



Technical BULLETIN

► Report on: Member Selection and Structural Design

Volume 7, Number 4

Applications of Non-Loadbearing Steel Studs

INTRODUCTION

Non-loadbearing steel studs (often called “drywall studs”) are used throughout the Canadian construction industry for interior partition walls, bulkheads, drop ceilings and miscellaneous framing. These members are not “structural” since they are not designed as part of the structural load carrying system of the building; however, they are required to meet certain minimum standards related to material properties and dimensions. The CSSBI LSF Technical Bulletin Volume 7, No. 3: *Specification of Non-Loadbearing Steel Studs* defines the minimum thickness requirements.



BENEFITS OF NON-LOADBEARING STEEL FRAMING

Low Cost:

Non-loadbearing steel stud framing has historically been less expensive than competing forms of construction.

Mass Produced:

The basic building blocks of steel stud construction are cold formed channels manufactured from coated sheet steel on continuous roll forming mills. The coated steel is purchased by the manufacturer in the form of a master coil, which is subsequently slit into various widths as required by the geometry of the final products. The slit coil of flat steel is fed into one end of the roll forming mill and the cold formed channel member is cut to length as it emerges from the other end. (On some mills the sheet steel is cut to length before it enters the roll forming mill.) A typical mill can produce kilometres of straight, highly uniform, accurate product in one eight-hour shift.

Lightweight:

Lightweight translates into cost savings in a variety of ways.

- Buildings not previously designed for an extra floor level may be candidates for expansion upwards.
- Economical spread footings might be possible in marginal soil conditions as opposed to expensive deep foundations.
- Low mass construction minimizes lateral bracing in seismic regions.
- In panelized construction, low weight assemblies cost less to transport and erect.

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- In general, lightweight assemblies allow more economical structural framing because less material is required to support the self weight of the structure.

Reliable and Durable:

Steel framing is a reliable product with no shrinking, warping, swelling, rotting, creep, nail-popping or termite problems. Durability of steel products is assured with corrosion resistant metallic coatings.

Recyclable:

Steel is the world's most recycled material, and in North America, over 70 million tonnes of steel are recycled or exported for recycling annually. Steel possesses a unique material property unrivalled by other materials in that it can be recycled both up and down the product value chain without degrading its structural strength & other chemical properties.

Non-combustible and Fire Resistant:

- Steel framing meets all the requirements for non-combustible construction required of certain building components by the provisions of the National Building Code of Canada and the various provincial building codes.
- There are many applications for non-loadbearing steel studs in wall assemblies that need to have a fire resistance rating. A fire-resistance rating is based on the time taken in a standard fire test for an assembly to fail. The National Building Code of Canada requires buildings with certain occupancies and size to have some of the components fire rated.

Resistant to the Transmission of Sound:

The National Building Code of Canada requires that separations between dwelling units be designed for a sound transmission class (STC) rating of 50. For separations between a dwelling unit and an elevator shaft or a refuse chute, an STC rating of 55 is required. The necessary STC ratings can be achieved with steel framing by using combinations of resilient channels, layers of drywall, insulation, or staggered studs.



Pre-punched for Services:

Steel studs are manufactured with regularly spaced holes in the webs to serve as raceways for electrical and plumbing lines. Electricians and plumbers do not have to drill or cut to install their work, minimizing construction time, cost and the possibility of inadvertent damage to the studs.



Report on:
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and Structural Design

Quickly and Easily Erected:

Construction projects do not bring a return on the owner's investment until the building is finished and occupied. With steel stud framing the construction process can be accelerated. Mass production at the manufacturing level assures a ready supply of product. Erection can proceed quickly even in temperatures below freezing allowing the interior trades to begin their work sooner.

Architecturally Flexible:

With steel framing the Designer has extensive flexibility in the choice of finishes to achieve the desired aesthetics for the project. From large flat surfaces to small curved or angular projections and recesses, steel stud framing can accommodate most building shapes and detail requirements.

Knowledge:

Non-loadbearing steel studs are part of the family of cold formed steel products whose performance has been extensively researched over the past 50 years. The necessary tools for structural design are contained in CAN/CSA-S136 *North American Specification for the Design of Cold-Formed Steel Structural Members*, a referenced document in the National Building Code of Canada.

FIRE-RESISTANCE AND ACOUSTIC RATINGS FOR ASSEMBLIES

The Steel Framing Alliance have published a compilation document on fire and acoustic ratings titled *A Guide to Fire & Acoustic Data for Steel Floor & Wall Assemblies*. This document includes all of the available listings for non-loadbearing steel stud walls, and can be accessed free of charge through the following URL: <http://www.steel framing alliance.com>. For specific details of material components in the listed assemblies, consult the appropriate UL or ULC directory.

There is also a computer program available from the National Research Council of Canada called "Socrates" that can be used to estimate assembly acoustic ratings. The link is as follows: http://irc.nrc-cnrc.gc.ca/ie/floors/socrates_e.html. Although mention is made of the Floors II program, when one downloads the program Socrates has inputs for both loadbearing and non-loadbearing wall studs.

MAXIMUM WALL HEIGHTS

Non-loadbearing steel wall studs are typically used for interior partition walls and support the gypsum drywall. These wall assemblies are classified as "non-structural"; however, they still need to stand up to internal air pressure differences caused by ventilation or wind gusts and to human occupancy. The NBCC gives requirements for 5 to 10 psf lateral load. There will also be deflection limitations placed on the wall to control the possibility of cracking brittle finishes. To facilitate the proper specification for walls, the CSSBI has published the following document: LSF Technical Bulletin Volume 7, No.1: *Maximum Height Tables for Interior Non-Loadbearing Partitions*. This document can be accessed free of charge through the following URL: <http://www.cssbi.ca/publwsf.html>

FOR MORE INFORMATION

For more information on sheet steel building products, or to order any CSSBI publications, contact the CSSBI at the address shown below or visit the web site at www.cssbi.ca



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