

بسم الله الرحمن الرحيم

معرفی سازه های Isf

سیستم ساخت قاب سبک فولادی Lightweight Steel Framing که به اختصار LSF

می نامند، یک سیستم ساختمانی است، که برای اجرای ساختمانهای کوتاه مرتبه و میان مرتبه (حداکثر تا ۵ طبقه) استفاده میشود.

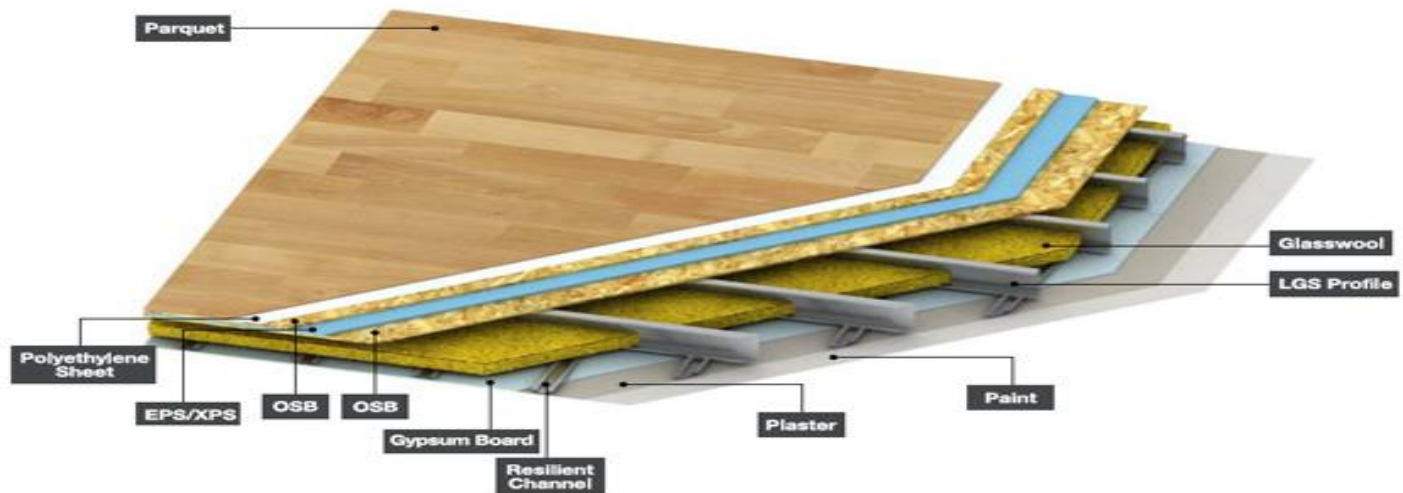
دیوارها از قطعات سازه ای به شکل حروف انگلیسی سی که در فواصل ۴۰ تا ۶۰ سانتی متری از هم قرار میگیرند و اصطلاحاً به آنها ستونک می گویند، همچنین در این سیستم به اجرای افقی رادی یا رانر می گویند.



سازه های هستند از جنس ورق گالوانیزه که به وسیله دستگاه های خاص در کارخانه به صورت نورد سرد تولید میشود و مقاومت سازه بر اساس تعداد اعضای باربند می باشد که به صورت ضعیف در اجرا و یا در حین بهره برداری و در صورت عملکرد نامناسب در هر کدام از اجزا سایر اجزا قابلیت تحمل پل را حفظ نموده و به سادگی مجموعه سازه مورد تهدید واقع نمیشود و ضخامت اجزای آن بر حسب نوع کاربری از ۲.۵ تا ۶ سانتیمتر متغیر است و شکل مقاطع آن U و Z می باشد.

***اجزای تشکیل دهنده:**

اجزای خمشی سقف به آن جویز می گویند: اعضای قالب(تراک) و اجزای باربر جانبی(فلت استراف) و اعضای قائم باربر.



Floor Detail

استفاده از مصالح فولادی سرد نورد شده از دهه ۱۸۵۰ آغاز گردید ولی به مدت ۱۰۰ سال مورد استفاده قرار نگرفت تا سال ۱۹۳۹ اولین استاندارد طراحی بر مبنای تحقیقات انجام شده در دانشگاه آمریکا تدوین گردید، امروزه به دلایل متعدد در کشور های پیشرفته از جمله آمریکا - کانادا و انگلستان از سازه های Lsf حتی تا ۸ طبقه استفاده میشود.



مرحله اول:

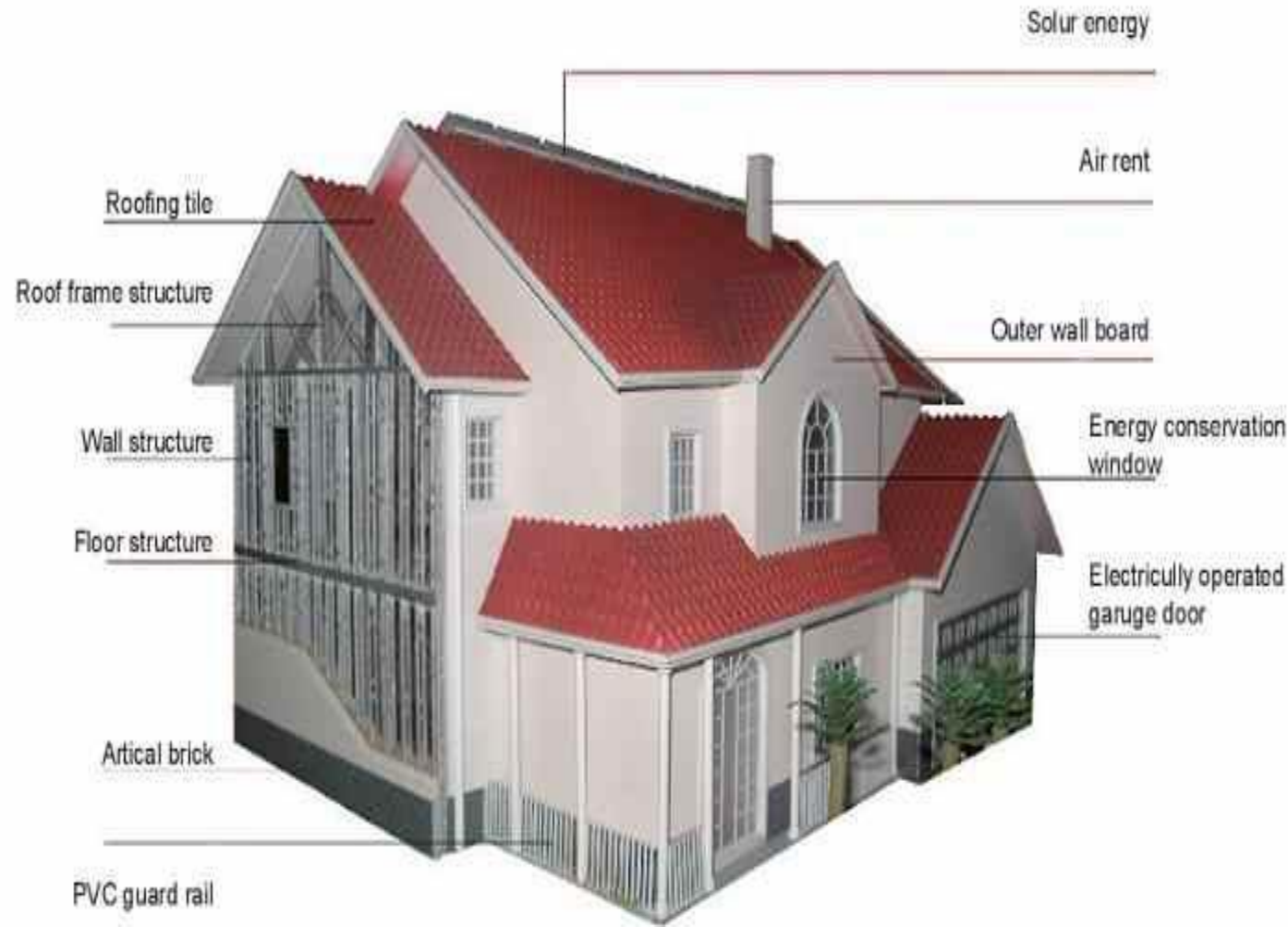
۱- فنداسیون شناسی

۲- فنداسیون نواری با ابعاد کم + میلگرد های طولی

مرحله دوم:

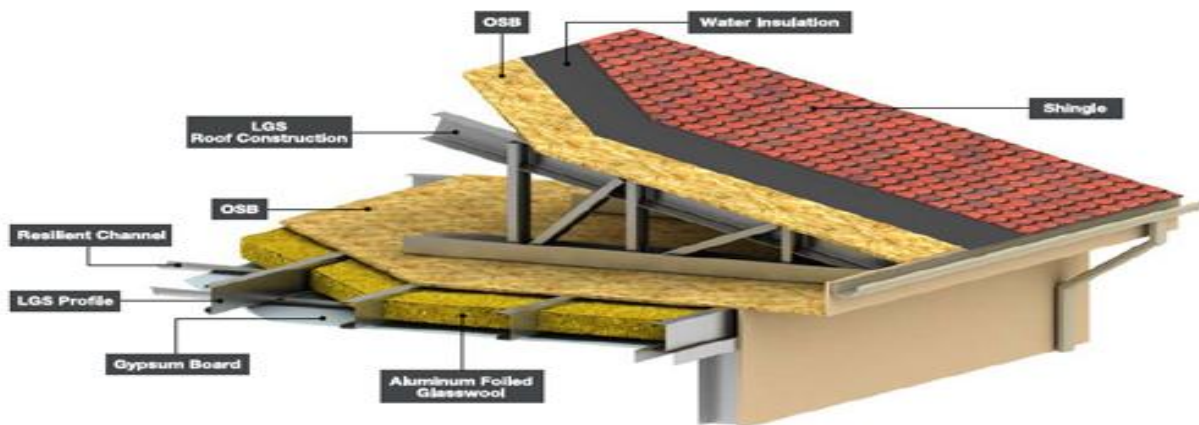
اجرای اسکلت

House view



* مصالح Lsf :

گالوانیزه سرد نورد شده



Hip Roof Detail Finishes Material: Shingle

- ۱- مقاومت پایین در برابر حرارت: لازم است در مقابل آتش سوزی تمهیدات لازم پیش بینی گردد ، از جمله ایجاد باربند حد فاصل جداره پایینی و عایق حرارتی.
- ۲- ناآشنایی کارفرما
- ۳- ناآشنایی پیمانکار و نیروی متخصص
- ۴- ناآشنایی استفاده کننده
- ۵- محدودیت در طول دهانه
- ۶- توخالی بودن دیوارها و جایی برای جمع شدن حشرات
- ۷- انتقال سرو صدا کوبه ای
- ۸- تغییر قطعات و هزینه بالای حمل نقل

نکته: یک لایه پلی استایلین در کف (کف نیمه شناور) باعث میشود ۷۰ درصد صدای کوبه ای را بگیرد.

* راهکارهای پیشنهادی:

- ۱- آموزش پیمانکاران و کارفرمایان
- ۲- ایجاد کلاس آموزشی
- ۳- ایجاد کارخانه های متعدد در هر استان بخاطر رقابت بیشتر
- ۴- آموزش نیروی ماهر



- ۱-قابلیت افزایش طبقات تا ۵ و حداکثر تا ۸ طبقه
- ۲-مقاوم در برابر شرایط جوی متفاوت
- ۳- سهولت اجرای دهانه های متنوع و نیز تغییرات ارتفاع سازه
- ۴- مناسب برای انبوه سازی
- ۵- افزایش فضای مفید داخلی
- ۶- عایق صوتی و حرارتی
- ۷- کاهش شدید مصالح و صرفه جویی در ثروت ملی
- ۸- کاهش ۶۰ درصدی وزن مرده ساختمان نسبت به ساختمان های سنتی
- ۹- پایداری ایدآل به هنگام زلزله به دلیل اتصالات مناسب و وزن کم
- ۱۰- اجرای کلیه اتصالات در محل نصب با استفاده از پیچ و مهره
- ۱۱- رعایت مفاد مبحث ۱۹ مقررات ملی ساختمان

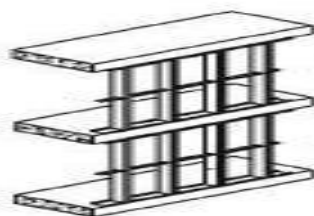


Kat Planı

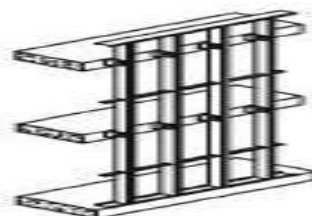
Yatak Odası	: 10 m ²
Yatak Odası	: 10 m ²
Wc - Banyo	: 5 m ²
Salon	: 26 m ²
Hol	: 14 m ²

Wind Bearing Walls (WB)

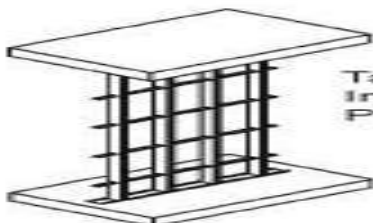
LSF provides economical structural support for finishes under lateral wind loads on buildings where other structural components carry the axial loads. WB walls can be designed for a variety of deflection limits for finishes such as EIFS, Stucco, Metal Panel and Brick Veneer. Wind-Bearing LSF may be used in buildings of any height.



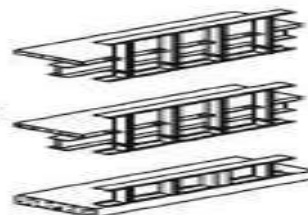
Exterior
Infill
Walls



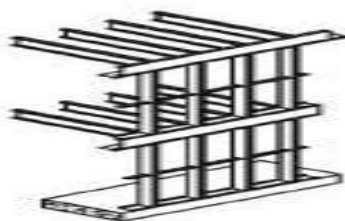
Continuous
Exterior
Curtain
Walls



Tall
Interior
Partitions



Spandrel
Walls for
Continuous
Strip
Windows



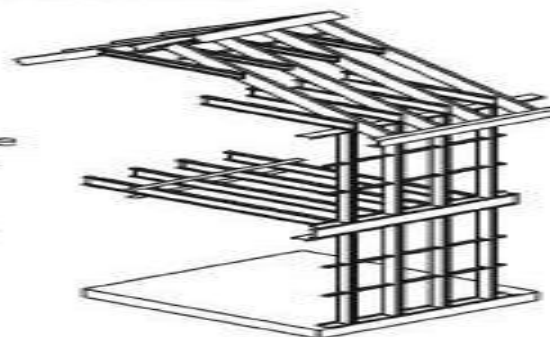
Axial Load-Bearing Walls (AB)

LSF supports the combined axial and wind loads on interior and exterior walls. Buildings up to six stories in height can be framed using LSF.

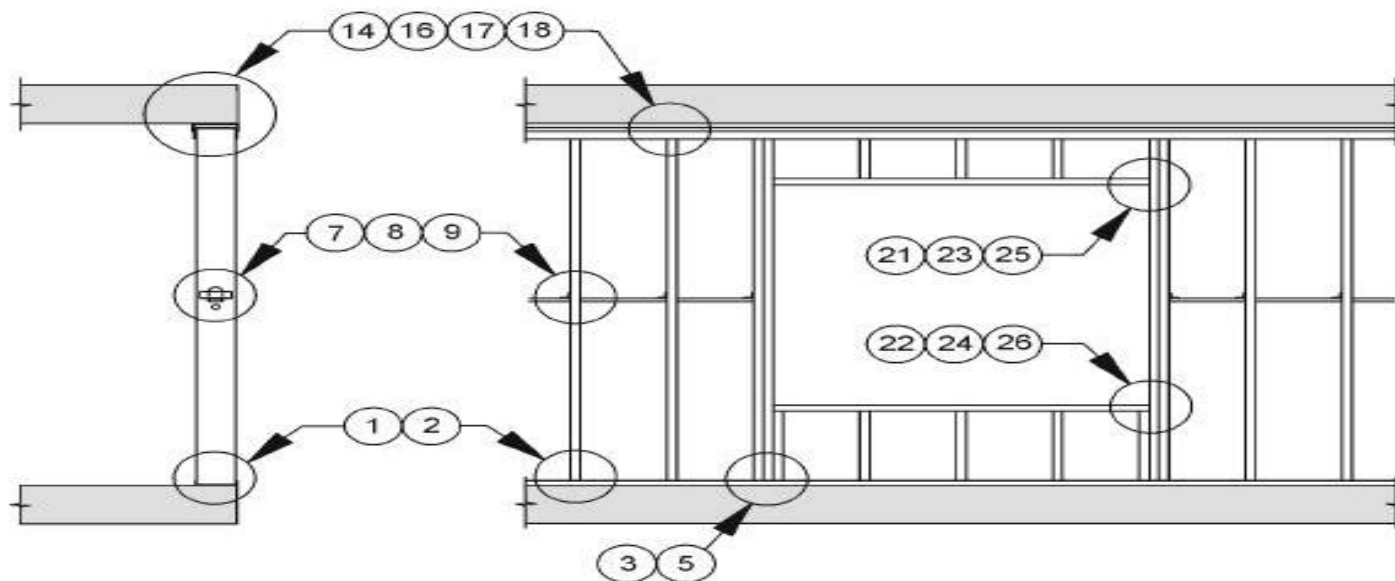
LSF works with a variety of floors including LSF Joists, OWSJ's and hollow precast concrete.

Joists for Floors and Roofs

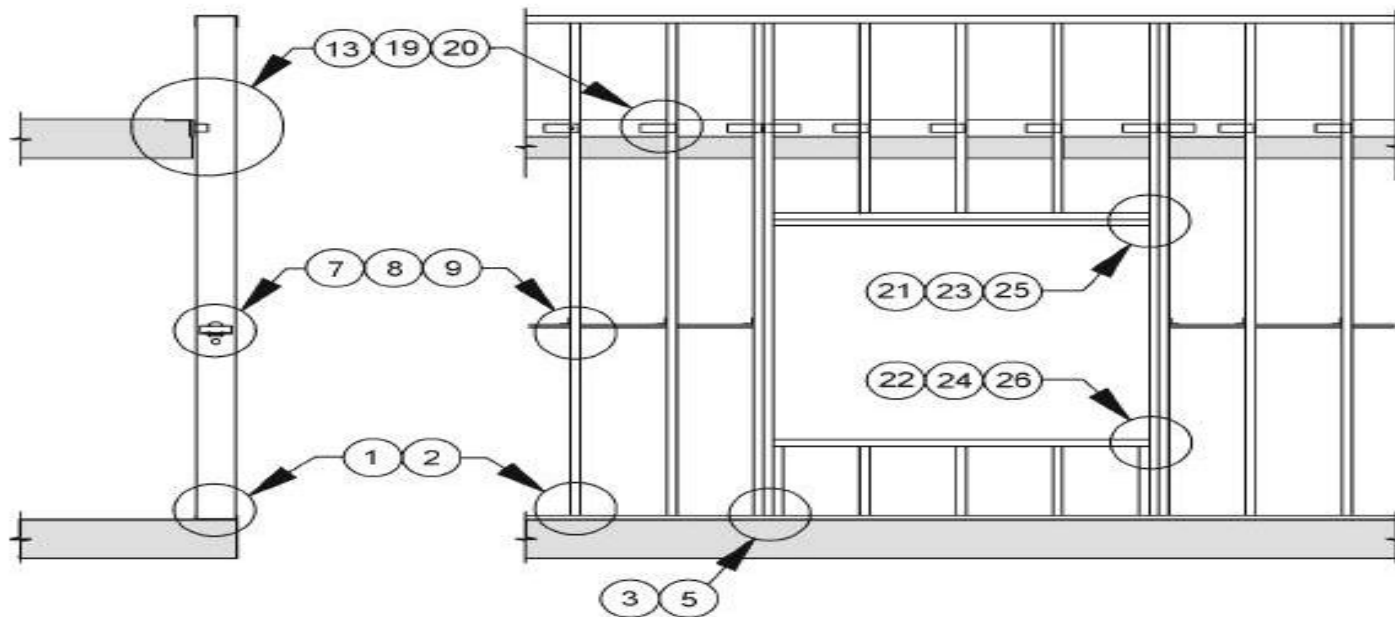
LSF joists offer a wide range of span and load capacities for mezzanine floors, residential floors, pitched roofs, mansards and flat roofs as well as support for interior drywall ceilings where a long clear span is desired.



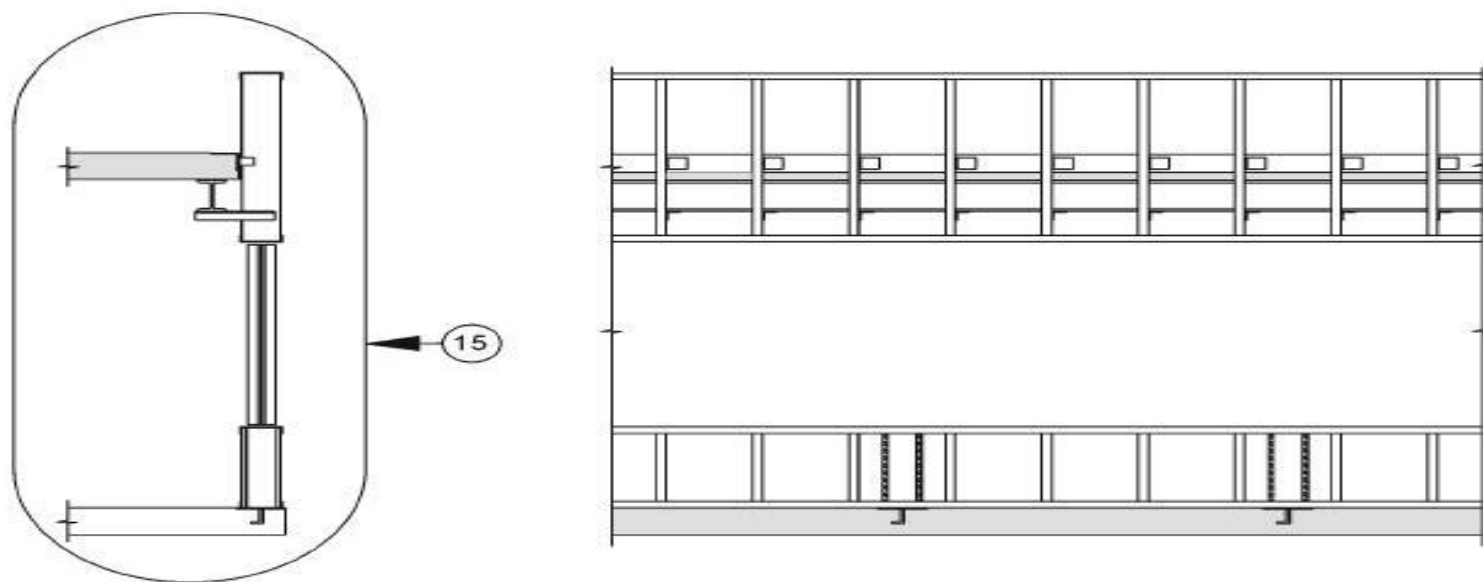
Wind Loadbearing Infill Wall



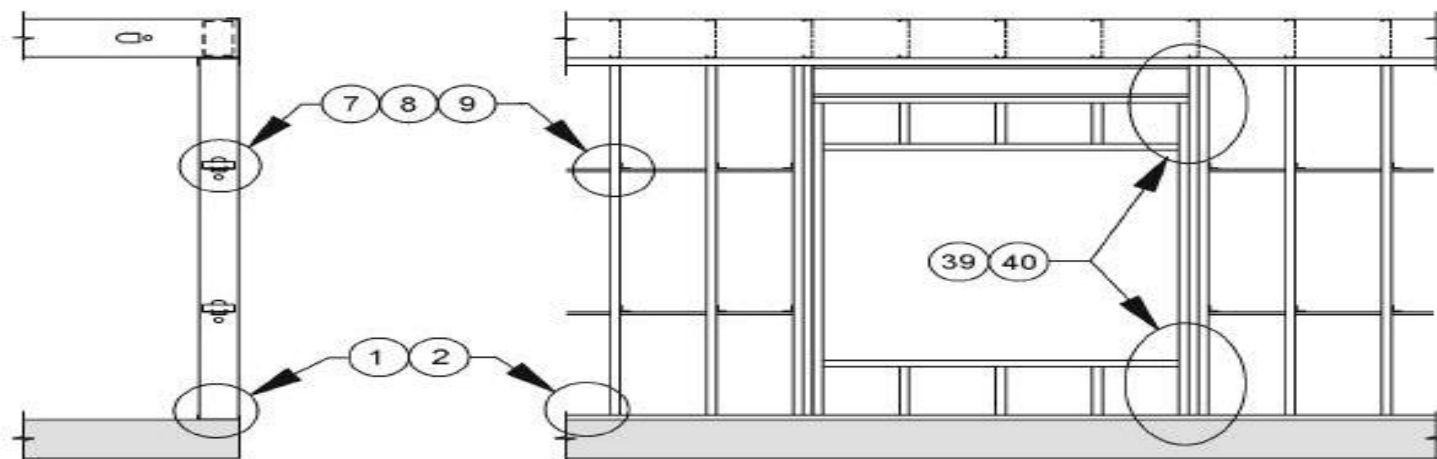
Wind Loadbearing Continuous Curtain Wall



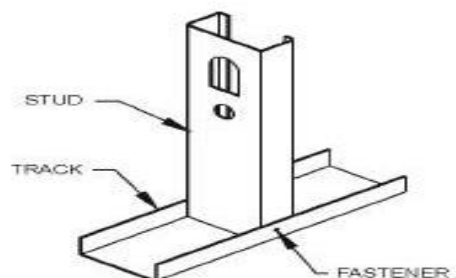
Wind Loadbearing Spandrel Wall for Strip Windows



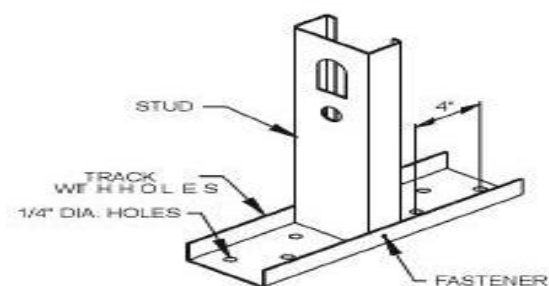
Axial Loadbearing Wall



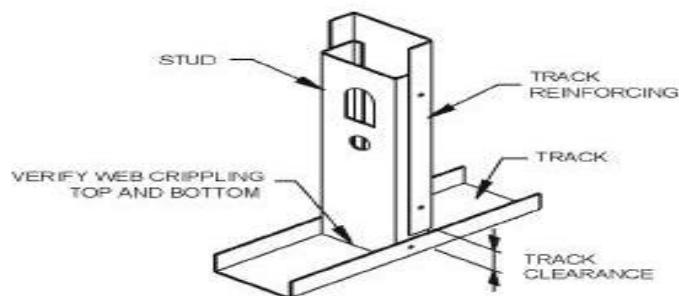
GENERAL DETAILS



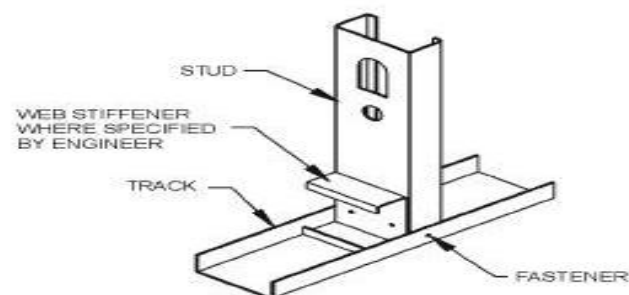
1 STUD TO TRACK



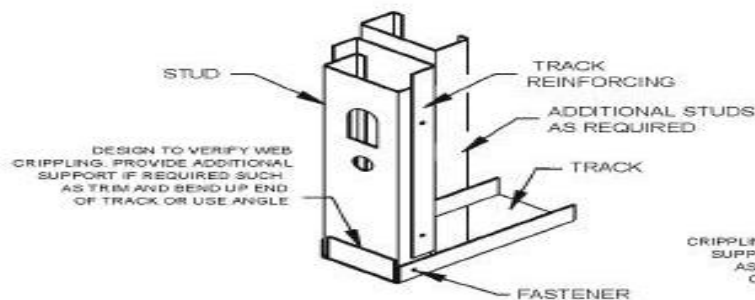
2 STUD TO TRACK WITH HOLES



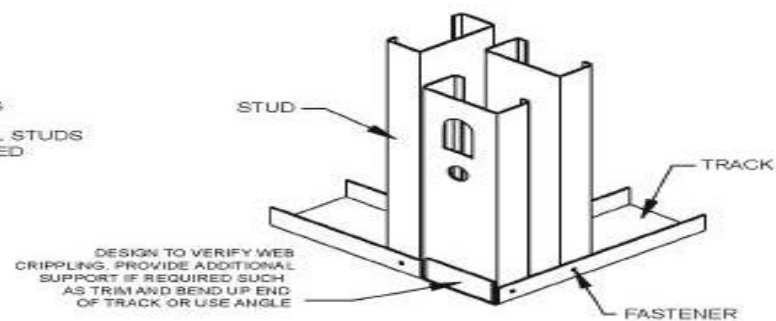
3 STUD REINFORCED WITH TRACK



4 STUD WITH WEB STIFFENER REINFORCING

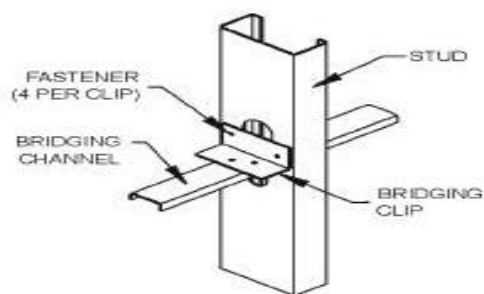


5 JAMB STUD AT DOOR OPENING

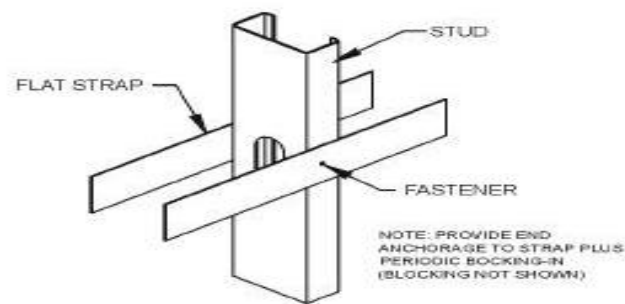


6 STUD TO TRACK AT CORNERS

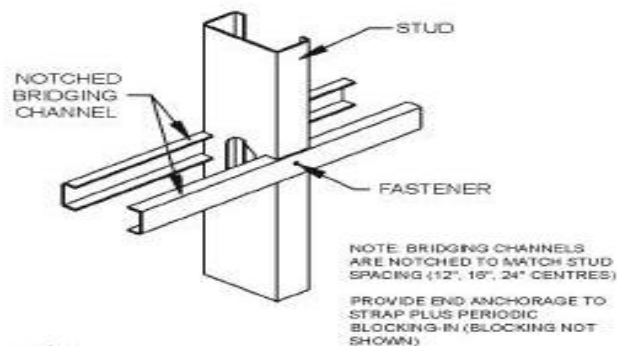
GENERAL DETAILS



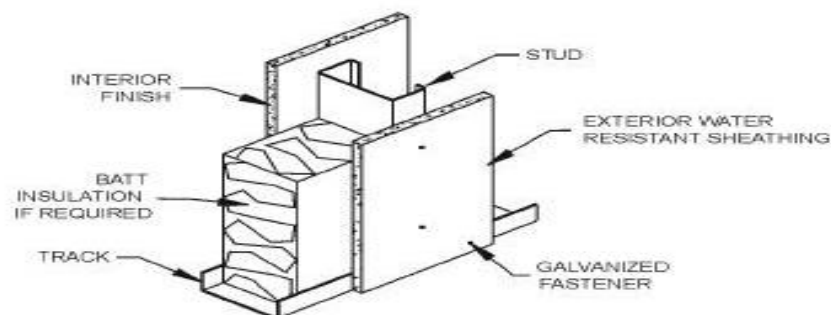
7 THROUGH-THE-STUD BRIDGING



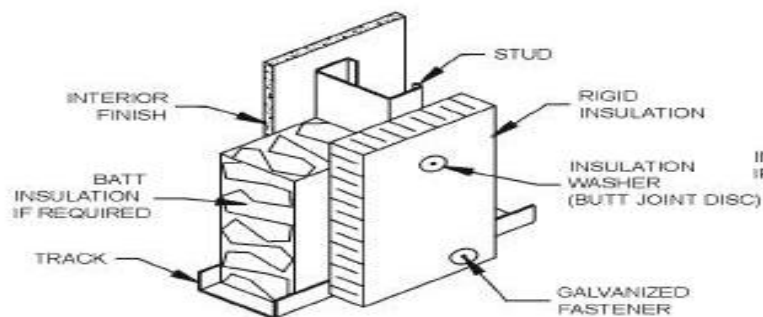
8 FLAT STRAP BRIDGING



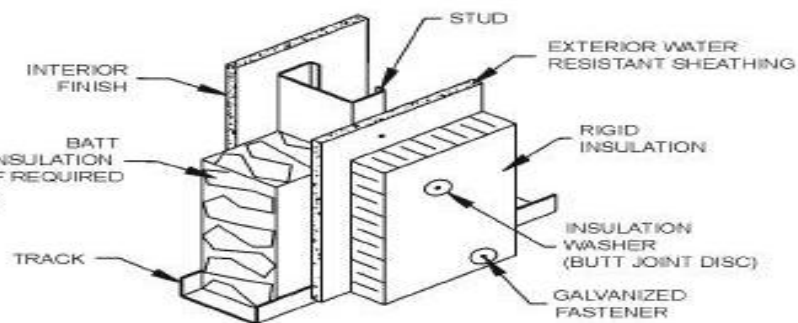
9 NOTCHED CHANNEL BRIDGING



10 EXTERIOR SHEATHING

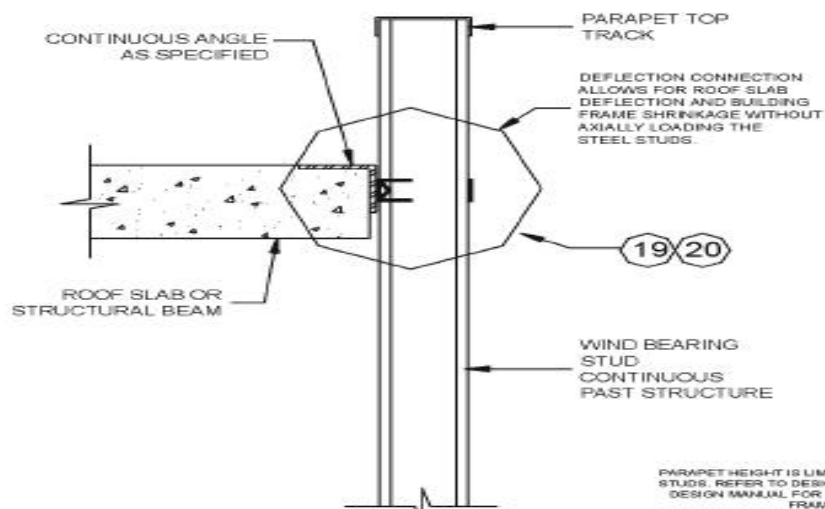


11 EXTERIOR RIGID INSULATION

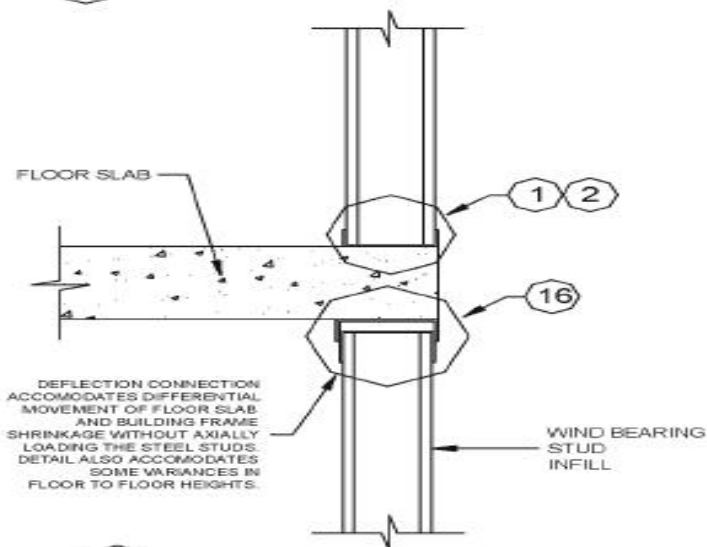


12 EXTERIOR SHEATHING AND RIGID INSULATION

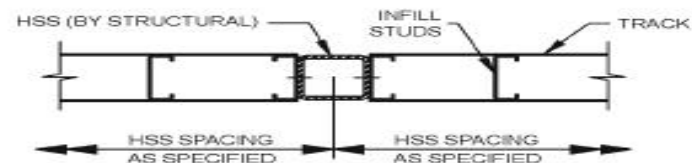
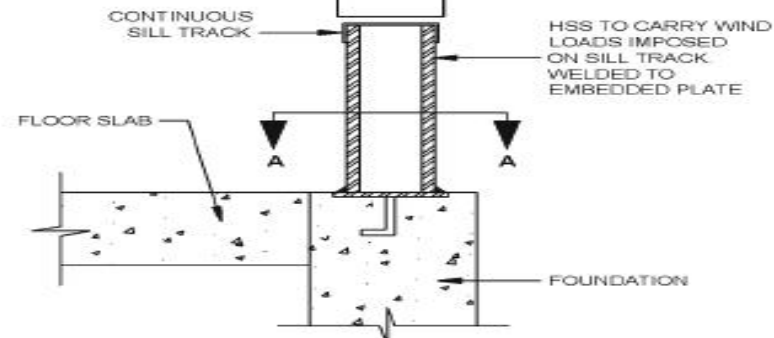
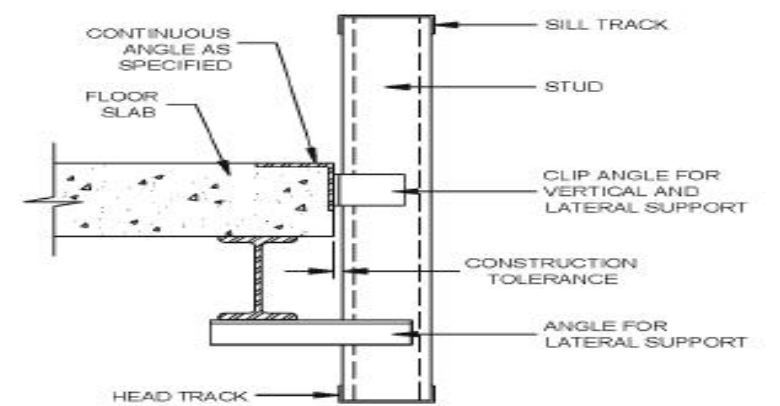
WIND BEARING WALLS



13 CONTINUOUS WIND BEARING STUD AT PARAPET



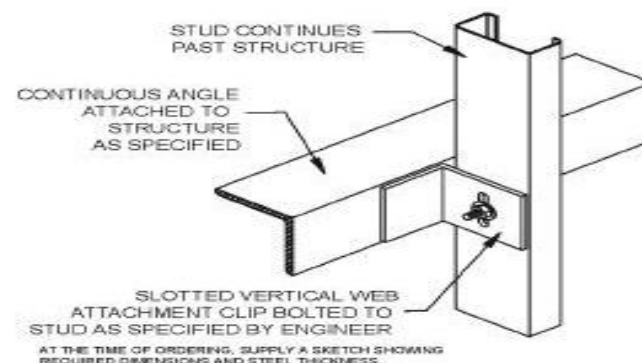
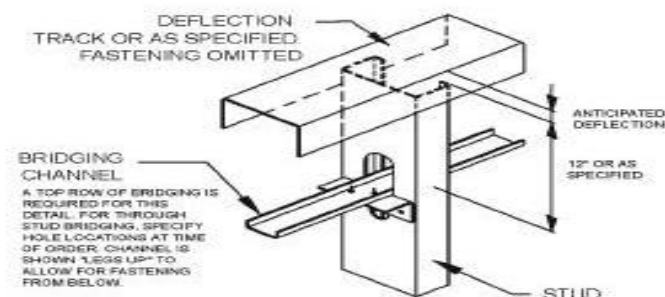
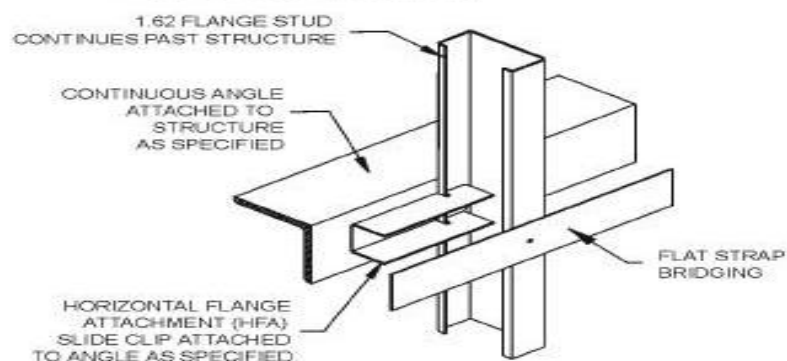
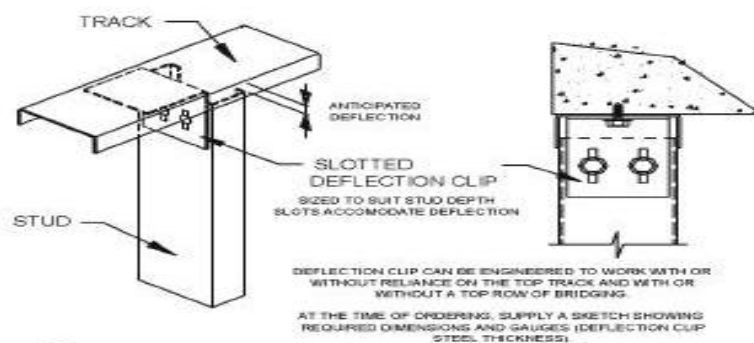
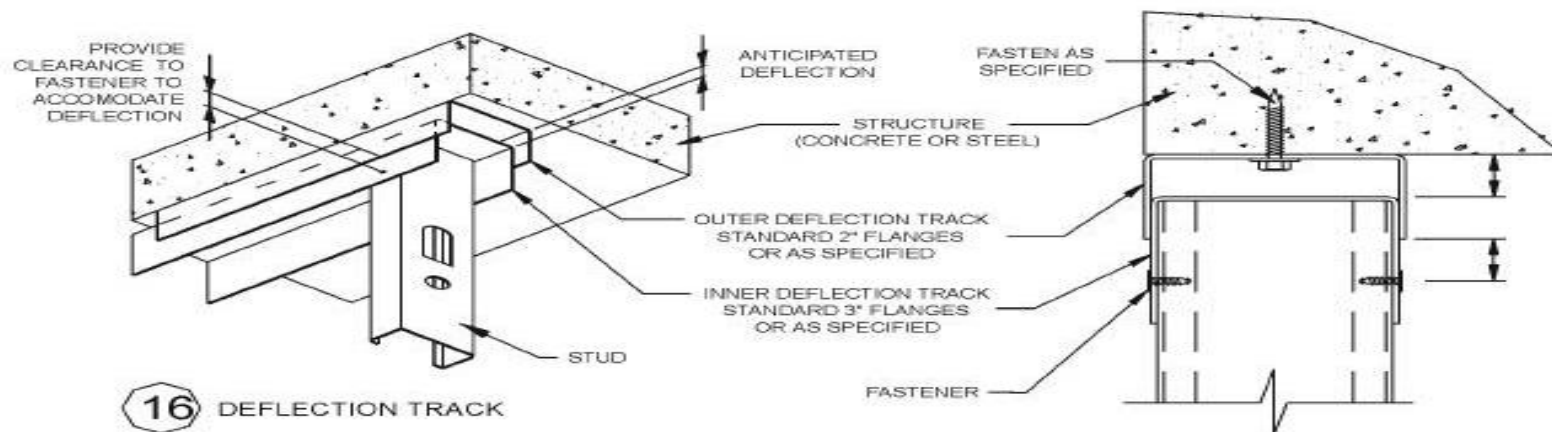
14 WIND BEARING INFILL WALL



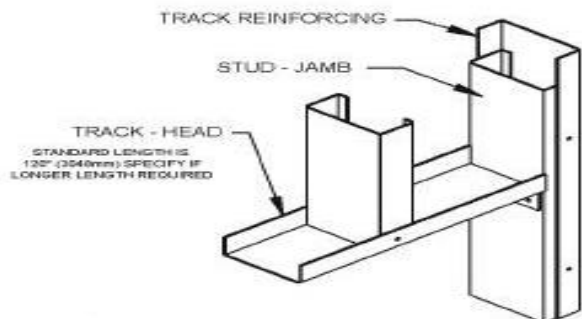
SECTION A-A

15 SPANDREL WALL FOR STRIP WINDOWS

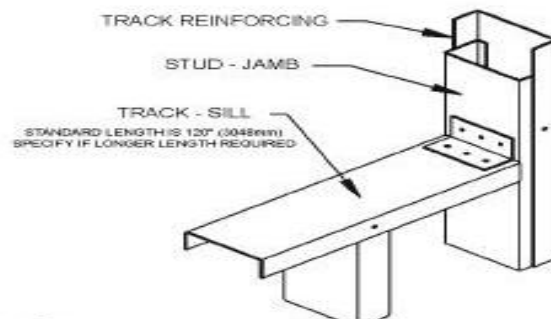
WIND BEARING WALLS - DEFLECTION DETAILS



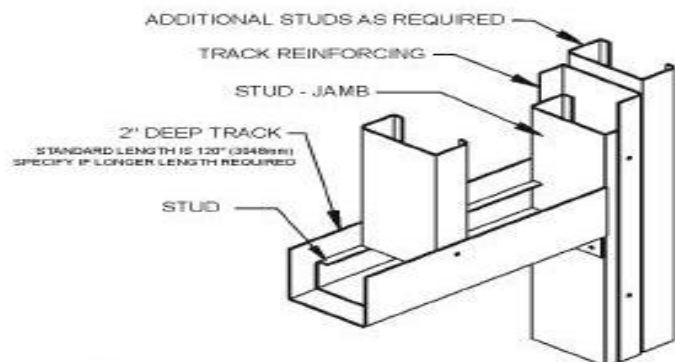
WIND BEARING WALLS AT OPENINGS



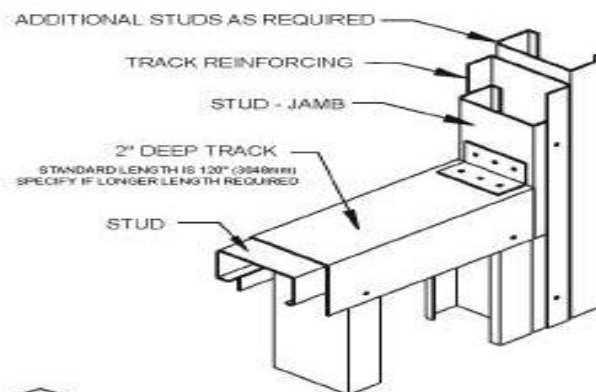
21 HEAD TRACK TO JAMB STUDS



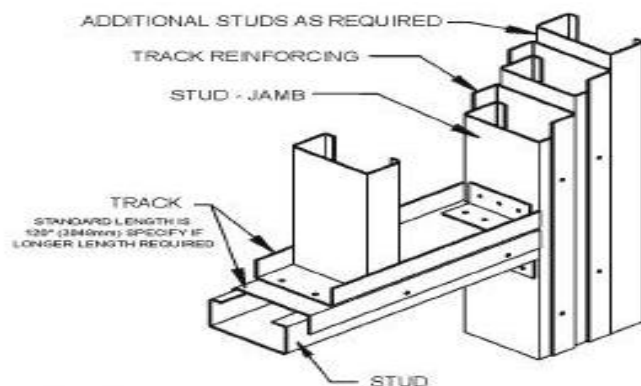
22 SILL TRACK TO JAMB STUDS



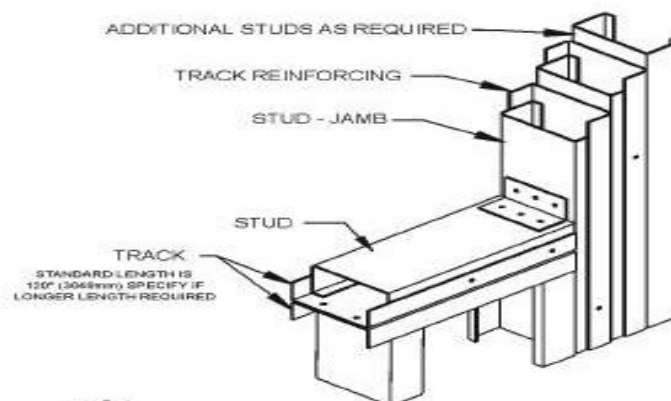
23 REINFORCED HEAD TRACK TO JAMB STUDS



24 REINFORCED SILL TRACK TO JAMB STUDS

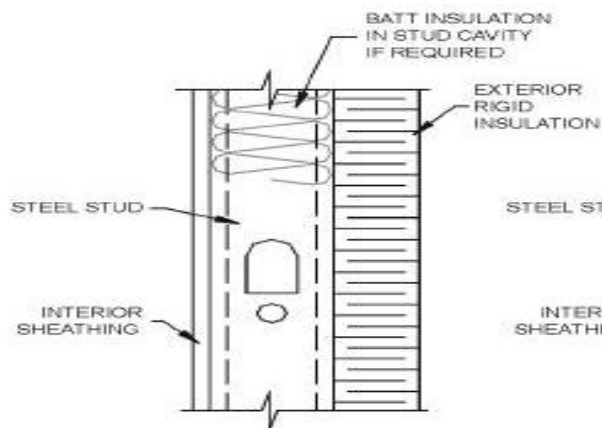


25 BUILT-UP HEAD TRACK TO JAMB STUDS

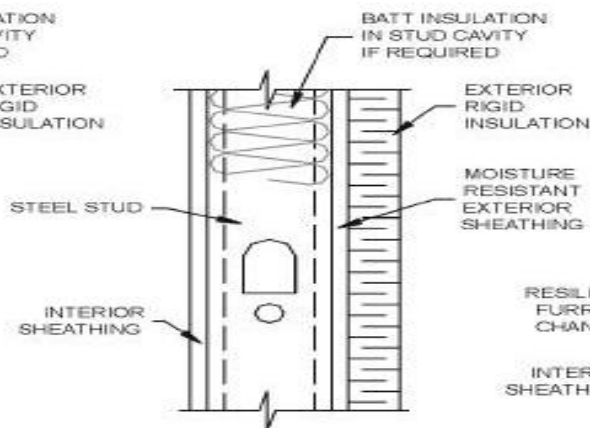


26 BUILT-UP SILL TRACK TO JAMB STUDS

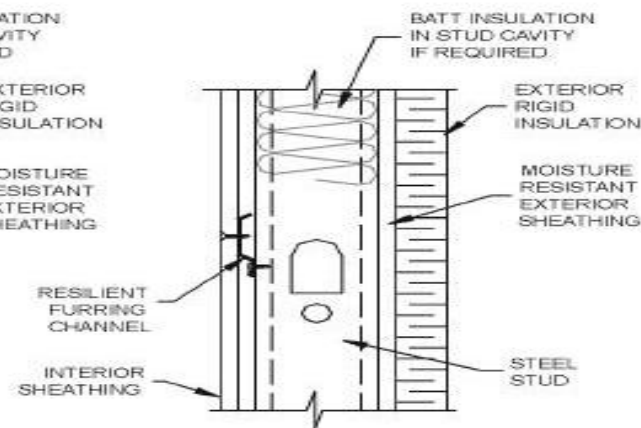
WALL SECTIONS



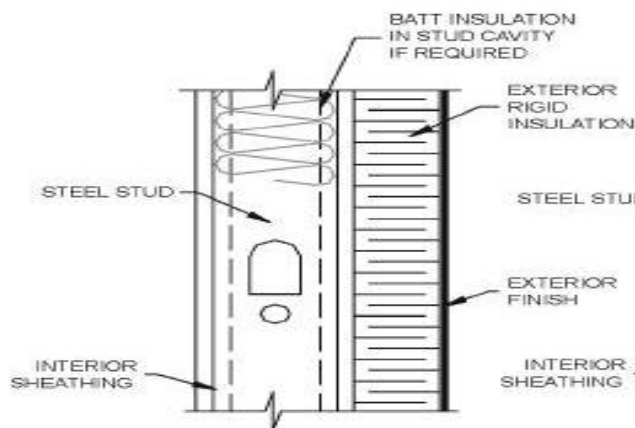
27 EXTERIOR RIGID INSULATION WITHOUT EXTERIOR SHEATHING
(EXTERIOR FINISH NOT SHOWN)



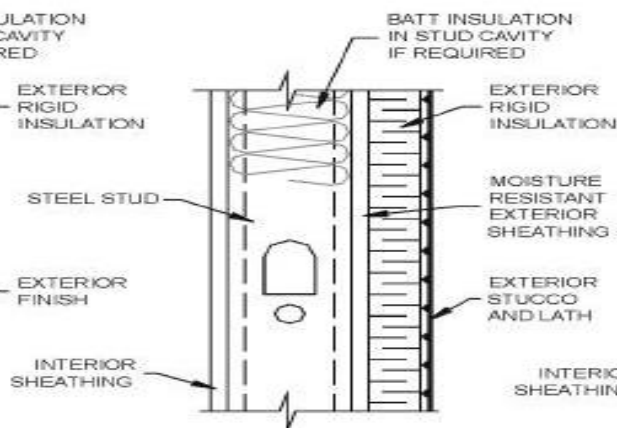
28 EXTERIOR RIGID INSULATION WITH EXTERIOR SHEATHING
(EXTERIOR FINISH NOT SHOWN)



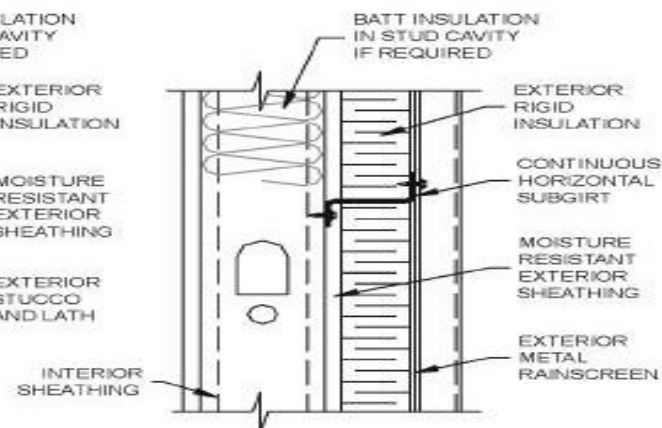
29 RESILIENT FURRING CHANNEL
(EXTERIOR FINISH NOT SHOWN)



30 EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)



31 EXTERIOR STUCCO AND METAL LATH



32 EXTERIOR METAL WALL PANEL

BRICK CONNECTORS

Brick connectors for steel stud rain-screen wall systems must meet the structural and performance requirements of CSA A370-94 Connectors for Masonry and CSA S304.1 Masonry Design for Buildings (Limit States Design).

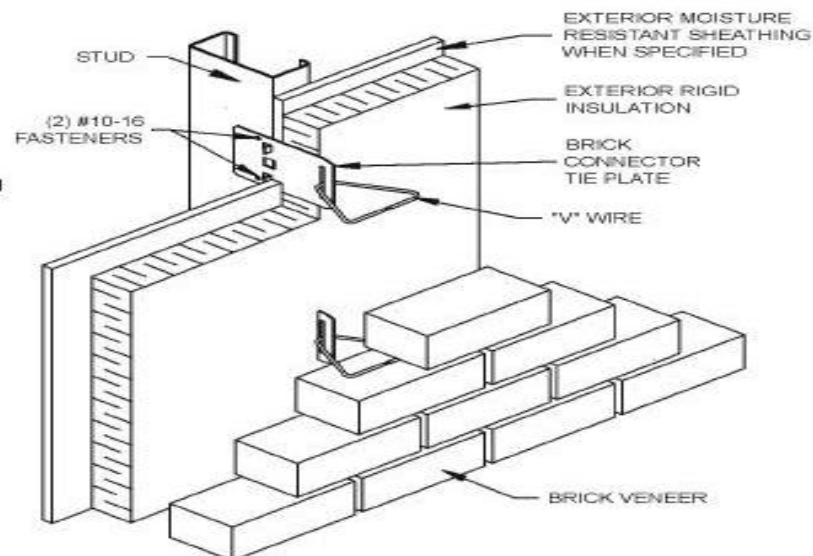
Two common brick connector systems are available consisting of steel tie plates, v wires and fasteners:

- HDG - Hot-Dip-Galvanized after fabrication system.
- SS - Stainless Steel system.

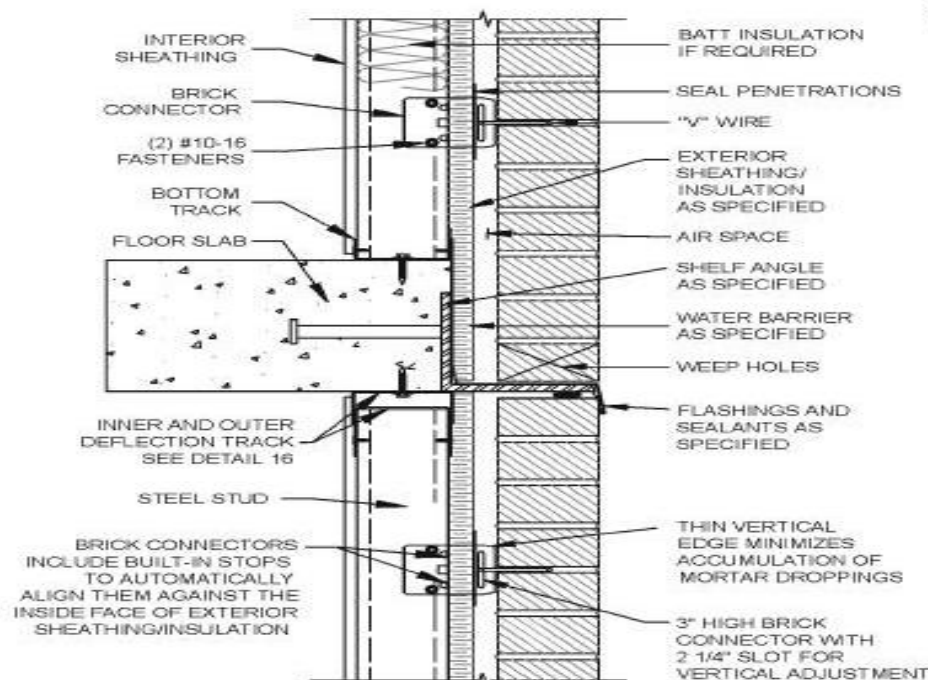
Both systems include "bayonet" style tie plates that attach directly to the web of the steel studs ensuring that the fasteners are located in the warm and dry cavity and loaded in shear when transferring the loads to the studs.

Tie plates are available in a variety of lengths to accommodate exterior sheathing/insulation thickness.

To simplify site coordination and ensure that brick connectors are included in the LSF Engineers' design and shop drawings, brick connectors can be specified to be supplied and installed by the steel stud sub-contractor.

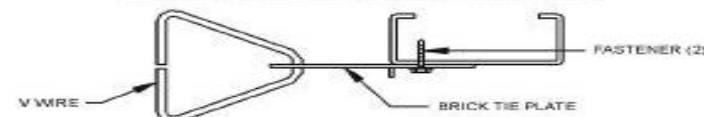


33 BRICK CONNECTORS TO STEEL STUDS



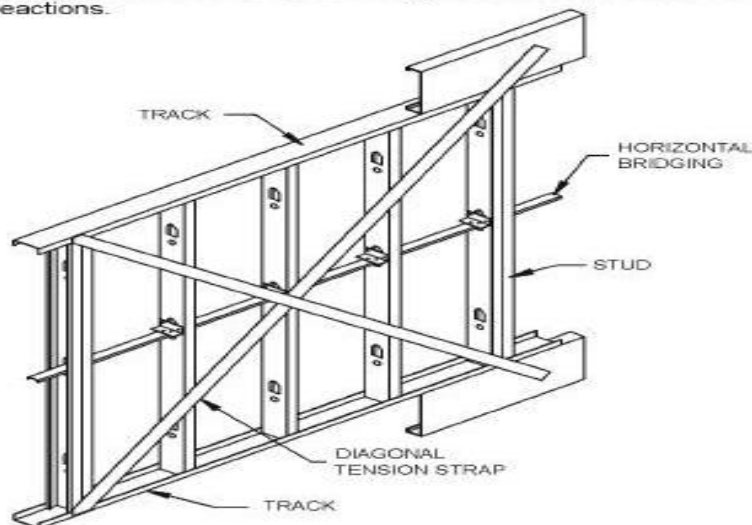
34 WIND BEARING STEEL STUD WALL WITH BRICK VENEER AND SHELF ANGLE
(Air Barrier / Vapour Barrier Not Shown)

BRICK CONECTOR COMPONENTS

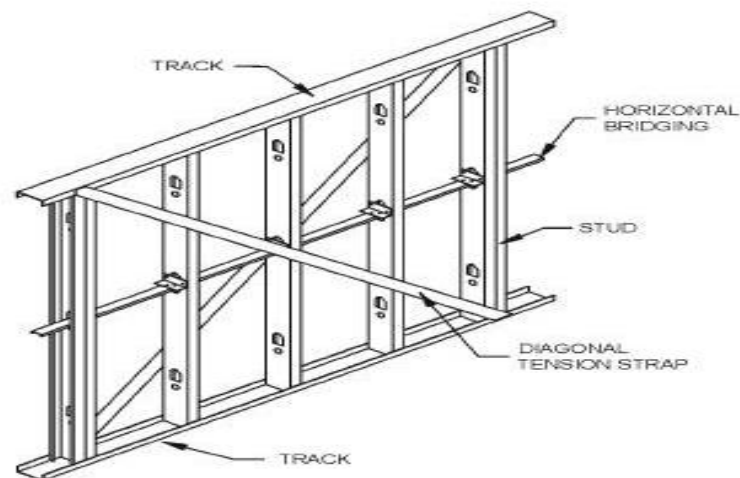


AXIAL LOADBEARING WALLS

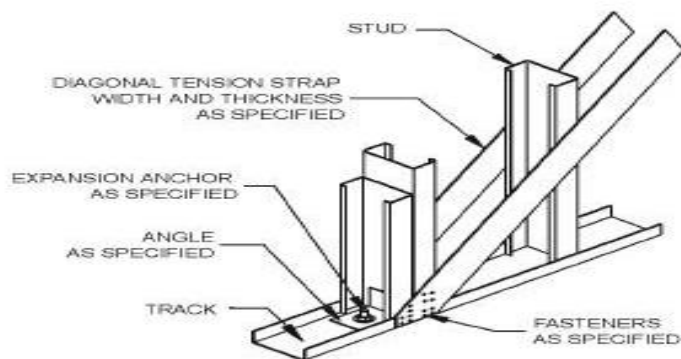
In axial loadbearing construction, some form of bracing is required to resist wind, seismic and the sway effects produced by vertical loads acting on the structure (the P-delta effect). Diagonal tension straps are normally the most economical means of providing this bracing. Diagonal straps are typically installed in pairs to form the X pattern over the face of the studs. Strap end connections must be engineered to transfer the full design load and account for horizontal and vertical strap reactions.



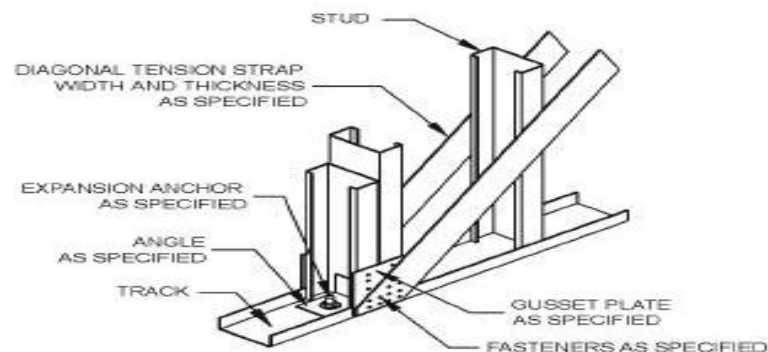
35 DIAGONAL TENSION STRAPS ONE SIDE



36 DIAGONAL TENSION STRAPS BOTH SIDES

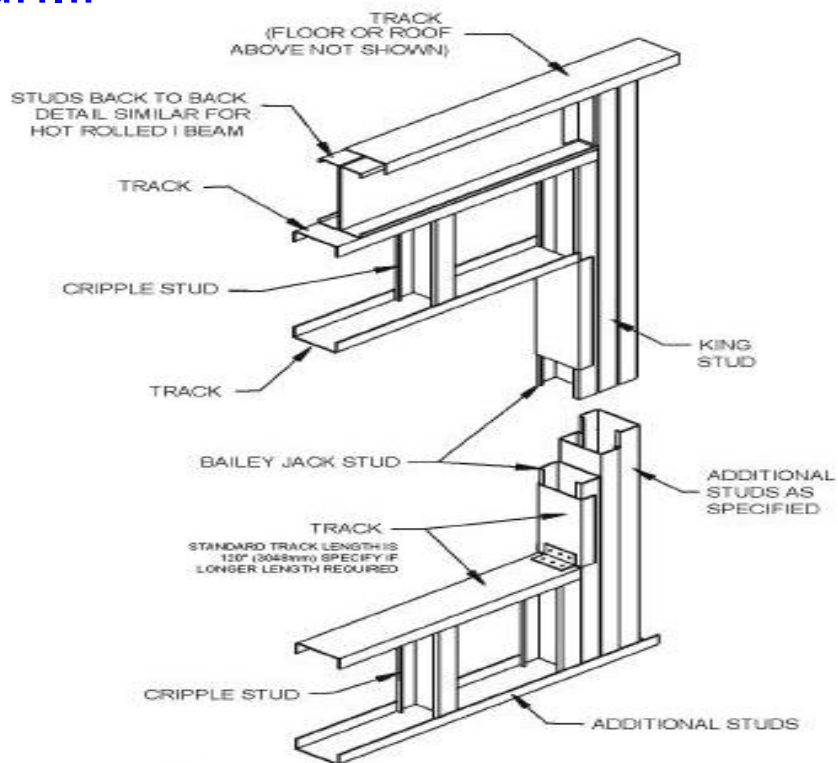


37 TENSION STRAP CONNECTION

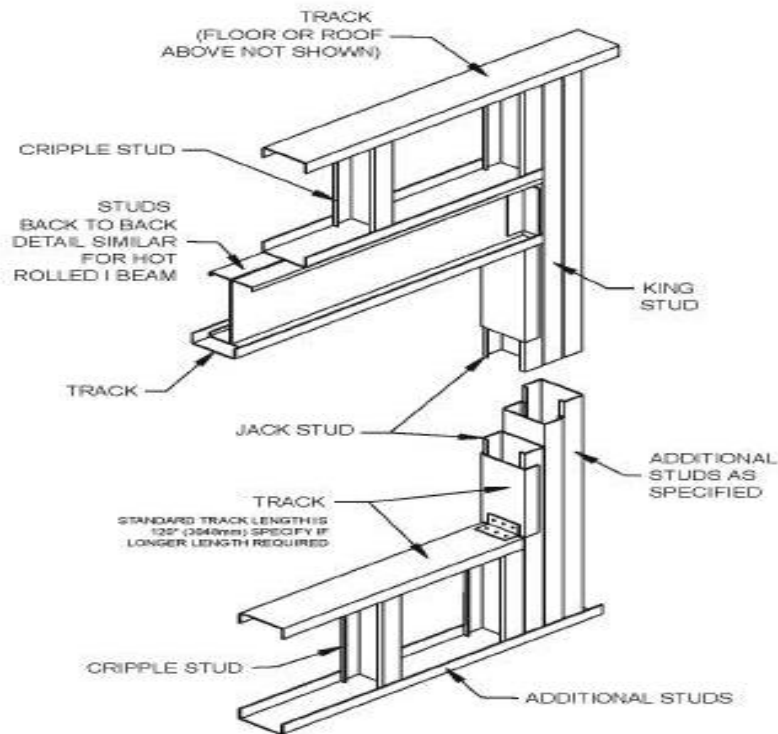


38 TENSION STRAP CONNECTION WITH GUSSET PLATES

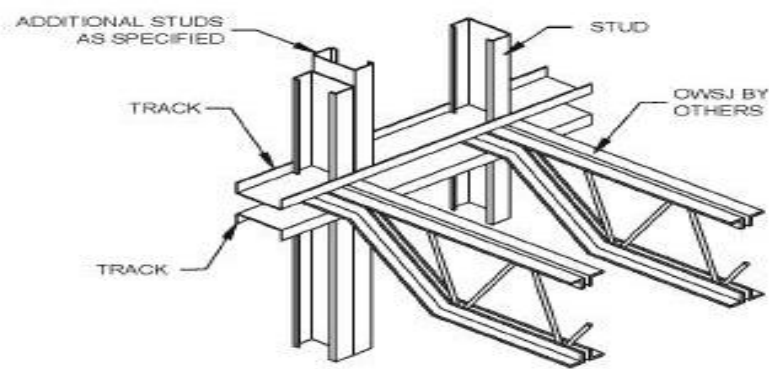
AXIAL LOADBEARING WALLS



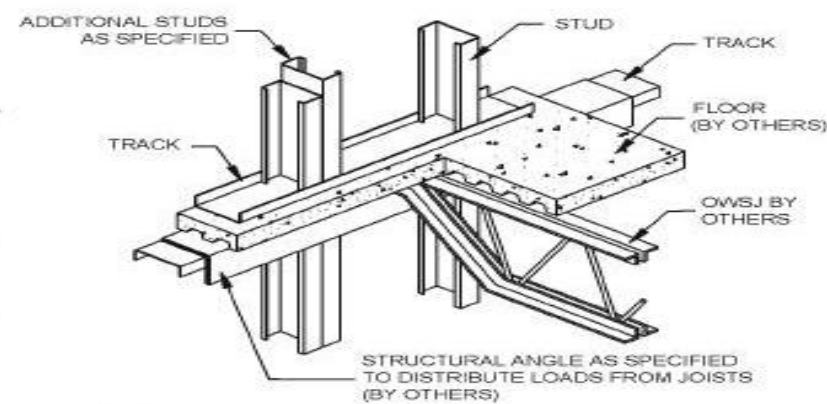
39 WALL OPENING WITH UPPER LINTEL



40 WALL OPENING WITH LOWER LINTEL

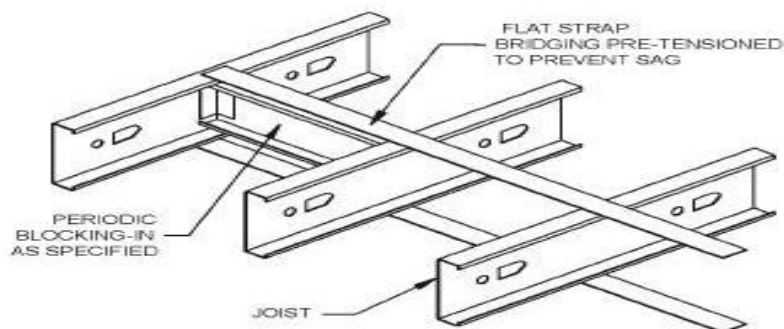


41 OPEN WEB STEEL JOISTS IN LINE WITH AXIAL LOADBEARING STEEL STUDS

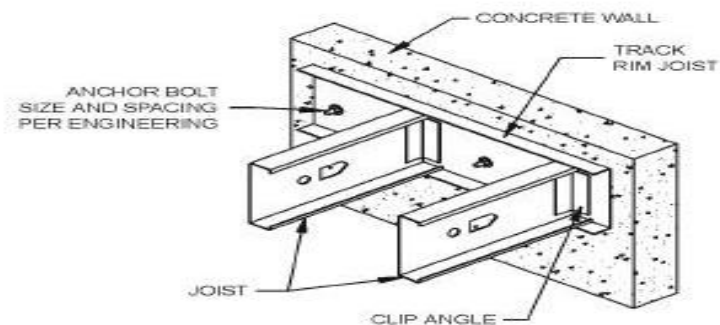


42 OPEN WEB STEEL JOISTS OFFSET TO AXIAL LOADBEARING STEEL STUDS

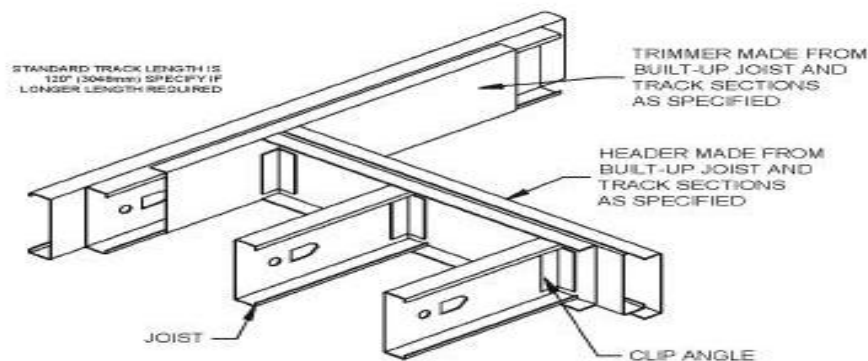
FLOOR JOISTS



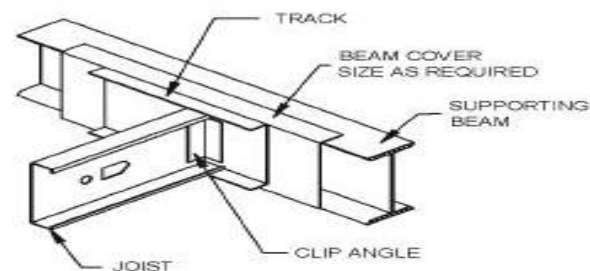
43 FLOOR JOIST WITH BRIDGING AND BLOCKING



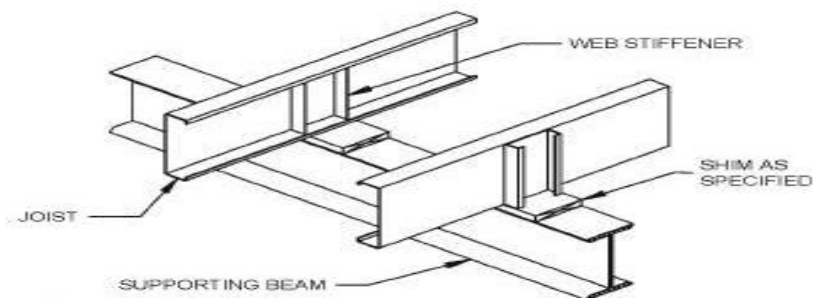
44 FLOOR MOUNTED INSIDE CONCRETE WALL



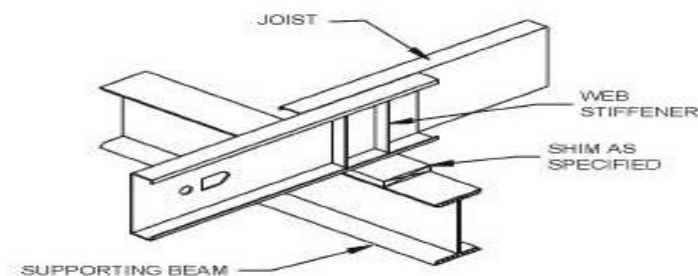
45 OPENING IN FLOOR



46 FLUSH CONNECTION TO SUPPORTING BEAM

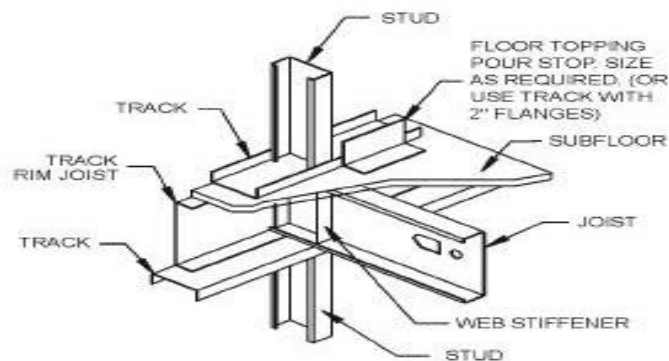


47 JOISTS CONTINUOUS OVER SUPPORTING BEAM

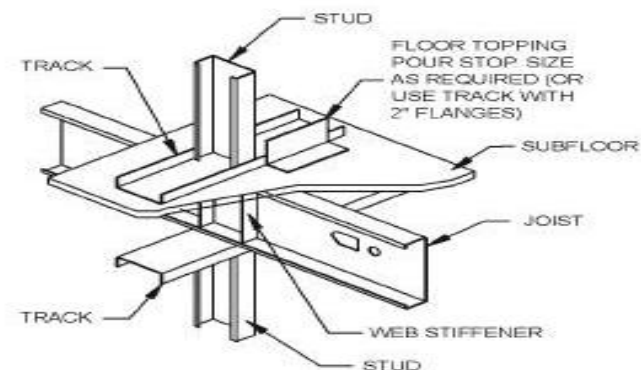


48 JOISTS OVERLAPPING SUPPORTING BEAM

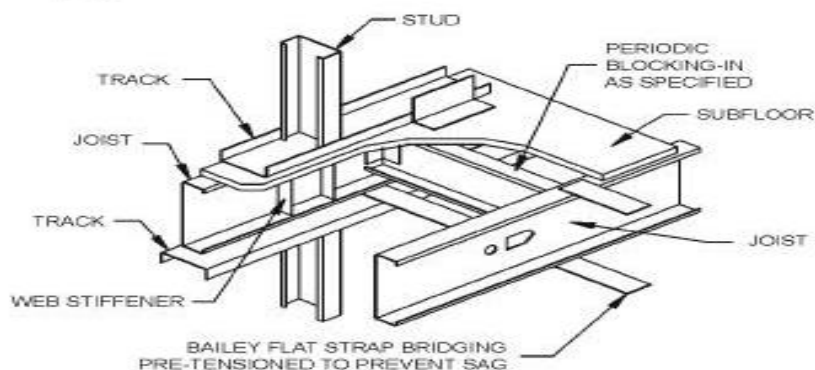
FLOOR JOISTS



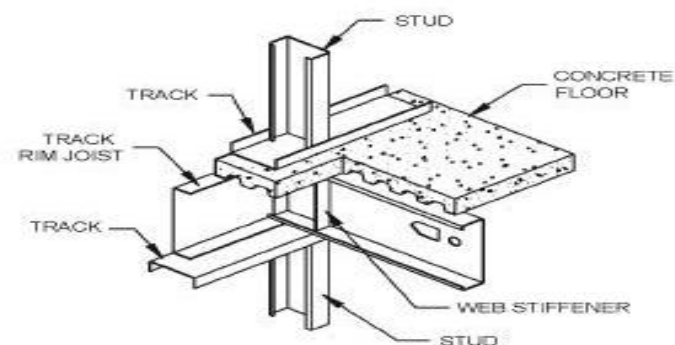
49 JOIST PERPENDICULAR TO PERIMETER



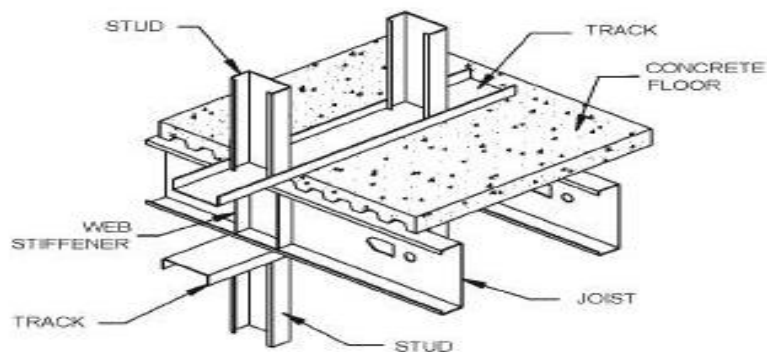
50 JOIST ABOVE LOADBEARING WALL



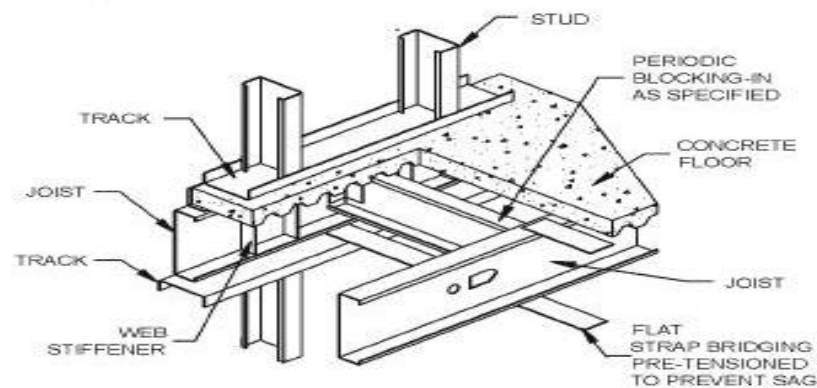
51 JOIST PARALLEL TO PERIMETER



52 JOIST PERPENDICULAR TO PERIMETER

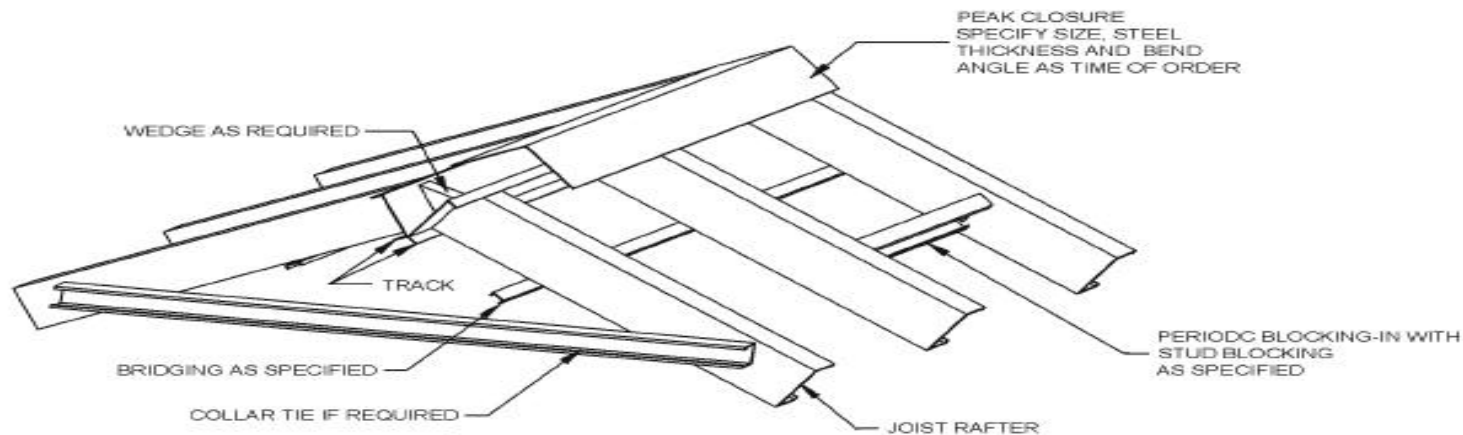


53 JOIST ABOVE LOADBEARING WALL

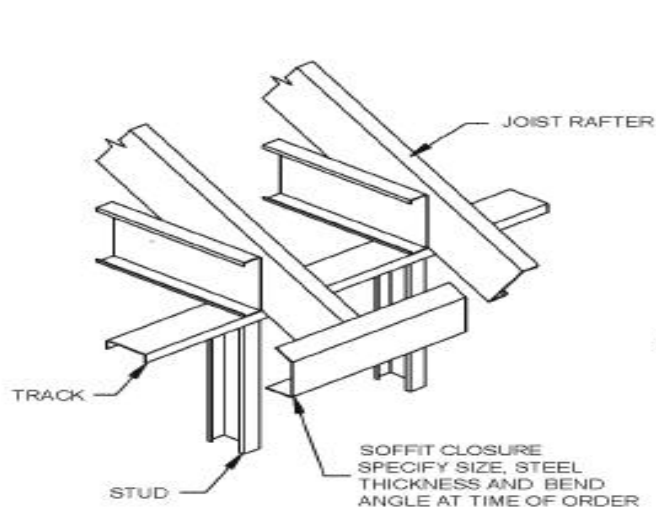


54 JOIST PARALLEL TO PERIMETER

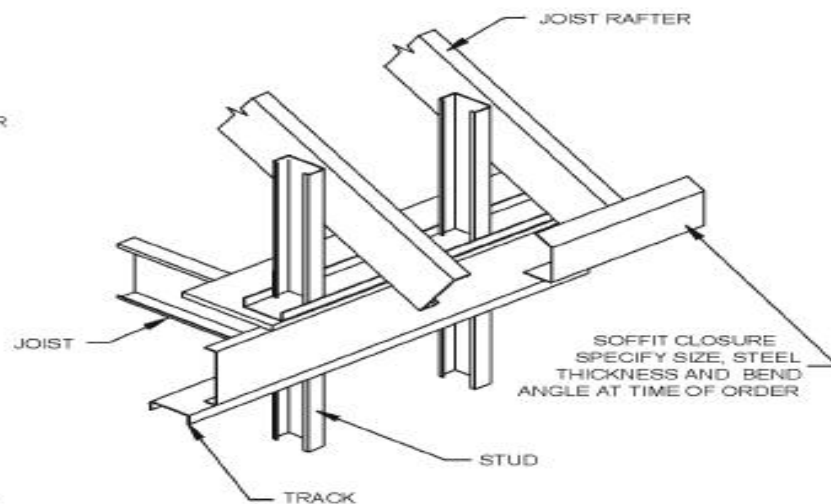
ROOF JOISTS



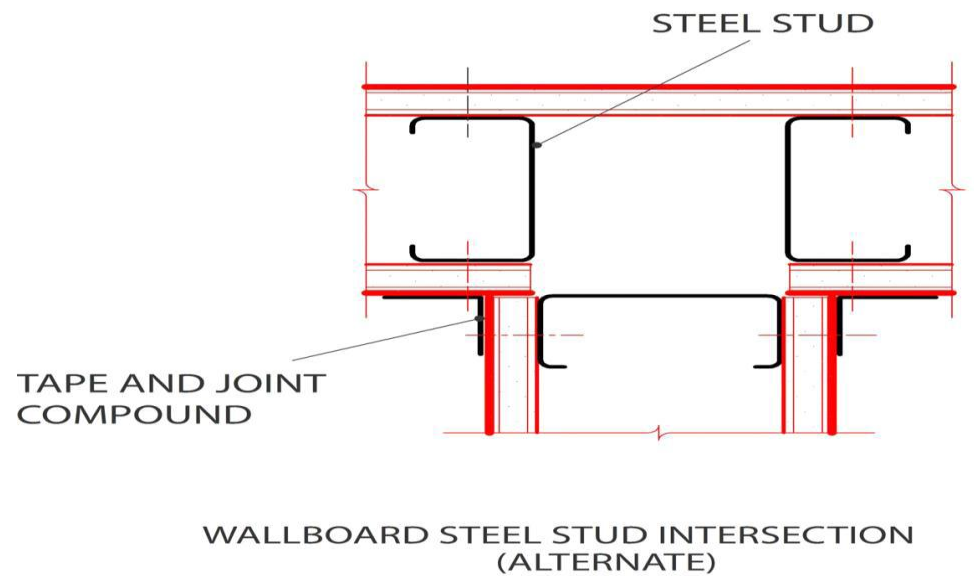
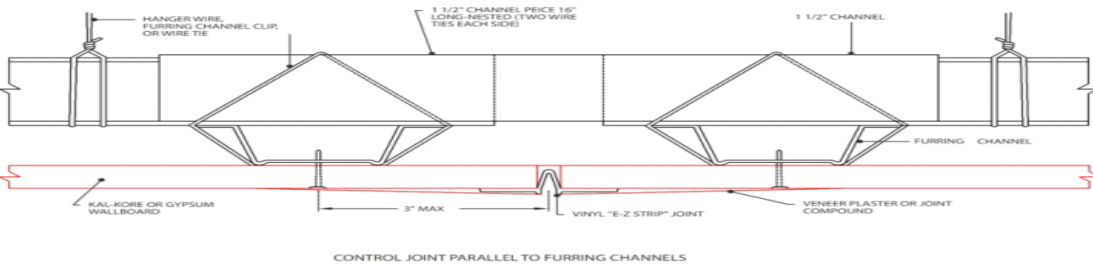
55 RAFTER AT PEAK

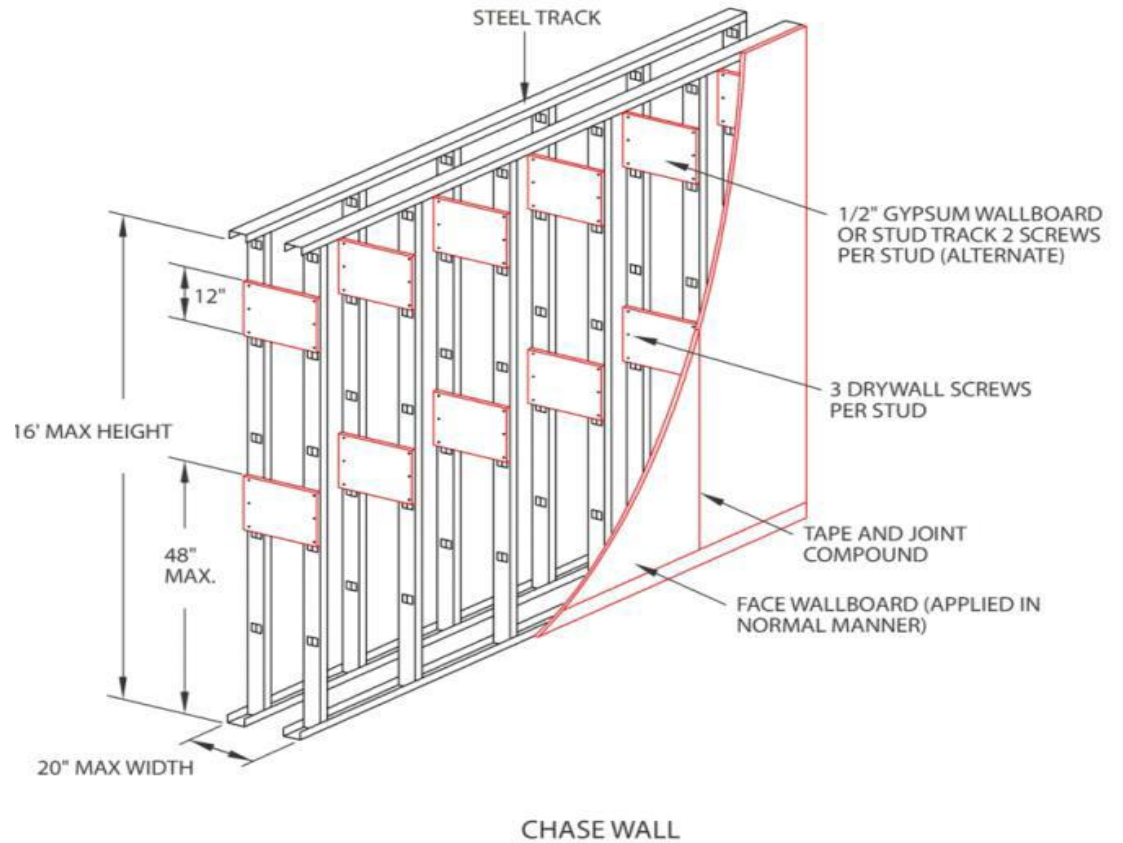
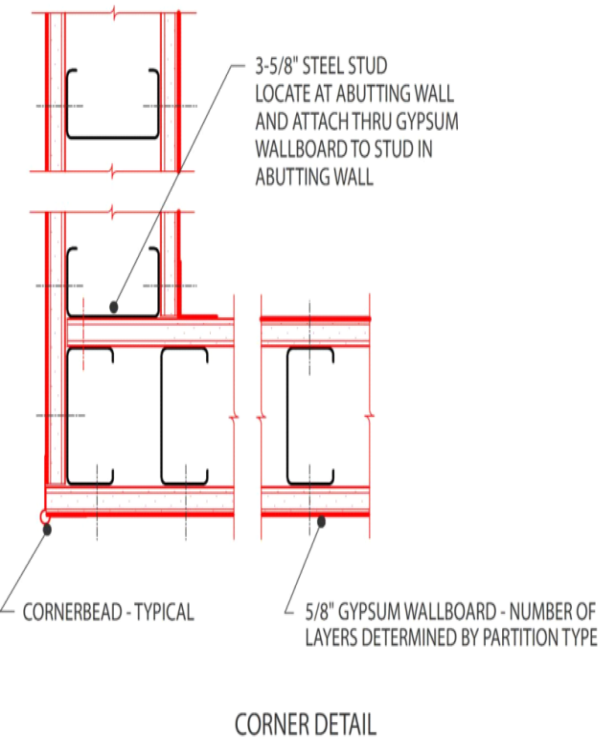


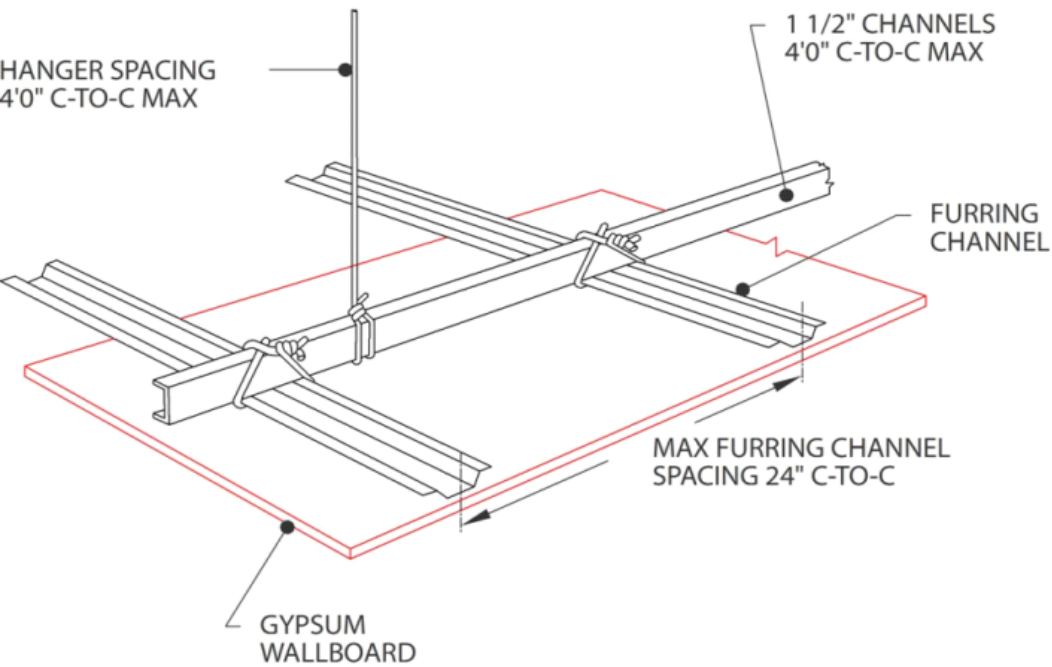
56 RAFTER AT PERIMETER WALL



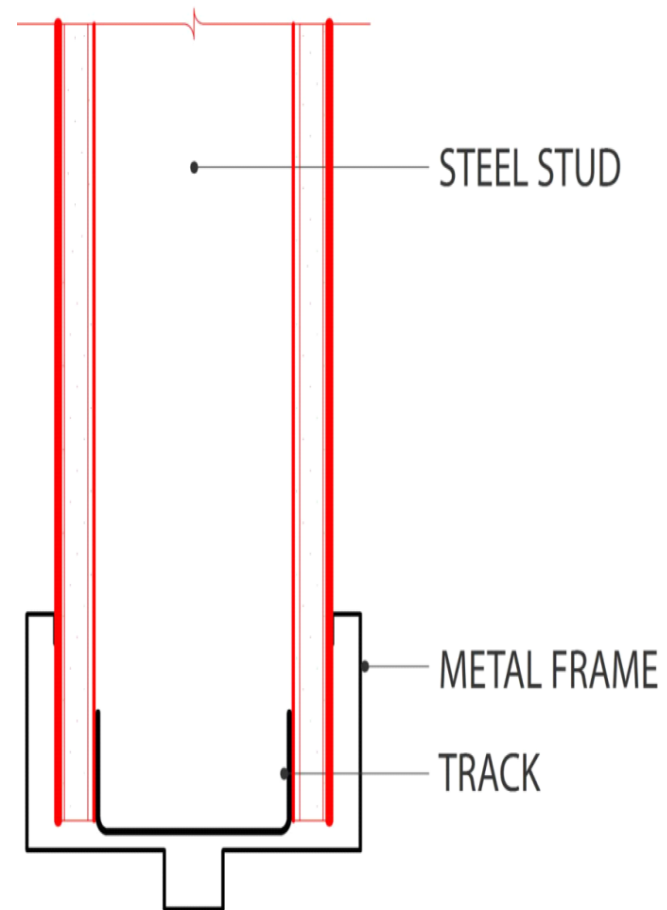
57 RAFTER AT PERIMETER WALL



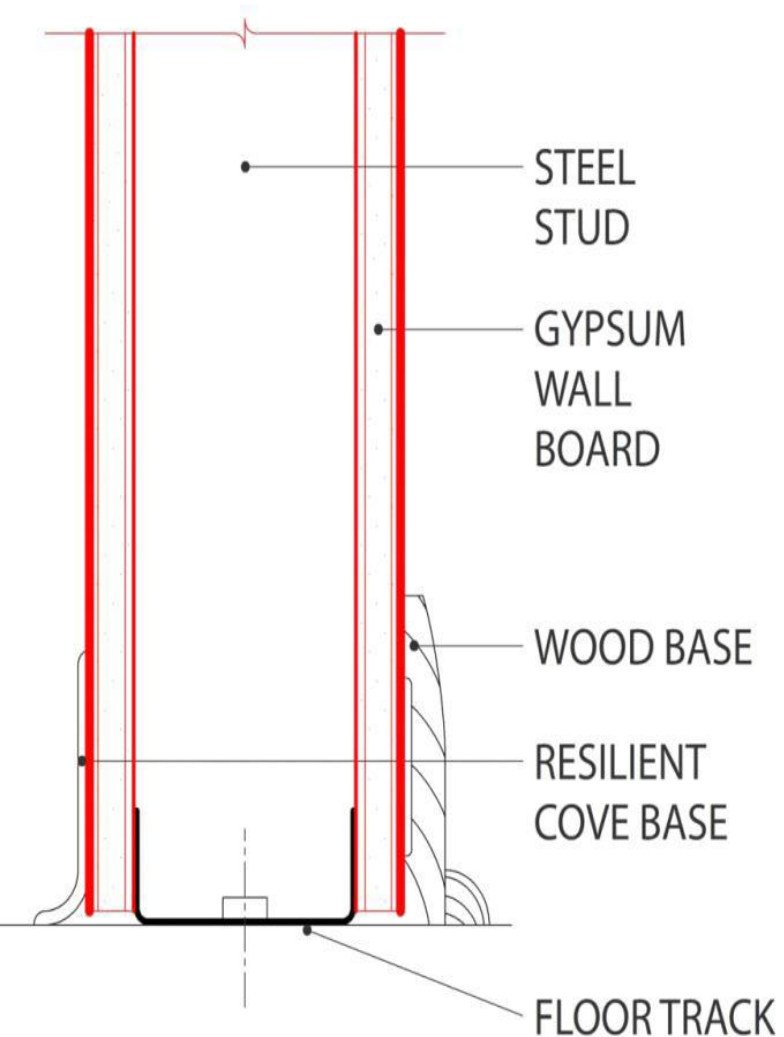




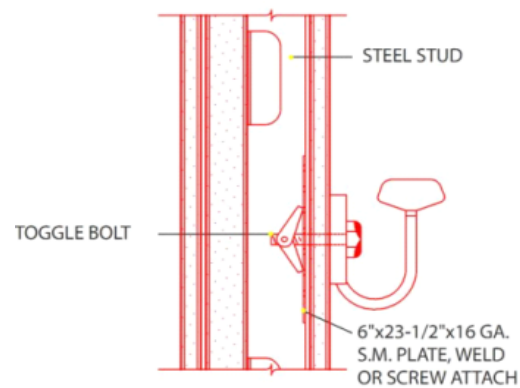
FURRING CHANNEL DETAILS



DOOR HEAD DETAIL - METAL

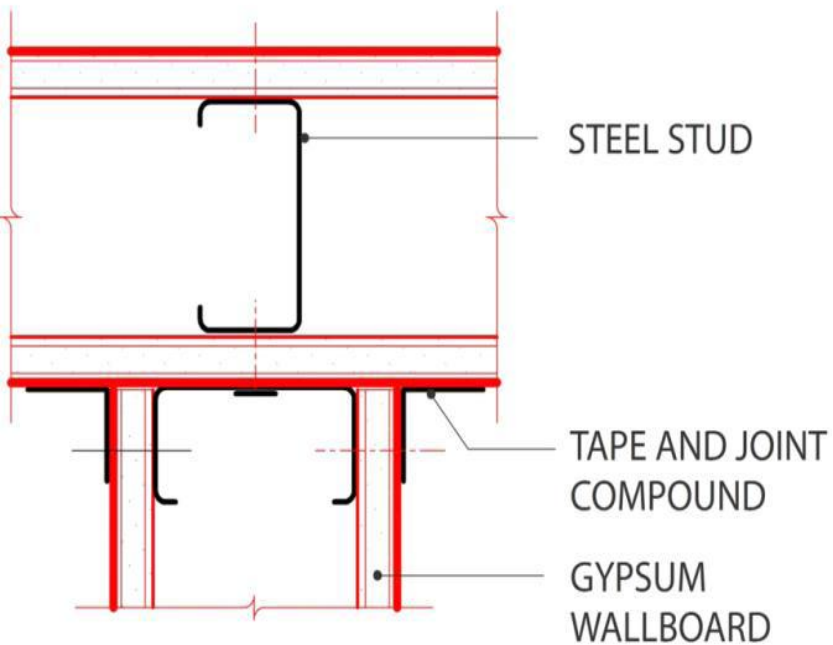


WALLBOARD PARTITION AT FLOOR



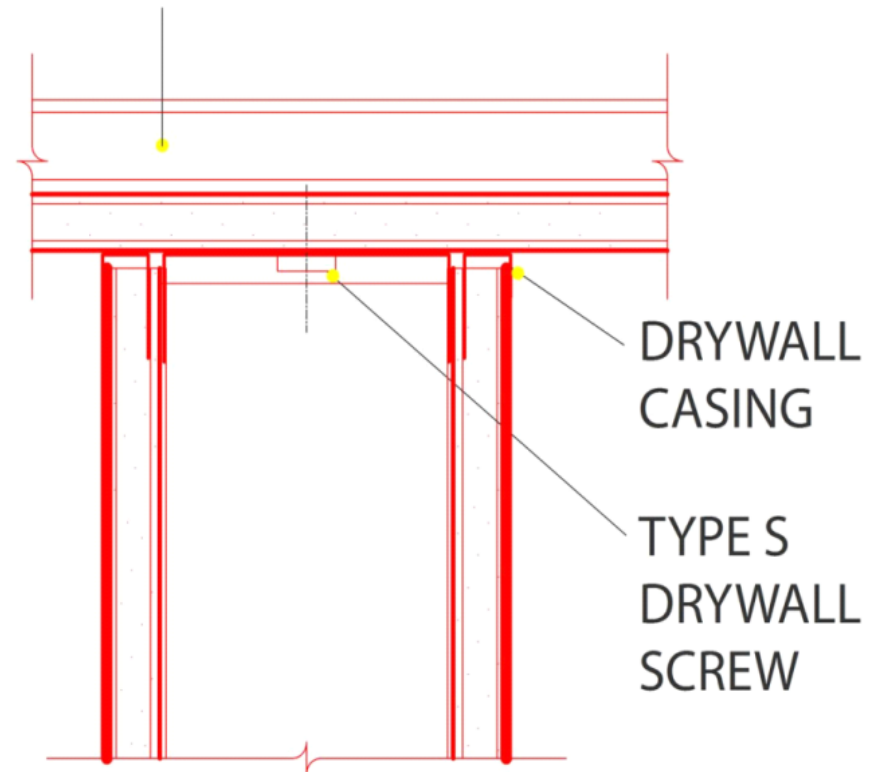
HANDRAIL SUPPORT DETAILS
(BOLT FASTENED)

NOTE: HANDRAIL BRACKET SHALL HAVE A MINIMUM AREA OF 3.25 SQ. IN. AND MINIMUM WIDTH ALONG BOTTOM EDGE OF 1-3/8" IF RECTANGULAR, AND A MINIMUM DIAMETER OF 2-3/8" IF ROUND IN ORDER TO COMPLY WITH 200 POUND PULLOUT AND/OR COMPRESSION TESTS (NFPA 101-1985 LIFE SAFETY CODE - BRACKETS).

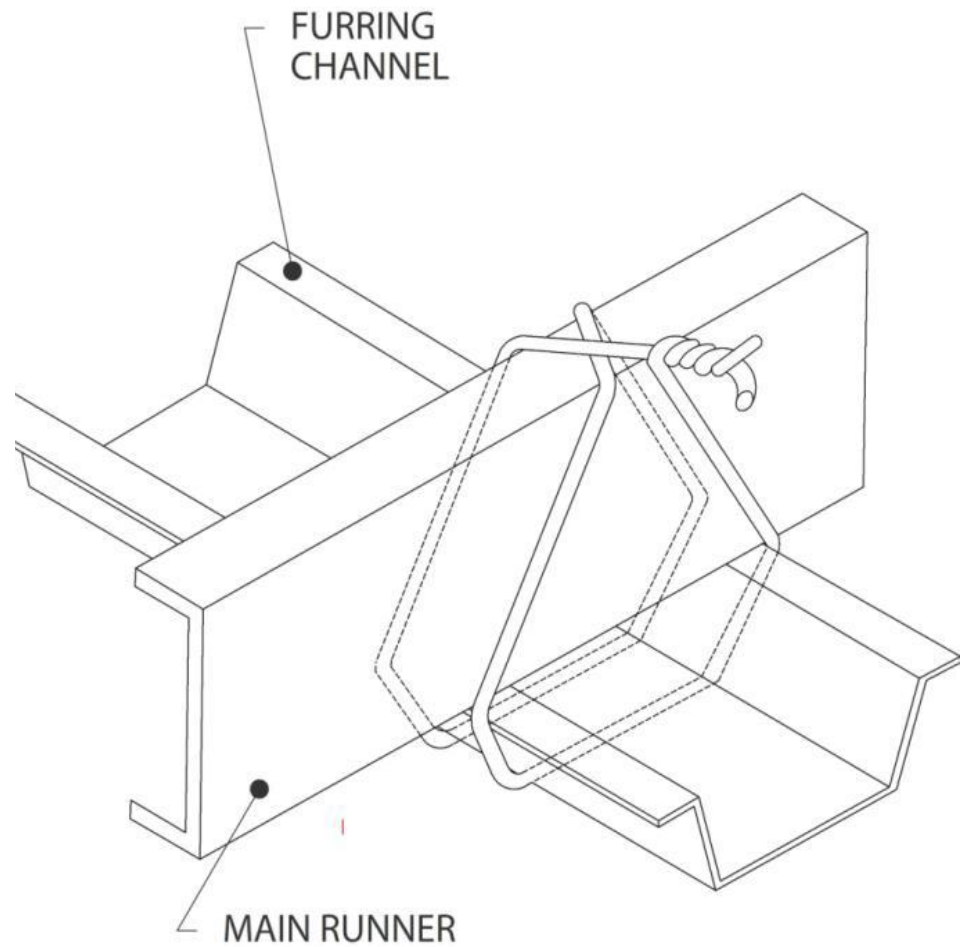
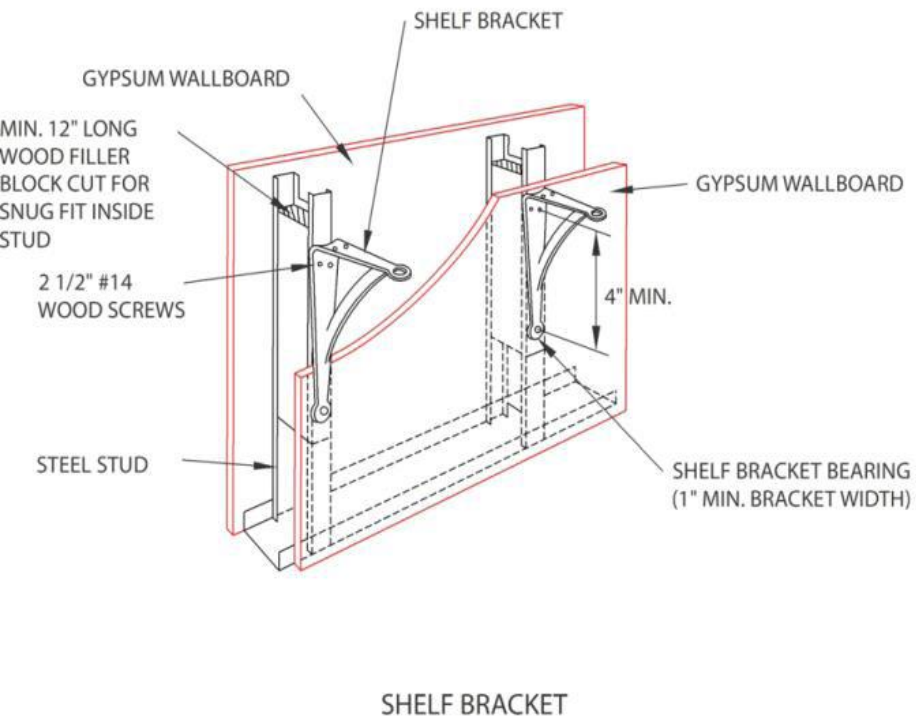


PARTITION INTERSECTION

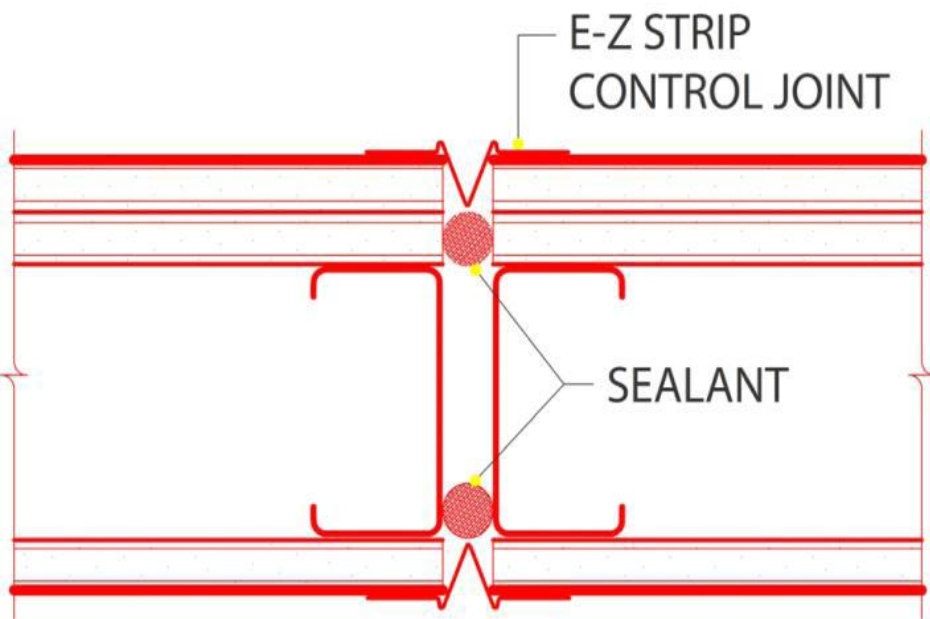
FURRING CHANNEL



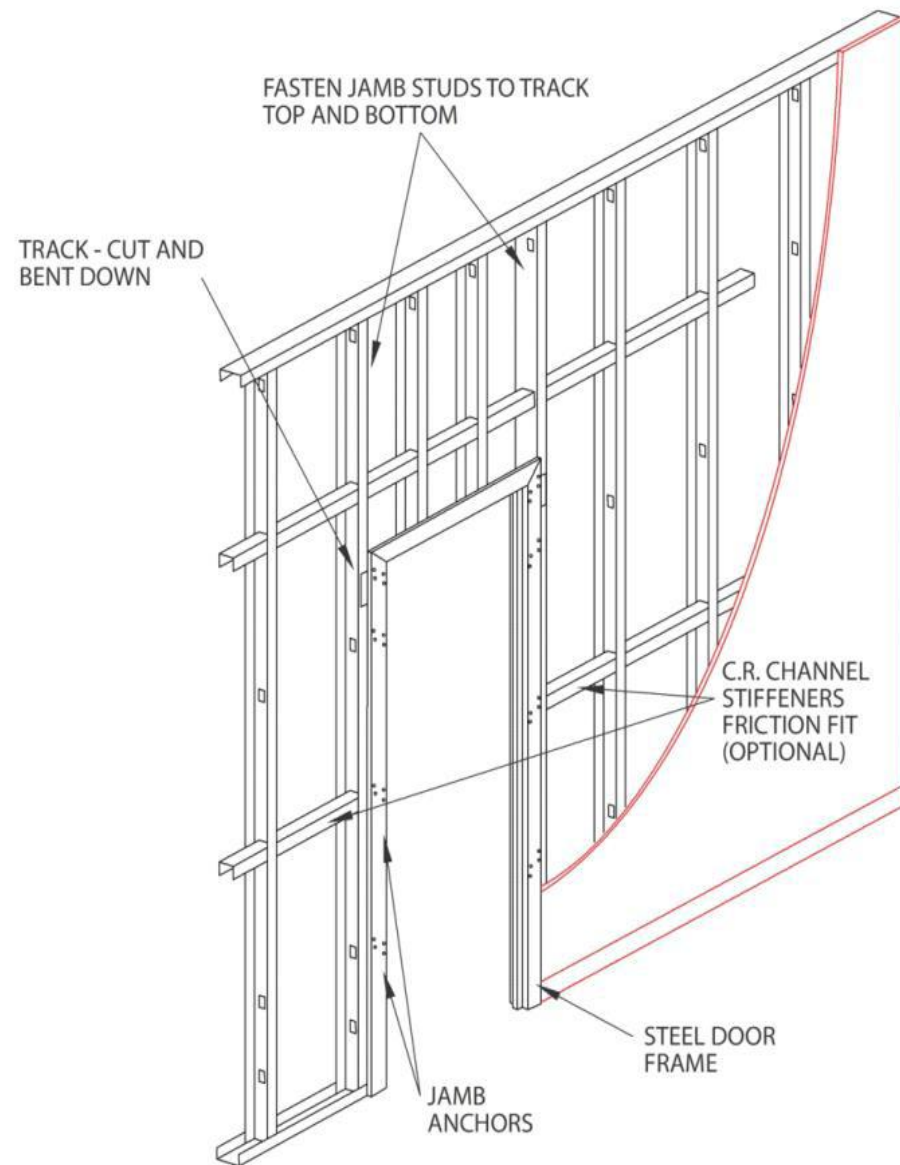
WALLBOARD PARTITION AT
FURRED CEILING



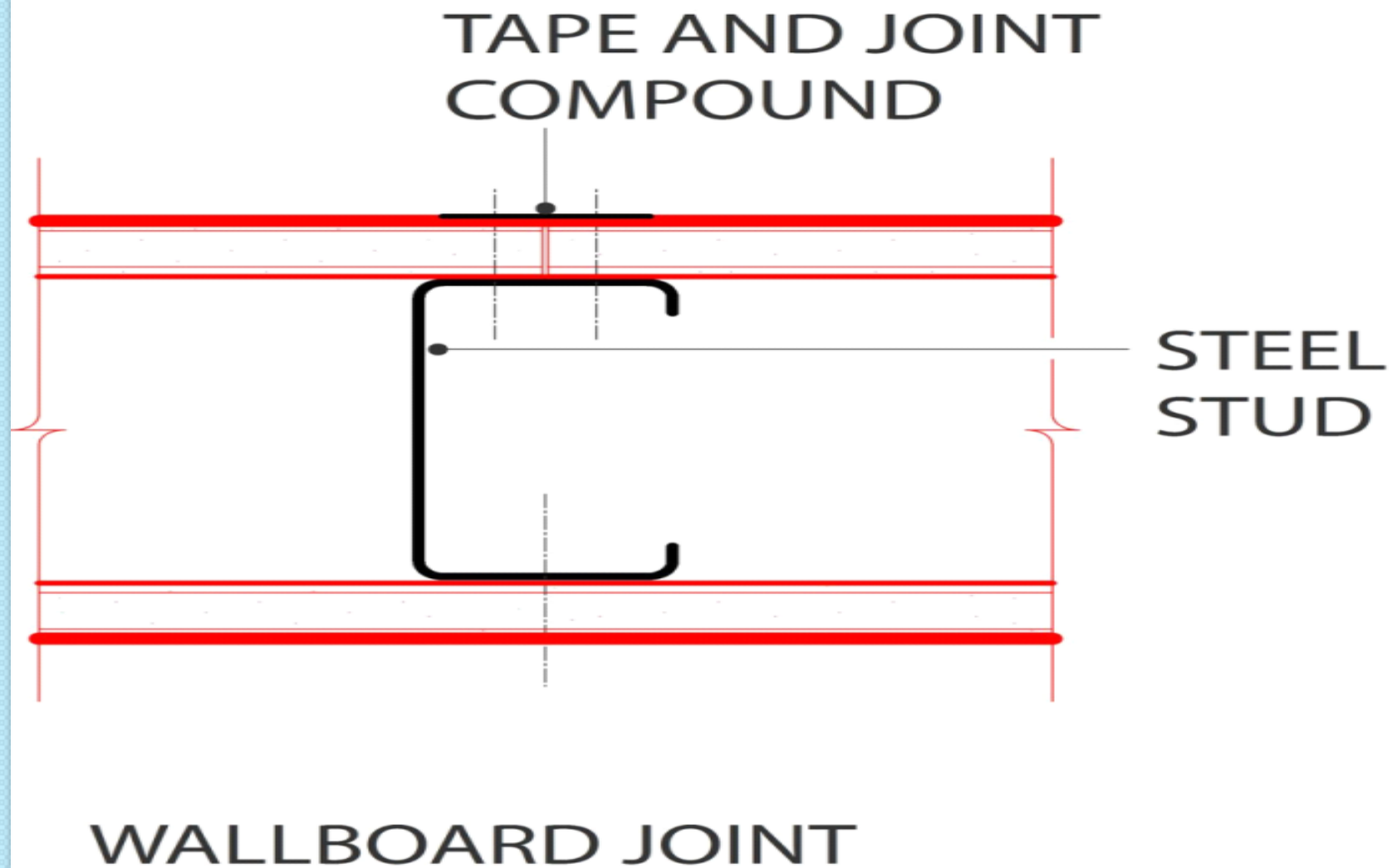
SADDLE TIE



WALL CONTROL JOINT



SINGLE LAYER CONSTRUCTION



پایان

با تشکر از توجه شما عزیزان