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ARTICLE

Metal Building Systems and the Code

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A shop technician operating a Purlin Roll Former. IAS accreditation verifies that workers are competent, have been adequately trained and equipment used in the manufacturing process is properly calibrated for the specified work.

Today, more than ever, owners and developers look to employ energy efficient, affordable building solutions to construct the next generation of industrial, commercial and residential buildings. Metal building systems offer industry a cost-effective and versatile alternative for projects that range from complex production facilities and distribution centers to retail stores, motels, schools and churches. As the application of metal building systems continues to rise, code officials and communities will

want demonstrable proof that low-cost, energy-efficient metal building systems provide equivalent or better performance than brick and mortar counterparts in terms of safety and strength.

Within the Code

The structural elements and components of metal building systems are almost entirely fabricated offsite. While the erection of the building can be monitored onsite for some areas of building code compliance, most elements of a metal building must also be inspected and verified as being in compliance during fabrication. These elements include built-up structural steel members, secondary members such as cold-formed steel or steel joists, and welding and bolting processes.

Code officials need look no further than Chapter 17 Structural Tests and Special Inspections of the 2009 International Building Code® (IBC) to find the minimum requirements for metal building system fabrication and special inspections. From in-plant inspections to special inspection of steel elements to seismic testing requirements, Chapter 17 has it all.

Shop Focus

The code specifically addresses the in-plant special inspection requirements for metal building systems. For instance, Section 1704.2 reads:

"Where fabrication of structural load-bearing members and assemblies is being performed on

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the premises of a fabricator's shop, special inspection of the fabricated items shall be required by this section and as required elsewhere in this code."

In addition, Section 1704.2.1 requires special inspections to verify that the fabricator complies with the design details and in-house quality control procedures at the plant, as well as its ability to construct/fabricate to the approved drawings, standards and specifications.

IAS Accreditation

Subject to the authority having jurisdiction, special inspections are not necessary for approved fabricators who have demonstrated that they have a quality control system in place that is consistently and effectively implemented. The International Accreditation Service (IAS), a subsidiary of the International Code Council (ICC) has a well-established accreditation program designed to fulfill code requirements that building officials can rely on to use as a basis for approving fabricators. The IAS program gets its name from the criteria on which it is based, the IAS Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems AC472. The program requires an initial onsite assessment by an IAS staff of technical experts at each fabrication entity that seeks to become accredited. Additionally, the IAS program takes it one step further to assure building officials of ongoing code compliance by requiring all IAS-accredited metal building manufacturers to be subject to periodic unannounced inspections by an accredited inspection agency. Section 1704.2.2 provides the basis for such approval by the building official. If the fabricator is approved by the building official, then its internal quality control procedures are deemed sufficient without the need for the special inspections.

Steel Construction

Table 1704.3 outlines a complete list of the types of materials and inspections, the verification required and the referenced standards to be used in evaluating conformance and code compliance of main stress-carrying elements of steel construction. This table includes minimum special inspection requirements for welding of steel construction based on the item and the type of weld. Under certain conditions (see Section 1704.3, Exception 2), some of these welding inspections may be periodic; otherwise, they should be continuous.

The special inspector is required to perform an inspection of the entire steel frame to verify compliance with the applicable code requirements and the approved engineering drawings. In some cases additional special inspections and testing for seismic requirements may be required by Sections 1707 and 1708.

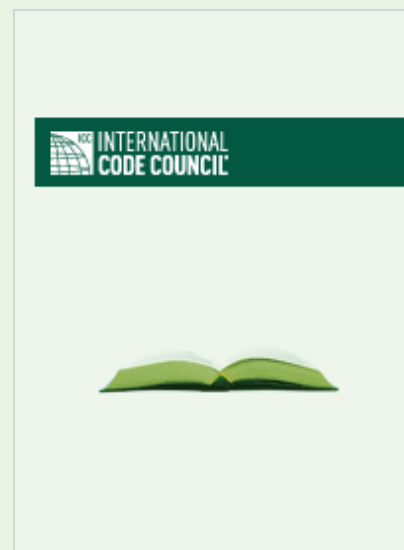
Industry Support

For some jurisdictions, the inspection of metal building fabricators along with the responsibility for a myriad of other activities such as building inspections and plan review requires additional resources that are simply not available to building departments. Many building departments now place more of the responsibility on fabricators by requiring them to maintain independent accreditation of their processes. Requiring fabricators of metal building systems to have accreditation from a recognized accreditation body can streamline the verification that they meet stringent code requirements.

In October 2007, the [Metal Building Manufacturers Association \(MBMA\)](#) approached IAS with a request that IAS develop an accreditation program for inspection of its member metal building manufacturers. The program was to be designed to serve the needs of MBMA members, code officials and design professionals. Over the next several months, IAS staff worked with the MBMA to develop a comprehensive accreditation program for the inspection of the metal-building fabrication process based on the requirements of Chapter 17 of the IBC. The IAS Accreditation Committee, consisting of code officials, approved the accreditation criteria ([AC472](#)) in a public meeting on April 28, 2009.

Since the rollout of this program, 22 metal building manufacturing facilities around the country have achieved accreditation with IAS. It is anticipated that another sixty or more facilities will be accredited in 2010. Certificates of accreditation for each facility are listed on the [IAS website](#). Jurisdictions and design professionals can use these certificates of accreditation to approve or select manufacturers of metal building systems who have demonstrated their ability to meet code requirements as an approved fabricator.

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How the Program Works

- Metal building fabricators voluntarily apply for accreditation by IAS.
- IAS conducts a thorough onsite evaluation of the fabrication facilities (See below for more details on the evaluation process and criteria).
- The accreditation process is based on IBC Chapter 17 and IAS Accreditation Criteria ([AC472](#))
- Manufacturers whose fabrication inspection processes meet the requirements are issued a Certificate of Accreditation from IAS
- Building departments and design professionals can verify that manufacturers are accredited by looking on the IAS website at www.iasonline.org .
- Accredited manufacturers are subject to periodic inspections by IAS-accredited third-party inspection agencies.
- Accredited manufacturers are subject to annual onsite reassessment from IAS to maintain their accreditation status.

Code Requirements and Accreditation Criteria

The IAS accreditation program is based on IBC Chapter 17 and IAS Accreditation Criteria ([AC472](#)).

The AC472 was developed in open, public hearings and approved by the IAS Accreditation Committee which is made up of building code officials from a cross-section of jurisdictions throughout the U.S. The criteria addresses essential requirements necessary for code officials to deem IAS-accredited entities as approved fabricators per IBC Section 1704.2.2.

- Inspections of fabrication and engineering design facilities
- Personnel requirements
- Product traceability
- Process control
- Ability to manufacture buildings in accordance with approved plans
- Technical standards

The IAS accreditation criteria ([AC472](#)) addresses quality management system elements for engineering, fabrication and shop practices, personnel requirements, materials certification, process control, and technical requirements. The program requires comprehensive material and workmanship traceability. Documentation allows an owner to trace materials all the way from the maker of the steel to the erection of the finished product. IAS AC472 covers three areas of quality in workmanship and building integrity:

- Structural welding (modeled after AC172: Fabricator Inspection Programs for Structural Steel)
- Cold-formed steel fabrication
- Engineering

To view all the details of AC 472, [click here](#).

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