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Conspectus's Tech Tips received the national Communications Award from the Construction Specifications Institute September 2011.

ABSTRACT:
The metal framing industry stopped using imprecise gage thicknesses and started using precise minimum base metal thicknesses. Yet, many A/Es continue to specify metal framing by gage. Why should they adopt the newer standard and how are other industry standards incorporating metal thickness?

FILING:
UniFormat™
B2010 - Exterior Walls
C1010 - Interior Partitions

MasterFormat®
05 54 00 Cold-Formed Metal Framing
09 22 16 Non-Structural Metal Framing

KEYWORDS:
Gage, Gauge, Metal gage, Metal Gauge, Metal Studs, Steel Studs, Stud Framing, Interior Framing, Gypsum Panel Assemblies

REFERENCES:
ASTM C645 - Standard Specification for Nonstructural Steel Framing Members

ASTM C955 - 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.
TechTips:
C1010 Steel Studs: Thru Thick & Thin
B2010 and C1010 Zinc Coatings and Metal Studs

Metal Framing Thickness or Gage

By David Stutzman, AIA, CSI, CCS, SCIP, LEED AP

Thickness v. Gage

Old habits die hard. And sometimes familiarity and industry standards prevent newer technology and terminology from being fully adopted. The metal framing industry stopped using imprecise gage thicknesses and started using precise minimum base metal thicknesses. This is not a recent change.

So What Is The Concern?

Well, architects, engineers, and even standards organizations continue to use gage to designate metal framing thickness. The standards governing metal framing manufacture no longer recognize gage as a thickness measure. Specify metal framing by gage, and technically, the manufacturer cannot supply a material meeting the specifications.

Metal framing is manufactured to two different standards, depending on use. Exterior and load bearing framing complies with ASTM C955. Interior non-load-bearing framing complies with ASTM C645. Both standards require metal framing to be manufactured to meet a minimum base metal thickness stated in mils, decimal inch, and millimeters. These standards do not include a gage designation. See Table 1. gage is shown for reference only.

Two common references for architects to select metal framing for interior partitions and ceilings perpetuate the use of gage thicknesses: Underwriters Laboratories (UL) ANSI/UL 263 Online Certifications Directory for Fire Resistance Rating and the Gypsum Association GA-600 Fire Resistance Design Manual. This may contribute to the confusion.

ANSI/UL 263 and GA-600 both contain introductory information that does not appear in any individual design listing. These standards follow one of CSI's principles: say it once. All the general information applicable to multiple designs was gathered together and placed in the introduction. It is important to know what is contained in the introduction because it affects every fire resistant design.

ANSI/UL 263 introduction, Design Information Section, includes Section VI Walls and Partitions near the bottom of the document. This section discusses metal thickness and explains that UL designs may include framing thickness stated in gage. UL acknowledges that gage is no longer used. Then the introduction specifies the minimum metal thickness for each gage designation used in the individual fire resistant designs.

GA-600 introduction sets the minimum metal framing thickness as 0.0179 inches unless otherwise specified for an individual fire resistant design. There is no recognition of the gages stated in individual designs. But the introduction does require the metal framing to comply with ASTM C645. By default, the framing must meet the thicknesses specified by the ASTM standard. Some designs show dual

thickness measurements, using decimal inch and gage designations. UL Design No. U403 is an example where the framing is specified as "minimum 0.020 inch (25 gage)." To purchase a minimum 0.020 inch thick stud, today, 22 gage is required. In this instance, the introduction default thicknesses may not help because 0.020 inch will govern since it is the greater.

There are some that are shown with decimal inch thickness. Those are the newer designs that are tested with dimpled framing members. Dimpled framing is a recent industry development (See TechTips C1010). UL Design No. U419 is one that permits dimpled studs. This design requires studs to be fabricated from minimum 0.015 inch (with effective thickness of 0.034 inch) steel. None of the minimum thicknesses in the UL design for dimpled studs corresponds to thicknesses in the ASTM standards. Just be careful to select the right framing for fire rated construction when using dimpled framing.

Whatever the reason for the change, the result is better standardization. Now metal framing minimum metal thicknesses are defined. The industry established standardized load and span tables that are consistent for all manufacturers, and the Steel Stud Manufacturers Association (SSMA) published the document. The Product Technical Information catalog is available as a free download from SSMA.

Table 1 is compiled from ASTM C645 and ASTM C955. The metal thicknesses are for non-dimpled framing. Gage designations are not part of the ASTM standards. They are shown here for reference only. The color is the framing marking required by the ASTM standards to indicate the metal thickness.

To avoid confusion, specify metal framing by minimum metal thickness. Consider using the mil thicknesses that are part of the standards. It will simplify the specification and will be much easier to remember than 4 significant digits required for decimal inch thickness.

Use ANSI/UL 263 and GA-600 with confidence that studs specified by mil thickness are acceptable for use to meet the tested design requirements.

Table 1 Metal Framing Metal Thickness

ASTM	Color	Minimum Base Metal Thickness			Gage & Visual (reference)
		mils	inches	mm	
C645	None	18	0.0179	0.455	25
	Black	27	0.0269	0.683	22
	Pink	30	0.0296	0.752	20
C645 & C955	White	33	0.0329	0.836	20
C955	Yellow	43	0.0428	1.087	18
	Green	54	0.0538	1.367	16
	Orange	68	0.0677	1.720	14
	Red	97	0.0966	2.454	12
	Blue	118	0.1180	2.997	10

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