* of the building or the person that *contracts* with the *owner* for the design of the framing structural system or who is responsible for the preparation of the *construction documents*. When mandated by the legal requirements, the *building designer* shall be a *registered design professional* (e.g., architect or structural engineer-of-record). Also referred to as *owner's representative for design*, but hereinafter will be referred to as *building designer*.

*CASE*. Council of American Structural Engineers.

*CFS. Cold-formed steel.*

*CFS Structural Framing.* The elements of the structural frame, as given in Section B1 of this *Code of Standard Practice*.

*CFS Component Assembly.* A fabricated assemblage which consists primarily of *CFS structural members* that is manufactured by the *CFS component manufacturer*.

*CFS Component Design Drawing.* The written, graphic and pictorial definition of an individual *CFS component assembly*, which may include engineering design data. Also referred to as *truss design drawing* for *truss* construction.

*CFS Component Designer.* The individual or organization responsible for the engineering design of *CFS component assemblies*. Also referred to as *truss design engineer* on projects involving *trusses*, but hereinafter will be referred to as *CFS Component Designer*.

*CFS Component Manufacturer.* The individual or organization responsible for the manufacturing of *CFS component assemblies* for the project. Also referred to as *truss manufacturer* on projects involving *trusses*, but hereinafter will be referred to as *CFS Component Manufacturer*.

*CFS Component Placement Diagram.* The illustration supplied by the *CFS component manufacturer* identifying the location assumed for each of the *CFS component assemblies* which references each individually designated *CFS component design drawing*.

*Clarification.* An interpretation of the *construction documents* that have been *released for construction*, providing an explanation that neither revises the information that has been *released for construction* nor alters the cost or schedule of performance of the work.

*Construction Documents.* Written, graphic and pictorial documents prepared or assembled for describing the design (including the framing structural system), location and physical characteristics of the elements of a building necessary to obtain a building permit and construct a building.

*Contract.* The legally recognized agreement between two parties, which defines, among other items, the responsibilities of the parties involved in bidding, purchasing, designing, supplying, and installing *CFS framing*.

*Contractor.* *Owner* of the building, or the person that *contracts* with the *owner*, who constructs or manages the construction of the building in accordance with the *construction documents*. Also referred to as *owner's representative for construction*, but hereinafter will be referred to as *contractor*.

*Discrepancy.* Any conflicts within the *construction documents*, or conflicts between the *construction documents* and *applicable building codes*.

*Drawings.* See *Plans and Installation Drawings*.

*Embedded Anchor.* A structural anchor or device (bolt, strap, plate, etc.) intended for fastening *CFS structural framing* to masonry or concrete that is installed prior to hardening of the grout or concrete.

*Framing Contractor.* See *Installer*.

*Framing Material.* Steel products, including but not limited to *structural members* and *CFS component assemblies*, ordered expressly for the requirements of the project.

*General Contractor.* See *Contractor*.

*Installation Drawings.* Drawings that show the location and installation of the *CFS structural framing*. Also referred to as *truss placement diagram* for *truss* construction.

*Installer.* Party responsible for the installation of *CFS* products.

**Commentary:**

While this *Code of Standard Practice* was patterned after a similar document by the AISC, care was taken to use terminology to avoid confusion between material suppliers, fabricators and trades. Therefore, the term *installer* is used in reference to *CFS structural framing* versus the term *erector* typically used in reference to *structural steel*.

*Lateral Force-Resisting System.* The *structural* elements and connections required to resist racking and overturning due to wind forces or seismic forces, or both imposed upon the structure in accordance with the *applicable building code*.

*Material Supplier.* An individual or entity responsible for furnishing *framing materials* for the project.

*MBMA.* Metal Building Manufacturers Association.

*Metal Building System.* A complete integrated set of mutually dependent components and assemblies that form a building. As defined by the MBMA, a *metal building system* includes the primary and secondary framing, covering, and accessories, all of which are manufactured to permit inspection on site prior to assembly or installation.

*Owner.* The individual or entity organizing and financing the design and construction of the project.

*Owner's Representative.* The *owner* or individual designated contractually to act for the *owner*. Referred to as *building designer* when referencing *owner's representative* for design. Referred to as *contractor* when referencing *owner's representative* for construction.

*Plans.* Also referred to as construction drawings. Drawings prepared by the *building designer* for the *owner* of the project. These drawings include but are not limited to floor plans, framing plans, elevations, sections, details and schedules as necessary to define the desired construction.

*Post-Installed Anchor.* A structural anchor or device (bolt, clip, angle, bracket, etc.) intended for fastening *CFS structural framing* to hardened masonry or concrete. For anchorage to concrete, these anchors are installed after the concrete has achieved sufficient stiffness to be sawn or drilled.

*Receiving Entity.* The individual or entity responsible to the *contractor* for accepting or rejecting furnished *framing materials*, and proper storage of received *framing materials* on the job site.

*Registered Design Professional.* Architect or engineer, who is licensed to practice their respective design profession as defined by the legal requirements of the jurisdiction in which the building is to be constructed.

*Release for Construction.* The release by the *owner's representative* permitting the *CFS component manufacturer* or *installer* to commence work under the *contract*, including ordering *framing material* and preparing *installation drawings*.

*Revision.* An instruction or directive providing information that differs from information that has been *released for construction*. A *revision* may, but does not always, impact the cost or schedule of performance of the work.

*RFI.* Request for Information. A written request for information or *clarification* generated during the bidding, design or construction phases of the project.

*RMI.* Rack Manufacturers Institute.

*SDI.* Steel Deck Institute.

*Shop Drawings.* Drawings for the production of individual *CFS component assemblies* for the project.

*Specialty Designer.* The *registered design professional*, individual or organization having responsibility for the design of the specialty items. This responsibility shall be in accordance with the state's, province's or territory's statues and regulations governing the professional registration and certification of architects or engineers. Also referred to as *CFS component designer*, specialty engineer, delegated engineer, design engineer, registered engineer, and engineer, but hereinafter will be referred to as *Specialty Designer*. The requirement for a *Specialty Designer* is typically called out in the *specifications* or structural general notes. The *Specialty Designer* is typically not the *building designer*.

*Specifications.* Written instructions, which, with the *plans*, define the materials, standards, design of the products, and workmanship expected on a construction project.

*SJI.* Steel Joist Institute.

*SSMA.* Steel Stud Manufacturers Association.

*Standard Cold-Formed Steel Structural Shapes.* *CFS structural members* that meet the requirements of the *SSMA Product Technical Information* or *AISI North American Standard for Cold-Formed Steel Framing – Product Data*.

**Commentary:**

The *AISI North American Standard for Cold-Formed Steel Framing – Product Data* was introduced in 2006. While the industry is encouraged to migrate to this new document, it is recognized that the *SSMA* document is also applicable and has widespread acceptance.

*Structural Steel.* The elements of the structural frame defined as *structural steel* by *AISC* in the *Code of Standard Practice for Steel Buildings and Bridges*.

*Sub-Contractor.* The individual or organization with whom a *contractor* has contracted to furnish or install all or a portion of the project.

*Submittals.* Items required by the *construction documents* or *contract* to be submitted by the *contractor* or *sub-contractor*. These include but are not limited to *CFS component design drawings*.

*Truss Design Drawing.* Written, graphic and pictorial depiction of an individual *truss*.

*Truss Designer.* Person responsible for preparation of the *truss design drawings*.

*Truss Design Engineer.* Person who is licensed to practice engineering as defined by the legal requirements of the jurisdiction in which the building is to be constructed and who supervises the preparation of the *truss design drawings*.

*Truss Member.* A *chord member* or *web member* of a *truss*.

*Truss Placement Diagram.* Illustration identifying the assumed location of each *truss*.

*Truss Submittal Package.* Package consisting of each individual *truss design drawing*, and, as applicable, the *truss placement diagram*, the cover/truss index sheet, permanent individual *truss member* restraint/bracing details designed in accordance with generally accepted engineering practice, applicable permanent individual *truss member* restraint/bracing details, and any other structural details germane to the *trusses*.

### **A3 Referenced Documents**

The following documents or portions thereof are referenced within this *Code of Standard Practice* and shall be considered part of the requirements of this document.

1. AIA 201, *General Conditions of the Contract for Construction (1997)*, American Institute of

Architects, Washington, DC.

2. AISI S200-07, *North American Standard for Cold-Formed Steel Framing – General Provisions*, American Iron and Steel Institute, Washington, DC.
3. AISI S201-07, *North American Standard for Cold-Formed Steel Framing – Product Data*, American Iron and Steel Institute, Washington, DC.
4. AISI S214-07 with S2-08, *North American Standard for Cold-Formed Steel Framing – Truss Design, 2007 Edition with Supplement 2*, American Iron and Steel Institute, Washington, DC.
5. ASTM A780-01, *Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings*, ASTM International, West Conshohocken, PA.
6. ASTM A1003/A1003M-05, *Standard Specification for Sheet Steel, Carbon, Metallic and Non-Metallic Coated for Cold-Formed Framing Members*, ASTM International, West Conshohocken, PA.
7. ASTM C645-06, *Standard Specification for Nonstructural Steel Framing Members*, ASTM International, West Conshohocken, PA.
8. ASTM C754-04, *Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products*, ASTM International, West Conshohocken, PA.
9. ASTM C955-06, *Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases*, ASTM International, West Conshohocken, PA.
10. SSMA, *Product Technical Information, 2001 Edition*, Steel Stud Manufacturers Association, Chicago, IL.

#### **A4 Responsibility for Design**

**Commentary:**

Prior to this *Code of Standard Practice*, design responsibilities for *component assemblies* were defined in several overlapping industry documents, which included the AISI S214, the *North American Standard for Cold-Formed Steel Framing – Truss Design*, LGSEA Council Technical Note 551f on *Specifying Trusses*, and STCA *Standard Practices and Recommended Guidelines on Responsibilities for Construction Using Cold-Formed Steel Trusses and Components*. Where the AISI S214, the *North American Standard for Cold-Formed Steel Framing – Truss Design* is referenced by the *applicable building code*, those responsibilities would be legally binding unless modified. However, design responsibilities for other types of CFS *structural framing* were only partially defined in several CASE documents, which included the *National Practice Guidelines for Structural Engineer of Record* and *National Practice Guidelines for Specialty Structural Engineers*.

**Commentary:**

A key point of this *Code of Standard Practice* and the documents used in its development is that although design may be delegated, the *building designer* is responsible for the overall stability and integrity of the structure when completed.

**A4.1** The *building designer* is responsible for the overall design of the building as required by the *applicable building code*. The *building designer* or the *owner* shall have a right to solicit designs, *plans*, *specifications* and data for the *CFS structural framing* or *CFS component assemblies* from the *CFS component manufacturer*, *installer* or *specialty designer*, but the responsibility for specifying the requirements of the design, including the *applicable building codes* and standards, remain with the *building designer*.

**A4.2** If the *construction documents* or *contract* specify *CFS component assemblies*, the *construction documents* or *contract* shall define the responsibility for design of the *CFS component assemblies*. If the *construction documents* or *contract* require that the *CFS component manufacturer*, *installer* or *specialty designer* be responsible for the design of *CFS structural framing* or *component assemblies*, the *construction documents* or *contract* shall state clearly and precisely the exact requirements, including all *applicable building codes* and design criteria. The *building designer* assumes the responsibility for specifying the appropriate design criteria and shall confirm that the *specialty designer's* work conforms to the intent of the *construction documents*. The *building designer* shall be responsible for reviewing submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building. This review shall, at minimum, address the forces and reactions as identified by the *specialty designer* that are transmitted to those elements of the structure that are not designed by the *specialty designer* as well as coordinate the various structural-related submittals with each other to ensure compatibility with the main building structure.

**Commentary:**

For *lateral force-resisting systems*, the design responsibilities of the *building designer* include but are not limited to design of roof/floor diaphragms, lateral load transferring elements (sometimes referred to as shear walls or shear transfer bracing), main lateral force-resisting elements and foundations, as well as compliance of the overall structure with *applicable building codes*.

When the design of lateral load transferring elements is to be performed by a *specialty designer* or *CFS component designer*, the *building designer* must specify the following:

- (1) Magnitude of lateral load to be transferred;
- (2) Load path (i.e., where loads originate and where they are to be transferred);
- (3) Bearing material and conditions; and
- (4) Any special requirements for the design of the transferring elements.

The *building designer* must also provide for the following in the design and detailing of the building:

- (1) Horizontal, vertical or other deflection requirements due to vertical or lateral loads, or both; and
- (2) Support and anchorage accommodating horizontal and vertical reactions due to lateral loads.

**A4.3** If the *owner* chooses not to hire a *registered design professional*, the *owner* is responsible for the suitability, adequacy and legality of all aspects of design in the *plans* and *specifications*. In this case, the *owner* is responsible for the review and approval of *submittals*.

**A4.4** The *contractor* or *sub-contractor* shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the *construction documents* or *contract* for a portion of the work or unless the *contractor* or *sub-contractor* needs to provide such services in order to carry out the *contractor's* or *sub-contractor's* responsibilities for construction means, methods, techniques, sequences and procedures.

**Commentary:**

The provisions of Section A4.4 were based on AIA 201 Section 2.12.10; however, references to the *contractor* were expanded to include both the *contractor* and *sub-contractor*.

## B. CLASSIFICATION OF MATERIALS

### B1 Definition of Cold-Formed Steel Structural Framing

*CFS structural framing* shall consist of the elements of the structural frame that are shown in the *construction documents*, essential to support the design loads and described as:

- *CFS structural members.*
- *CFS component assemblies.*
- *Bracing and blocking* necessary for the *CFS structural framing* or to provide stability for *CFS structural members.*
- Connection methods, hardware (fasteners, connectors, and *post-installed anchors*) and processes necessary for the installation of *CFS structural framing.*
- *Lateral force-resisting system.*
- Welding materials and processes related to the fabrication or installation of *CFS structural framing.*

#### **Commentary:**

The items listed in Section B1 are normally fabricated or installed by the *CFS component manufacturer or installer*, and thereby define the scope of this *Code of Standard Practice.*

### B2 Other Items

*CFS structural framing* shall not include other items that are not generally described in Section B1, even where such items are shown in the structural *plans* or are attached to the *CFS structural framing* unless specifically identified by item in the *contract* or *construction documents*, or *both*. Other items include but are not limited to:

- Awnings.
- Blocking for other attachments, such as door, window, cabinet, handrail, plumbing, awnings, storefront, glazing and other systems.
- Building cleaning equipment and equipment anchor support.
- Cables for permanent *bracing* or suspension systems.
- *CFS* concrete form decking.
- *CFS* floor decking.
- *CFS non-structural framing.*
- *CFS* roof decking.
- *CFS* wall sheathing, except as part of a *lateral force-resisting system.*
- Chimney support framing.
- Concrete slab edge forms.
- Drywall and plaster trims and accessories.
- Eave struts deployed as a component of a *metal building system.*
- Edge angles, plates, embeds and *structural steel* supports necessary for the support of suspended *CFS framing.*
- *Embedded anchors.*
- Expansion and control joints.
- Fastening systems for ceiling, wall, floor and roof sheathing materials.
- Fire, smoke and draft stopping.
- Flagpole support framing.
- Girts deployed as a component of a *metal building system.*
- Handrails and handrail support members.
- Insulation products.



- Interior drywall (*non-structural*) framing.
- Mechanical equipment support framing.
- *Metal building systems.*
- Metal panels deployed as a component of a *metal building system.*
- Miscellaneous metal.
- Opening framing, if made from other than *standard CFS structural shapes.*
- Open-web steel joists.
- Plaster lathing, except where included with a *prefabricated structural assembly.*
- Purlins deployed as a component of a *metal building system.*
- Sheathing, unless part of a *prefabricated structural assembly.*
- Stairs, stair landings and stair railings.
- Stair component support framing.
- *Structural steel* framing.
- *Structural steel* lintels, if job-site installed.
- *Structural steel* plate.
- Support framing for cables.
- Support framing for sign structures.
- Suspended ceiling systems, proprietary or pre-engineered.
- Window washing supports.

**Commentary:**

The items listed in Section B2 are normally not fabricated or installed by the *CFS component manufacturer* or *installer*. When such items are contracted to be provided by the *CFS component manufacturer* or *installer*, coordination will normally be required between the *CFS component manufacturer* or *installer* and other material suppliers and trades.

## C. CONSTRUCTION DOCUMENTS

### Commentary:

*Construction documents* vary greatly in complexity. Nonetheless, the *CFS component manufacturer* and *installer* must be able to rely upon the accuracy and completeness of the *construction documents*. This allows the *CFS component manufacturer* and *installer* to provide the *owner* with bids that are adequate and complete.

### Commentary:

One of the *contractor's* responsibilities is to ensure proper communication of all facts throughout the construction phases of the project between all parties involved. The *construction documents* (i.e., architectural plans, structural plans, *specifications* and structural notes) are the primary method of communication. It is the *building designer's* responsibility to properly define the scope of work. When the *contractor* releases *plans* or *specifications* for construction, the *CFS component manufacturer* and *installer* rely on the fact that these are the *owner's* requirements for his project.

### Commentary:

Critical requirements that are necessary to protect the *owner's* interests, which affect the integrity of the structure or that are necessary for the *CFS component manufacturer* or *installer* to proceed with their work must be included in the *construction documents*. In some cases, however, the *owner* can benefit when reasonable latitude is allowed in the *construction documents* or *contract* for alternatives that can reduce cost without compromising quality.

## C1 Responsibilities

**C1.1** The *owner* or *contractor* shall furnish to the *CFS component manufacturer* and *installer* a set of *construction documents* of current issue including addenda showing the type of support supplied, method of attachment, correct dimensions, and required minimum or maximum sizes and spacings.

**C1.2** If *construction documents* are not available, the *building designer* shall provide complete information as specified in Section A4.2.

**C1.3** The *construction documents* or *contract* may require the *CFS component manufacturer* or *installer* to submit a complete design for *approval* or review prior to the commencement of construction. In the process of this submittal, the *CFS component manufacturer* or *installer* shall bring to the attention of the *building designer* any *discrepancy* within the construction documents. The *building designer* must present clear instructions to the *CFS component manufacturer* or *installer* on how to resolve each *discrepancy*. Changes resulting from such discrepancies shall be handled in accordance with Sections H5 through H9.

**C1.4** Architectural *plans* shall be legible, shall indicate the design intent of *CFS structural framing*, and shall include at a minimum the location of *CFS structural framing*, constraints on member size (e.g., web depth), wall and other assembly types, non-standard spacing and location requirements.

**C1.5** Structural *plans* shall show the *structural member* locations, sizes, reinforcing and connections in sufficient scale and detail to enable the construction of the building in a reasonable sequence by a competent *contractor* experienced in the techniques of construction for the specified materials. Structural *plans* may refer to architectural *plans* for dimensions, where appropriate. Elevations, sections and details should be of appropriate scale, number and extent to portray clearly the relationship of members to each other and their interconnection(s). Care should be taken to determine that details noted "typical" are applicable to the project or condition being portrayed.

## C2 Limit of Responsibility

The *construction documents* are assumed to be correct in all details, and the *CFS component manufacturer's* and *installer's* responsibility is limited to furnishing products in accordance with these documents and this *Code of Standard Practice*. Any change to these *construction documents* must be authorized in writing by the *building designer*.

### Commentary:

It should not be the responsibility of the *CFS component manufacturer* or the *installer* to compare the *construction documents* (i.e., architectural plans, structural plans, *specifications* and structural notes) against each other in order to verify consistency. This is typically the responsibility of the *building designer*.

## C3 Jurisdiction

The *construction documents* shall specify the required building codes and authorities having jurisdiction.

## C4 Discrepancies or Omissions

When a *discrepancy* or omission is discovered in the *construction documents* in the course of work by the *contractor*, *CFS component manufacturer*, *installer* or any other parties involved with the construction, the entity finding the *discrepancy* or omission shall promptly notify the *contractor* so that the *discrepancy* or omission can be resolved by the *building designer*. Such resolutions shall be timely so as not to affect the work of the *CFS component manufacturer* or *installer*. Changes resulting from such *discrepancies* or omissions shall be handled in accordance with Sections H5 through H9 as appropriate.

### Commentary:

While it is the responsibility of the *CFS component manufacturer* or *installer* to report any *discrepancies* or omissions that are discovered in the *construction documents*, it is not the responsibility of the *CFS component manufacturer* or *installer* to discover *discrepancies* or omissions, including those that are associated with the coordination of the various disciplines. The quality of the *construction documents* is the responsibility of the entities that produce those documents.

## C5 Revisions

*Revisions* to the *construction documents* shall be made either by issuing new *construction documents*, by reissuing the existing *construction documents*, or by the *RFI* process. In all cases, *revisions*, including *revisions* that are communicated through responses to *RFIs* (see Section H5) or the review process (see Section D3), shall be clearly and individually indicated on such documents. If new *construction documents* are issued due to *revisions*, the parties issuing the new *construction documents* shall submit them to the *contractor* for distribution. The *construction documents* shall be dated and identified by *revision number*. Revised *construction documents* shall be identified by the same number throughout the duration of the project, regardless of the *revision*. See also Sections H5 through H9 as appropriate.

### Commentary:

*Revisions* to the *construction documents* can be made by issuing sketches and supplemental information separate from the *construction documents*. These sketches and supplemental information become amendments to the *construction documents* and are considered new *construction documents*. All sketches and supplemental information must be uniquely identified with a number and date as the latest instructions until such time as they may be superseded by new information. When *revisions* are made by revising and reissuing the existing *construction documents*, a unique revision number and date must be added to those documents to identify that information as the latest instructions until such time as they may be superseded by new information. The same unique *drawing number* must identify each *drawing* throughout the duration of the project so that *revisions* can be properly tracked, thus avoiding confusion

and miscommunication among the various entities involved in the project. When *revisions* are communicated through the annotation of *submittals*, such changes must be confirmed in writing by one of the aforementioned methods. This written confirmation is imperative to maintain control of the cost and schedule of a project and to avoid potential errors in fabrication and installation.

## D. INSTALLATION DRAWINGS

### D1 Owner Responsibility

**D1.1** When the project is *released for construction*, the *owner* or *contractor* shall provide complete *construction documents* and relevant information (including addenda and other related drawings such as window shop drawings and architectural metal panel drawings) in a timely manner for the installation of *CFS structural framing* and, if required, for the preparation of *CFS component design drawings* and *installation drawings*. A scope of work for items required, having been agreed upon at the time of the *contract*, shall also be incorporated with these documents. This scope shall include and indicate all items that are to be fabricated and installed.

**D1.2** If the *owner* or *contractor* requests that *submittals* be prepared before the timely submittal of any other required documents, such as window shop drawings or architectural metal panel drawings, any changes required due to the differences between these drawings and the assumptions made in preparation of the *submittals* must be the responsibility of the *building designer*. Delays in obtaining such required information can extend the schedule agreed to at time of *contract*.

### D2 Component Manufacturer and Installer Responsibility

**D2.1** The *CFS component manufacturer* or *installer* shall submit *submittals* including provisions per Chapter I, when required by and per the *construction documents* or *contract*, on a schedule formulated and agreed to at time of *contract*.

**Commentary:**

The *CFS component manufacturer* or *installer* should be permitted to use the services of a *specialty designer* or independent detailer to produce *shop drawings* or *installation drawings* and to perform other support services.

**Commentary:**

When the *CFS component manufacturer* or *installer* provides a schedule for *submittals*, it must be recognized that this schedule may be affected by *revisions*, response time to *RFI(s)*, and resolution of *discrepancies* or omissions.

**D2.2** Requests for supplemental structural support elements, such as miscellaneous structural steel or embedded items not specified in the *construction documents* or *contract*, shall be submitted by the *CFS component manufacturer* or *installer* and handled in accordance with Sections H5 through H9. Delays in obtaining confirmation of such requests can extend the schedule agreed to at time of *contract*.

### D3 Review Process

**Commentary:**

Upon receipt of *shop drawings* from different trades, the *owner* or *contractor* must review each *submittal*, as well as forward it as appropriate to the *building designer* for review in order to assure continuity and completeness. The different trade *submittals* must be reviewed to ensure conformity and identify conflicts or “gray” areas not covered by any trade but necessary to integrate the different trades.

**D3.1** The *owner* or *contractor* shall forward the *submittals* to the *building designer* for review. The *building designer* shall return the *submittals* indicating one of the following: reviewed (no exception taken), reviewed as noted (re-submittal not required), revise and resubmit, or rejected.

**D3.2** The *owner* or *contractor* shall return to the *CFS component manufacturer* or *installer* one set of the *submittals* indicating one of the following: approved (no exception taken), approved as noted (re-submittal not required), revise and resubmit, or rejected.

**D3.3** If modifications are required, the *CFS component manufacturer* or *installer* and *specialty designer*, if retained by the *CFS component manufacturer* or *installer*, shall have at least fourteen (14) calendar days for incorporating the required changes.

**D3.4** If modifications with the re-submittal are required, the *submittals* shall be resubmitted to the *contractor* for construction for review and approval in accordance with Sections D3.1 and D3.2 after all required modifications and corrections have been executed.

**Commentary:**

If such modifications involve a single item or minor changes, only those items need to be revised and resubmitted. These *revisions* may be appended to the original *submittals*. For example, if one *CFS component design drawing* among several designs is incorrect, that design should be revised and resubmitted. However, if the design criteria have been revised, all the *CFS component design drawings* based on that criteria must be revised and resubmitted. *Revisions* to the *CFS component design drawings* can be made by issuing sketches and supplemental information separately from the *CFS component design drawings*.

**D3.5** Should modifications be required which were not part of the agreed to scope of work, the *CFS component manufacturer* or *installer* shall submit in writing an appropriate modification to the contract price for this modification (including but not limited to engineering, material, labor, overhead and profit) for approval by the *owner* or *contractor*.

**D3.6** The *CFS component manufacturer* or *installer* shall not proceed with any portion of work until all modifications and extra charges for that portion of work are resolved.

**Commentary:**

The intent of this section is to protect all parties from potential risks and costs associated with proceeding prior to the resolution of issues.

**D3.7** It is the responsibility of the *owner* or the *contractor* to ensure that the above *submittal* process is coordinated with the project schedule.

#### **D4 General Responsibility**

**D4.1** The *owner* or *owner's representative for construction* is responsible for approval of the *submittals* prepared by the *CFS component manufacturer* or *installer* that have been reviewed by the *building designer*. This approval and review indicate that the *CFS component manufacturer* or *installer* has correctly interpreted the construction drawings and *contract* requirements and is released to start fabrication and installation.

**D4.2** Approval by the *owner* or *contractor* and review by the *building designer* of *submittals* does not relieve the *CFS component manufacturer* or *installer* of the responsibility for compliance with the project plans and specifications, accuracy of quantities and dimensions on *submittals*, the general fit-up of parts to be assembled in the field, or for providing acceptable workmanship.

**Commentary:**

When the *CFS component manufacturer* or *installer* intends to make a submission of an alternate to what is shown in the *contract documents*, the *CFS component manufacturer* or *installer* must notify the *owner*, *contractor*, or the *building designer* in advance. This will allow the parties involved to schedule the review of the alternate for impact on cost, schedule and benefits. This evaluation may result in the rejection of the alternate. However, if alternate *submittals* are reviewed and approved, this constitutes acceptance by the *owner*, *contractor*, or *building designer* of materials, criteria or designs that may differ from those required by the *contract documents*.

## **E. MATERIALS**

### **E1 Structural Members**

**E1.1** Steel of a higher-than-specified grade, *base steel thickness*, or coating may be substituted for the grade, *base steel thickness*, or coating as specified, unless specifically prohibited in the *construction documents or contract*.

**E1.2** Changes in size or shape of *structural members* shall require the consent of the *building designer*.

**E1.3** *Structural members* shall comply with the manufacturing tolerances listed in ASTM C955.

**E1.4** *CFS component assemblies* shall have *structural members* that are cut and assembled in accordance with the tolerances prescribed in the AISI S200. *Trusses* shall have *structural members* that are cut and assembled in accordance with the additional requirements of the AISI S214.

### **E2 Fasteners and Connection Hardware**

**E2.1** Use of a larger-than-specified fastener shall be permitted, provided that the minimum spacing and edge distance requirements of the larger fastener are met and the strength requirements of the specified fastener are met.

**E2.2** Connection hardware (i.e., connectors and *post-installed anchors*) shall be as specified in the *approved design*, except for substitutions accepted by the *building designer*.

### **E3 Preparation of Material**

**E3.1** Proper methods of cutting in accordance with AISI S200 are to be selected by the *installer*, unless otherwise specified in the *construction documents or contract*.

**E3.2** In the manufacture of *structural members* and connection hardware, mechanical braking, bending or forming is permitted.

### **E4 Member Identification**

*Structural members* shall be identified in accordance with the product identification requirements for framing members defined in AISI S200.

### **E5 Special Marking**

*CFS component assemblies* shall be marked, as necessary, to document such items as proper orientation, special bearing conditions and permanent *bracing* requirements. Alternatively, it shall be acceptable for the *specialty designer* to provide this information to the *installer* by means of indications on the *CFS component placement diagrams*.

### **E6 Camber**

*CFS component assemblies* will only be provided with camber if specified by the *building designer*.

## F. INSTALLATION

### F1 Scope

Items of *CFS* to be installed shall be enumerated in the *contract*.

### F2 Site Conditions

**Commentary:**

This section is deemed important for the safety and efficiency of the *installer* and the *installer's* crew, as well as for the protection of the people, property, etc., which may be present at the site at the time of installation.

**F2.1** The *installer* shall be permitted to use the most efficient and economical method and sequence of installation or assembly available consistent with the *construction documents*. When the *owner* or *contractor* contracts separately with a *CFS component manufacturer* and *installer*, the *owner* or *contractor* is responsible for coordinating work between these two parties.

**F2.2** The *installer* shall examine areas and conditions under which *framing materials* are to be installed. Work shall not proceed until unsatisfactory conditions have been corrected by those responsible.

**F2.3** The *contractor* shall provide and maintain adequate access necessary for equipment and *framing materials* to be installed. The *contractor* shall provide the *installer* level, convenient, and adequate space to safely use the necessary equipment and install the *framing materials*.

**F2.4** The *contractor* shall coordinate *installation drawings*, resolution of dimensional problems, compatibility of various trades and installation.

### F3 Delivery, Handling and Storage of Materials

**F3.1** It is the *receiving entity's* responsibility to verify that *framing materials* arrive in good condition. If *framing materials* arrive at a destination in a damaged condition, the *receiving entity* shall promptly notify the *material supplier* or *CFS component manufacturer* prior to unloading the *framing material*, or promptly upon discovery and prior to installation.

**F3.2** It is the *contractor's* or the *installer's* responsibility to verify the framing material is not damaged and meets the project *specifications* or *approved submittals* before installation. The *material supplier* or *CFS component manufacturer* shall be responsible solely for the replacement of damaged material or material that does not meet the project *specifications* or *approved submittals* or both. If the *contractor* or the *installer* installs damaged material, then that party assumes the cost of repairing or installing new materials. At no time will the consequential costs to be assumed by the *material supplier* or *CFS component manufacturer* exceed the selling price of the particular material in question.

**F3.3** Damage caused by improper storage or handling of *framing materials* on the job site is not the responsibility of the *material supplier* or *CFS component manufacturer*.

**F3.4** Proper storage of *framing materials* on the job site is the responsibility of the *receiving entity*, and requires that *framing materials* not be in direct contact with the ground and be protected from the elements. Adequate drainage and ventilation shall be provided to minimize the formation of "wet storage stain" or "white rust."

**F3.5** Proper handling of *framing materials* on the job site is the responsibility of the *contractor* and *installer*, and requires that care be exercised to not cause significant damage to the metallic coating. Bare steel exposed at minor scuffs and scratches is generally protected by



the zinc's ability to provide cathodic protection and does not require any repair; however, significant damage to the metallic coating, such as is caused by field welding, must be repaired in accordance with Section F4.

#### **F4 Field Modifications and Repairs**

**F4.1** Any modifications or repairs shall be in accordance with Section F4 and the provisions of Chapter I, as applicable.

**F4.2** If the *contractor, sub-contractor* or any others modify or damage *framing materials*, that party is responsible for all costs necessary to analyze and, when necessary, correct the situation.

**F4.3** Installation of holes in the *webs* of *structural members* is limited to the size, configuration, and location as specified in the *approved* design or recognized design standard. Any *webs* of *structural members* with holes violating the above requirements must be evaluated by the *building designer*. The *building designer* may request that the *specialty designer* provide recommendations on such holes, with final acceptance by the *building designer*.

**F4.4** Field repairs to damaged *structural members* shall be made in accordance with the *building designer's* recommendation. The *building designer* may request that the *specialty designer* provide recommendations on field repairs, with final acceptance by the *building designer*.

**F4.5** Repairs to the metallic coating, when required, shall be in accordance with ASTM A780.

**F4.6** Change orders resulting from field modifications or repairs shall be handled in accordance with Sections H5 through H9.

#### **F5 Installation Tolerances**

**F5.1** *Structural members* and *CFS component assemblies* shall be installed in accordance with the tolerances prescribed in the AISI S200.

**F5.2** *Trusses* shall be installed in accordance with the additional requirements of the AISI S214.

#### **F6 Temporary Bracing**

The *installer* shall determine, furnish, and install all temporary *bracing* required for the *cold-formed steel structural framing*. This temporary *bracing* shall secure the framing against loads that are expected to be encountered during installation.

##### **Commentary:**

Examples of temporary *bracing* conditions are:

- (1) Lateral *bracing* of top flange of floor joists before full installation or attachment of flooring material,
- (2) In-plane *bracing* of wall panels before installation of shear panels or sheathing material,
- (3) Out-of-plane *bracing* of wall panels before being connected to perpendicular walls or other parts of the structure, and
- (4) Top chord, web members and bottom chord plane *bracing* of roof and floor trusses before installation of permanent sheathing or *bracing*.

Loads that are expected to be encountered during installation include, but are not limited to, loads due to wind and snow, and loads that result from installation operations. The *installer* is not expected to consider loads during installation that result from the performance of work by other trades that are not identified on the *plans* or coordinated with the *contractor* and these trades. ASCE 37 Standard (2002) may be used as a reference to determine construction loads for the design of temporary *bracing*. SBCA-CFSBCSI (2008) may also be used as a best practice guide for bracing of *cold-formed steel trusses*.

**References:**

ASCE 37-02, *Design Loads on Structures During Construction (2002)*, American Society of Civil Engineers, Reston, VA.

SBCA-CFSBCSI, *Guide to Good Practice for Handling, Installing, Restraining & Bracing of Cold-Formed Steel Trusses (2008)*, Cold-Formed Steel Building Component Safety Information (CFSBCSI) published by Structural Building Components Association (SBCA), Madison, WI.

## G. QUALITY CONTROL

### G1 General

**G1.1** *Material suppliers and CFS component manufacturers shall maintain a properly documented quality control program to ensure that their work is performed in accordance with this Code of Standard Practice and relevant ASTM and AISI standards and in accordance with the applicable building code.*

**Commentary:**

If the *CFS component manufacturer or installer produces structural members using on-site mechanical bracing, bending, or forming*, they have in effect assumed the role of the *material supplier* and these provisions would apply.

**G1.2** *The contractor shall maintain a quality control program so that the work performed by the installer can be completed in accordance with this Code of Standard Practice, the contract, construction documents, and submittals.*

**Commentary:**

Items under the *contractor's* quality control that may affect the *installer's* performance include but are not limited to the following:

- Tolerances and quality of work by other trades that precede the *installer's* work.
- Placement of *embedded anchors* or bearing plates.
- Clean and unobstructed work areas.
- Timeliness and completeness of work by other trades.

**G1.3** *The installer shall maintain a quality control program so that the work is performed in accordance with this Code of Standard Practice, the contract, construction documents, and submittals. The installer shall be capable of performing the necessary installation or assembly and provide the equipment, personnel and management for the scope, magnitude and required quality of each project. The installer shall employ sufficient qualified personnel to properly complete the work required by the contract, construction documents, and submittals.*

### G2 Material Inspection

**G2.1** *The receiving entity shall verify that the framing materials delivered meet the requirements of the contract, construction documents, and submittals.*

**G2.2** *The receiving entity shall check the framing materials to verify that the framing materials have been properly labeled as required by Section E4.*

## H. CONTRACTUAL RELATIONS

### H1 Construction Documents and Contracts

This standard is not intended to take precedence over the *construction documents* where a *contract* between parties exists and incorporates by reference those *construction documents* which shall apply between the parties to the *contract*.

This standard is not intended to take precedence over a *contract*. A *contract* shall be permitted to contain provisions that take precedence over the standard and the *construction documents*. A party shall not exclude in a *contract* a responsibility established by this standard or in accordance with the *construction documents* unless that responsibility is assigned to a qualified party and that party agrees to that assignment. A party may exclude a responsibility assigned in the *construction documents* that is not established by this standard.

A *contract* shall be permitted to incorporate this chapter of the standard to establish the responsibilities of the parties to such *contract*.

### H2 Presentation of Proposals

All proposals for furnishing *framing material* shall be made on a sales *contract* form. After acceptance by the *owner*, these proposals must be accepted or executed by a qualified official of the *CFS component manufacturer* or *installer*. Upon such acceptance, the proposal becomes a *contract*.

### H3 Acceptance of Proposals

All proposals shall have a specified term of acceptance. If the proposal is not accepted within this term, the proposal becomes invalid.

### H4 Terms of Payment

The terms of payment for the work to be completed shall be specified in the *contract*.

### H5 The RFI Process

When *RFIs* are issued, the process shall include the maintenance of a written record of inquiries and responses related to interpretation and implementation of the *construction documents*, including the *clarifications* and *revisions* to the *construction documents* that may result. *RFIs* shall not be used for the incremental *release for construction* of *construction documents*. When *RFIs* involve *discrepancies*, *omissions*, or *revisions*, Refer to Sections C4 and C5.

#### Commentary:

The *RFI* process is most commonly used during the detailing process, but can also be used to forward inquiries by the *CFS component manufacturer* or *installer* or to inform the *owner's representatives* in the event of a *CFS component manufacturer* or *installer* error and to develop corrective measures to resolve such errors. The *RFI* process is intended to provide a written record of inquiries and associated responses, but not to replace all verbal communication between the parties on the project. *RFIs* should be prepared and responded to in a timely fashion so as not to delay the work of the *CFS component manufacturer* or *installer*. Discussion of the *RFI* issues and possible solutions between the *CFS component manufacturer* or *installer* and *owner's representatives* often can facilitate timely and practical resolution. Unlike *shop drawing* and *installation drawing submittals* in Section D2, *RFI* response time can vary depending on the urgency of the issue, the amount of work required by the *owner's representatives* to develop a complete response, and other circumstances such as building official approval. *RFIs* should be prepared in a standardized format, including *RFI* number and date, identity of the author, reference to a specific *drawing* number (and

specific detail as applicable) or *specification* section, the needed response date, a description of a suggested solution (graphic depictions are recommended for more complex issues), and an indication of possible schedule and cost impacts. *RFIs* should be limited to one question each (unless multiple questions are interrelated to the same issue) to facilitate the resolution and minimize response time. Questions and proposed solutions presented in *RFIs* should be clear and complete. *RFI* responses should be equally clear and complete in the depictions of the solutions, and signed and dated by the responding party.

**Commentary:**

Unless otherwise noted, the *CFS component manufacturer* or *installer* can assume that a response to an *RFI* constitutes a *release for construction*.

**H6 Revisions to the Construction Documents and Contract**

*Revisions* to the *construction documents* or *contract* shall be confirmed by change order, in accordance with Section H7. Unless otherwise noted, the issuance of a *revision* to the *construction documents* shall constitute authorization by the *owner's representative* that the *revision* is *released for construction*.

**H7 Change Orders**

The *contractor* shall review the change order within fourteen (14) days, or sooner if the decision delays the project schedule, and issue a formal response. The *contractor's* compensation of the *CFS component manufacturer* or *installer* or both for conflicts, *discrepancies*, omissions, and *approved* field modifications and repairs shall not be delayed due to the *contractor's* negotiations with the *sub-contractor* determined to be at fault.

**Commentary:**

These change orders may be necessitated by any conflicts, in accordance with Section C1; *discrepancies* or omissions, in accordance with Section C4; *revisions*, in accordance with Section C5; delivery, handling and storage of materials, in accordance with Section F3; or field modifications and repairs, in accordance with Section F4.

**H8 Contract Price Adjustment**

When the scope of work and responsibilities of the *CFS component manufacturer* or *installer* are changed from those previously established in the *contract*, an appropriate modification of the *contract* price shall be made. In computing the *contract* price adjustment, the *CFS component manufacturer* or *installer* shall consider the quantity of work that is added or deleted, the modifications in the character of the work and the timeliness of the change with respect to the status of material ordering, detailing, fabrication and installation operations.

Requests for *contract* price adjustments shall be presented by the *CFS component manufacturer* or *installer* in a timely manner and shall be accompanied by a description of the change that is sufficient to permit evaluation and timely approval by the *contractor*.

**H9 Scheduling**

The *contract* schedule shall state:

- When the construction documents will be released for construction
- When the job site will be ready, free from obstructions and accessible to the installer, so that installation can start at the designated time and continue without interference or delay caused by the *contractor* or other trades.

The *CFS component manufacturer* or *installer* shall advise the *owner*, *building designer* or *contractor*, in a timely manner, of the effect any *revision* has on the *contract* schedule.

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If the fabrication or installation is significantly delayed due to *revisions* to the requirements of the *contract*, or for reasons that are the responsibility of others, the *CFS component manufacturer* or *installer* or both shall be compensated for the additional costs incurred.

## I. PRACTICES SPECIFIC TO CFS COMPONENT ASSEMBLIES

In addition to Chapters A through H, this Chapter shall be followed for standard practices specific to *CFS component assemblies* as applicable.

### I1 Truss Responsibilities

#### I1.1 Design of Trusses

*Trusses* shall be designed in accordance with one of the following methods:

- (a) **Designed by a Design Professional.** If the *building designer* or a delegated *registered design professional* designs the *trusses*, all design criteria, details and specifications with respect to the *trusses* shall be indicated on the *construction documents* or *contract* as required by the *applicable building code*.
- (b) **Designed by a Truss Design Engineer or Truss Designer.** *Truss* design shall be in accordance with Sections I1.2.1, I1.2.2 and I1.2.3.

#### I1.2 Responsibilities of Truss Design Engineer/Truss Designer

##### I1.2.1 Preparation of Truss Design Drawings

###### I1.2.1.1 Truss Design Engineer

The *truss design engineer* shall supervise the preparation of the *truss design drawings* based on the *truss* design criteria and requirements set forth in the *construction documents*, or as otherwise set forth in writing by the *building designer*, as supplied to the *truss design engineer* by the *contract* or through the *truss manufacturer*.

###### I1.2.1.2 Truss Designer

The *truss designer* shall be responsible for the individual *truss* component design and the preparation of the *truss design drawings* based on the *truss* design criteria and requirements set forth in the *construction documents*, or as otherwise set forth in writing by the *building designer* as supplied to the *truss designer* by the *truss manufacturer*.

##### I1.2.2 Truss Design Criteria, Assumptions and Calculations

The *truss designer* shall make available as part of the *truss submittal package*, upon request by the *owner's representative* or building official, design calculations, including the following:

- (a) Loads and load combinations considered,
- (b) Axial forces, moments, and shears resulting from the applied loads and load combinations, and
- (c) Design assumptions.

##### I1.2.3 Truss Design Drawings

The *truss design drawings* shall consist of the individual *truss design drawings* and referenced details, if any. The *truss design drawings* shall be part of the *truss submittal package* and include, at a minimum, the information specified below:

- (1) *Applicable building code* used for design, unless specified on a cover/truss index sheet,

- (2) Slope or depth, span, and spacing,
- (3) Number of plies if greater than one,
- (4) Bearing locations and minimum bearing lengths,
- (5) Design loading(s) as applicable, including:
  - (a) Top chord roof or floor live load,
  - (b) Top chord roof snow load,
  - (c) Top chord dead load,
  - (d) Bottom chord live load,
  - (e) Bottom chord dead load,
  - (f) Additional loads and locations,
  - (g) Environmental design loads (e.g., wind and snow) and all applicable factors as required to calculate the *truss* loads, and
  - (h) Other lateral loads, including drag strut loads.
- (6) Reaction forces and direction, including maximum downward, lateral and uplift reaction forces, where applicable, based on *nominal [specified] loads*,
- (7) Location of all *truss member* connections,
- (8) *Gusset plate* locations, sizes, and material specifications,
- (9) Fastening type, size, quantities, and locations,
- (10) Shape and material specification for each *truss member*,
- (11) Maximum axial compressive and tension forces in all *truss members* based on *nominal [specified] loads*,
- (12) *Truss-to-truss* connection and *truss* field assembly requirements,
- (13) Calculated span-to-deflection ratio or maximum vertical and horizontal deflection for *nominal [specified] live and total load*, as applicable,
- (14) Locations of required permanent individual *truss member* restraint in accordance with Section I1.6(a) or I1.6(c), if required, and
- (15) Design and details for individual *truss member* reinforcement in accordance with Section I1.6(b), if required.

#### **I1.2.4 Truss Design Drawings Seal and Signature**

Where required by the *building designer* or the authority having jurisdiction, each individual *truss design drawing* shall bear the seal and signature of the *truss design engineer*. When an individual *truss design drawing* has multiple pages, only the first page shall be required to be signed and sealed by the *truss design engineer*. When a cover/truss index sheet is used, it shall be the only document required to be signed and sealed by the *truss design engineer*.

### **I1.3 Responsibilities of Truss Manufacturer**

#### **I1.3.1 Truss Design Criteria and Requirements**

The *truss manufacturer* shall obtain the *truss* design criteria and requirements from the *construction documents*.



### **I1.3.2 Communication to Truss Design Engineer**

The *truss manufacturer* shall communicate the *truss* design criteria and requirements to the *truss design engineer* or *truss designer*, as applicable.

### **I1.3.3 Truss Placement Diagram**

Where required by the *construction documents* or *contract*, the *truss manufacturer* shall prepare the *truss placement diagram* that identifies the assumed location for each individually designated *truss* and references the corresponding *truss design drawing*. The *truss placement diagram* shall be permitted to include identifying marks for other products including structural elements so that they may be more easily identified by the *contractor* during field installation. When the *truss placement diagram* serves only as a guide for *truss* installation and requires no engineering input, it does not require the seal of any *truss design engineer* or *registered design professional*.

### **I1.3.4 Truss Submittal Package**

Where required by the *construction documents*, *contract* or the building official, the *truss manufacturer* shall provide the appropriate *truss submittal package* for review or approval to one or more of the following: *building designer*, building official or *contractor* in accordance with Section D3.

### **I1.3.5 Reliance on Construction Documents**

The *truss manufacturer* shall be permitted to rely on the accuracy and completeness of information furnished in the *construction documents* or otherwise furnished in writing by the *building designer* or *contractor*.

## **I1.4 Responsibilities of Building Designer**

### **I1.4.1 Preparation of Construction Documents**

The *construction documents* shall be prepared by the *building designer* and shall be of sufficient clarity to indicate the location, nature and extent of the work proposed in accordance with the *applicable building code*.

### **I1.4.2 Deferred Submittals**

The *building designer* shall list the deferred submittals on the *construction documents*. The *building designer* shall review deferred submittals in accordance with Section I1.4.3.

### **I1.4.3 Review Submittal Packages**

The *building designer* shall review the *truss submittal package*. All such submittals shall include a notation indicating that they have been reviewed.

### **I1.4.4 Required Information in Construction Documents**

The *building designer*, through the *construction documents*, shall provide information sufficiently accurate and reliable to be used for facilitating the supply of the structural elements and other information for developing the design of the *trusses* for the building, and shall provide the following:

- (1) All *truss* and structural element orientations and locations,
- (2) Information to fully determine all *truss* profiles,

- (3) All structural element and *truss* support locations and bearing conditions,
- (4) The location, direction, and magnitude of all dead, live, and lateral loads applicable to each *truss* including, but not limited to, loads attributable to: roof, floor, partition, mechanical, fire sprinkler, attic storage, rain and ponding, wind, snow (including snow drift and unbalanced snow), seismic, and any other loads on the *truss*;
- (5) All *truss* anchorage required to resist uplift, gravity, and lateral loads by specifying either
  - (a) Pre-engineered anchors or fasteners, or
  - (b) Methods designed by a *registered design professional*;
- (6) *Truss-to-structural* element connections, but not *truss-to-truss* connections, by specifying either
  - (a) Pre-engineered anchors or fasteners, or
  - (b) Methods designed by a *registered design professional*;
- (7) Permanent building stability *bracing*, including *truss* anchorage connections to the permanent building stability *bracing*,
- (8) Criteria related to serviceability issues, including:
  - (a) Allowable vertical, horizontal or other required deflection criteria;
  - (b) Any dead load and live load deflection criteria for flat roofs subject to ponding loads;
  - (c) Any differential deflection criteria from *truss-to-truss* or *truss-to-adjacent* structural member;
  - (d) Any deflection and vibration criteria for floor *trusses*, including any strongback bridging requirements or any dead load and live load deflection criteria for floor *trusses* supporting stone or ceramic tile finishes; and
  - (e) Anticipated moisture, temperature, corrosive chemicals and gases expected to affect the *trusses* and requirements for any additional corrosion protection.

#### **I1.4.5 Permanent Individual Truss Member Restraint/Bracing**

The *building designer* shall be permitted to specify the method of the permanent individual *truss member* restraint/bracing in accordance with Section I1.6.

### **I1.5 Responsibilities of Contractor**

#### **I1.5.1 Information Provided to Truss Manufacturer**

The *contractor* shall provide to the *truss manufacturer* a copy of all *construction documents* pertinent to the framing structural system and the design of the *trusses* (i.e., framing plans, specifications, details, structural notes) and the name of the *building designer* if not noted on the *construction documents*.

Amended *construction documents*, upon approval through the plan review/permitting process, shall be immediately communicated to the *truss manufacturer*.

#### **I1.5.2 Information Provided to Building Designer**

The *contractor*, after approving the *truss submittal package*, shall forward the *truss submittal package* for review by the *building designer*.

#### **I1.5.3 Truss Submittal Package Review**

The *contractor* shall not proceed with the *truss* installation until the *truss submittal*

*package* has been reviewed by the *building designer*.

#### **I1.5.4 Means and Methods**

The *contractor* is responsible for the construction means, methods, techniques, sequences, procedures, programs, and safety in connection with the receipt, storage, handling, installation, restraining, and bracing of the *trusses*.

#### **I1.5.5 Truss Installation**

The *contractor* shall ensure that the building support conditions are of sufficient strength and stability to accommodate the loads applied during the *truss* installation process. *Truss* installation shall comply with installation tolerances shown in the standard industry details. Permanent individual *truss member* restraint/bracing for the completed building in accordance with Section I1.6 and any other construction work related directly or indirectly to the *trusses* shall be installed by the *contractor*.

#### **I1.5.6 Alterations to Trusses**

*Truss members* and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written concurrence and acceptance of any *registered design professional*. Alterations resulting in the addition of loads to any member (i.e., HVAC equipment, piping, additional roofing or insulation, etc.) shall not be permitted without verification by the *truss design engineer* or *truss designer* that the *truss* is capable of supporting such additional loading.

### **I1.6 Design of Permanent Individual Truss Member Restraint/Bracing**

Where permanent individual *truss member* restraint/bracing is required, it shall be accomplished by one of the following methods:

- (a) **Standard Industry Details.** Standard industry permanent individual *truss member* restraint/bracing details supplied in accordance with I1.3.4.
- (b) **Substitution with Reinforcement.** *Truss member* reinforcement designed by the *truss design engineer* or *truss designer* to eliminate the need for permanent individual *truss member* restraint/bracing. The permanent individual *truss member* reinforcement design and details shall be noted/shown on the *truss* design drawings or on supplemental *truss member* buckling reinforcement details provided by the *truss design engineer* or *truss designer*.
- (c) **Project-Specific Design.** A project-specific permanent individual *truss member* restraint/bracing design by any *registered design professional*, as specified in the *contracts* or *construction documents*, and supplied in accordance with I1.3.4.





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