1. Metallic-Coated Products and Specifications	
GalvInfoNote	**Advantages of Metallic-Coated Steel Framing in Residential Buildings**
1.7	REV 2 DEC 2017

Introduction

Metallic-coated steel framing has many advantages over competitive building materials in load-bearing residential buildings. While these advantages include a higher strength to weight ratio, non-combustibility, and improved dimensional stability, the purpose of this GalvInfoNote is to provide an introduction to the durability and service life benefits of metallic-coated steel framing. Along with short descriptions of the products used to manufacture steel framing, summary information on durability is provided along with links to more in-depth reports and data, including expected service life.

Source: CSSBI

A principle reference document on the durability of steel framing is published by **The Steel Framing Alliance,** and can be obtained at:

> http://www.steeler.com/uploads/pdf/aisi---durability-of-cold-formed-steel-framing-members.pdf ;
> "Design Guide 4 – Durability of Cold-Formed Steel Framing Members"; available for download

Benefits of Residential Steel Framing

1. Variety of steel thicknesses and strengths available allowing design flexibility, longer floor spans, and higher, straighter walls
2. More resistant to fires, hurricanes, earthquakes, insects and mold
3. Expected service life of hundreds of years under normal conditions
4. At the end of a steel-framed home's useful life, the steel components are recyclable

These are a few of the benefits of steel framing. Below is another link to the Steel Framing Alliance which has more detailed information on these and other advantages:

Steel Framing Alliance; www.steelframing.org

Types of Metallic-Coated Steel Framing

ASTM International; www.astm.org; Specification A1003/A1003M, Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members, covers the steel sheet used in the manufacture of this product. The metallic coatings allowed are; zinc (galvanize), zinc-iron alloy, 55% aluminum-zinc alloy, zinc-5% aluminum alloy, aluminum coated Type 1, aluminum-coated Type 2, and electrolytic zinc-coated. A description of these coatings can be found in GalvInfoNotes 1.2 and 1.5 of this GalvInfo Center series.

Specification A1003/A1003M can be purchased and downloaded from the ASTM website, as can the individual product specifications for each of the coated sheet types listed above. A link to all ASTM metallic-coated specifications can also be found at the GalvInfo website, http://www.galvinfo.com/other-websites-of-interest/ .

Note that most cold-formed framing members are produced using galvanized sheet. The process for producing galvanize is described in GalvInfoNote 2.1. The minimum coating weight designation in A1003/A1003M for galvanized cold-formed steel framing is G40.

How Metallic Coatings Protect Steel

There are two primary mechanisms by which metallic coatings protect steel, viz., barrier and galvanic (cathodic) protection. The details of these mechanisms are described in GalvInfoNote 3.1.

For in-depth study, an excellent reference text on the corrosion of zinc is:

"Corrosion and Electrochemistry of Zinc", Xaioge Gregory Zhang, Plenum Press, New York, 1996

Corrosion of Cold-Formed Framing Members in Residential Construction

As galvanized steel sheet is the predominant material used to manufacture steel framing members, the long term corrosion performance studies of this product are based largely on zinc coatings, although there is data available on aluminum-zinc and zinc-aluminum coatings.

All worldwide test results to date indicate that there is little corrosion of galvanized steel framing in residential construction under normal conditions. Minor corrosion, if present, will not adversely affect the anticipated life of a structure. The environment of building wall interiors is discussed in more detail in the following document, available at:

American Galvanizers Association (AGA):

https://www.galvanizeit.org/education-and-resources/publications/housing-for-generations-corrosion-performance-of-galvanized-steel-framing-i

As stated in the **Introduction** on page 1, an excellent document that provides guidance for designers in selecting coated steels and enhancing durability in residential (and commercial) buildings that utilize cold-formed steel framing members is again referenced below. It is a comprehensive guide that provides design information, not only on such issues as contact with non-metallic materials and other metals, and the corrosion properties of zinc, but cites data that shows the **expected life of metallic coated framing is in the hundreds of years.** The reference is:

http://www.galvinfo.com/wp-content/uploads/sites/8/2017/05/Durability_Galvanized_Framing.pdf

Of concern to many users is the durability of cold-formed steel members in aggressive environments, such as coastal areas. Issues such as chloride ion concentration and time of wetness impact the service life of

metallic-coated steel framing members. These and other issues are covered in a number of documents that are available on-line, and links are given below:

The Steel Framing Alliance

http://www.steelframing.org/PDF/sustainability/TN-D001-07.pdf "Durability of Cold-Formed Steel Framing Members"

http://www.steelframing.org/PDF/issuepaper/corrosionprotectionforlife.pdf "Corrosion Protection for Life"

Canadian Sheet Steel Building Institute (CSSBI)

Here is another website contains a wealth of information on steel framing.

http://cssbi.ca/products/steel-studs

Summary

Steel framing has many advantages, including extraordinary service life, and is a growing market for metallic coated sheet steel.

Source: Steel Framing Alliance