



**Steelrite®
Thinflor™
Installation
Manual**

February 28, 2011

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1. Introduction

Thinflor™ is a cost effective flooring system with unique benefits not found in pre-cast or cast in place reinforced concrete construction. It is easy to work with and adaptable to all wall systems. Thinflor™ can handle long spans and the assembly can act as a fire separation. Thinflor™ is ideal for fast-track construction especially in tight working spaces.

This manual is provided as a basic guide of recommended techniques for the installation of the Steelrite® Thinflor™ Composite Floor System. It is not intended to take the place of local building codes and project specific design. Local code requirements must be followed. Every actual installation must be in accordance with the contract drawings, specifications and appropriate installation drawings. Therefore, while the guidelines in this manual are intended as recommended techniques to be followed, they can only be used to the extent that they do not conflict with applicable codes, contract documents and direction by engineer of record.

2. Safety

These instructions are intended to describe the sequence and proper placement of parts. They are not intended to prescribe safety procedures.

Safe erection practices may be defined and made mandatory by provincial, state and/or local ordinances as well as good construction and erection practices. Maintaining good housekeeping on the jobsite is recognized as being a key ingredient to safety and successful job completion.

2.1 Working with Thinflor™ Panels

2.1.1 Setting Panels on Structure

Do not place bundles of panels on the structure without first verifying that the structure has sufficient strength and stability to safely support the concentrated weight of the panels and the weight of the installation crew.

2.1.2 Walking on Panels

As panels are often shored for the concrete pour, ensure that the panel has sufficient strength before using it as a working platform if shoring is not in place.

2.1.3 Point Loads

When properly supported before the concrete pour, panels are designed to support uniform loads evenly distributed over the panel surfaces. Point loads that occur in small concentrated areas, such as heavy equipment, ladder or platform feet, etc. may cause panel deformation or even panel failure with the possibility of personal injury.

2.1.4 Slick Surfaces

The surfaces of panels and structural steel are hard, non-absorbent and can be smooth. They can be very slick when wet or covered with snow or ice. Even blowing sand or heavy dust can make these surfaces difficult to walk on without slipping.

Unpainted panel surfaces are often coated with an oil to assist in the panel's roll forming process. Although designed to evaporate or wash away in time, the oil on newly un-bundled panels can be extremely slick, especially during period of light rain or dew.

Caution must be exercised under wet conditions to prevent slipping and falling. If the workers must be on the roof during these conditions, non-slip footwear is a necessity.

2.1.5 Electrical Conductance

Metal panels are excellent electrical conductors. A common cause of injury is the contact of metal panels with power lines during handling and erection. The location of all power lines must be noted and, if possible, flagged. The erection process must be routed to avoid accidental contact with all power lines and high voltage services and equipment. All tools and power cords must be properly insulated and grounded and the use of approved ground fault circuit breakers is recommended.

2.1.6 Sharp Edges

Some edges of panels and trims are razor sharp and can cause severe cuts if proper protective hand gear is not worn. Be careful not to injure others while moving panels and trim.

2.1.7 Securing Materials

Secure stacks of panels with banding or tie-downs so wind will not blow the panels off the stack.

2.1.8 Handling Materials in Strong Winds

Do not attempt to move panels in strong winds. Wind pressure can easily cause a person to lose their balance and fall. Wind lift on a panel can be greater than the weight of the person carrying the panel.

2.1.9 Safety Barriers

Assuming workers are appropriately tied off during deck installation, safety barriers would not be required. The barriers would normally be required afterwards including at the time of the concrete pour.

2.1.10 Tie Off to Steelrite Panels

Thinflor™ is often installed together with Steelrite vertical wall panels. Appropriately braced panels can be used by workers as a tie-off support. Please see Figure 1 for the recommended arrangement.

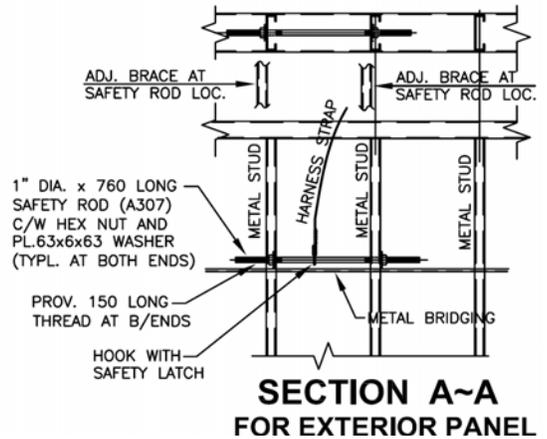
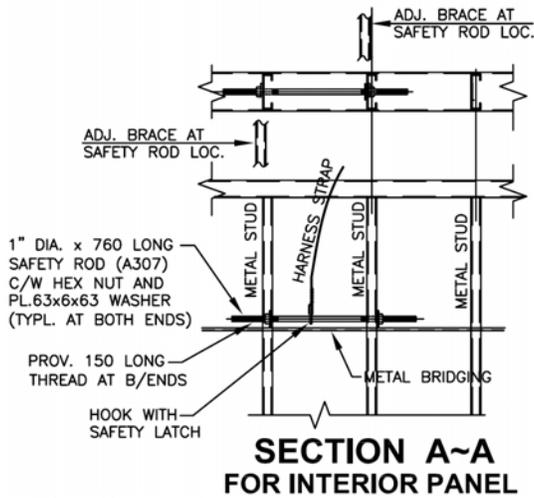
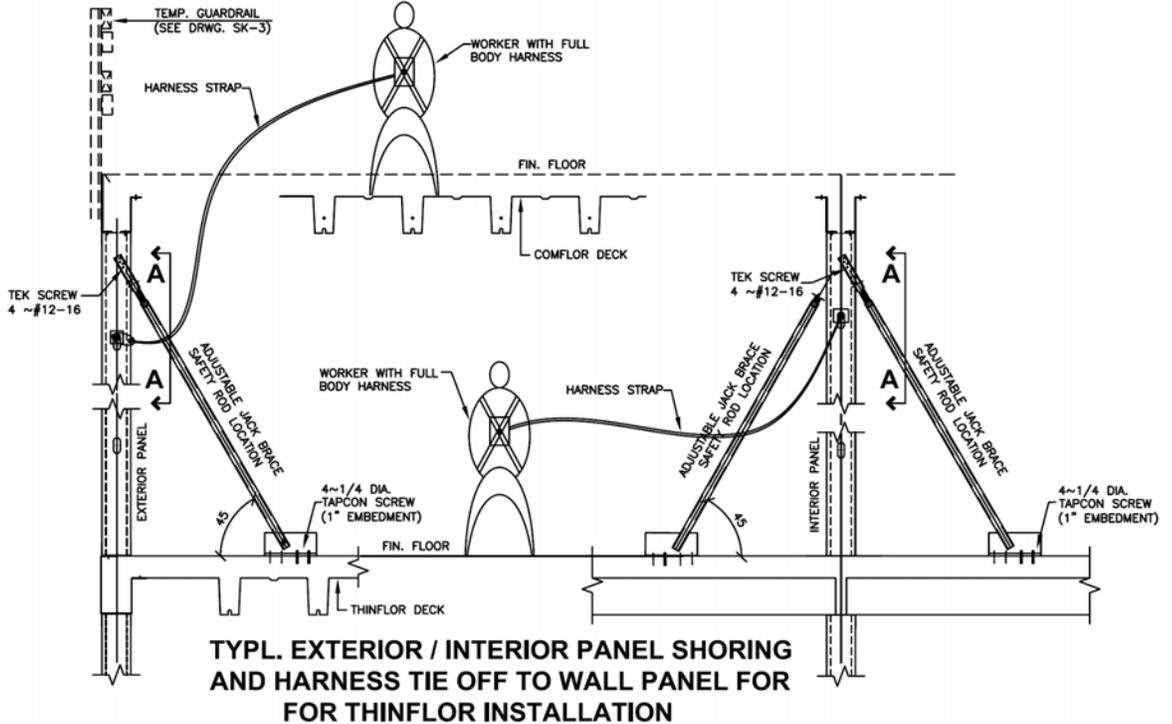


Figure 1 - Tie-off to wall panels

3. Tools and Equipment:

Tools that will often be required include:

- Circular saw (typically gas powered) with abrasive blade suitable for cutting sheet steel.
- Screw guns intended for self drilling and/or self tapping screws.
- Hex socket heads, 5/16" and 3/8" magnetic.
- Socket extension, 6 inches.
- Drill motor, 3/8"
- Drill bits to suit substrate.
- Guns to suit any shot-fired pins being used.
- Steel measuring tapes, 12', 50' and 100'.
- Brooms
- Utility knife
- Power source and extension cords
- Ladders
- Scaffolds
- Safety equipment as required by all applicable regulations.

Additionally, hoisting equipment is necessary to unload and position the Thinflor™ for site storage and erection. The equipment must have sufficient capacity and reach to place the material where it will be required for efficient erection.

4. Material Receiving:

Material inventory at the time of delivery of the shipment is an essential part of the overall success of the installation. By performing the materials inventory, the installer is able to identify any potential or damage to the material before erection is interrupted due to such shortage and damage.

It is imperative that any shortages or damage to the materials at the time of delivery be noted at once and clearly marked on the Bill of Lading before the signature of acceptance. Notify Steelrite® immediately of any conflicts.

5. Field Storage:

Thinflor™ composite panels should be stored on the jobsite in accordance with the following minimum recommendations:

1. Tilt bundles for drainage
2. Block bundles off the ground for effective drainage and ventilation.
3. Block long bundles to prevent sagging.
4. Store away from chemically corrosive substances (e.g. salt, cement, fertilizer), away from materials that could contaminate the surface (e.g. diesel, oil, paint, grease) and away from site traffic. If bundles are to be covered, avoid impermeable materials such as plastic and ensure that adequate ventilation is provided to prevent condensation.

Accessories should be stored in a secure area and protected from damage, weather and theft.

6. Installation:

6.1 End Closures

End closures are used to contain the concrete, provide alignment for the Thinflor™ profile and help prevent web crippling at the end of the deck sheet. They are typically fastened to a continuous supporting structure with shot fired pins or self-drilling screws at **610 mm (24 inches) c/c max**. End closures are installed before deck is put in place. In locations where Thinflor™ coverage is reduced from 610 mm (24 inches), end closures must be cut and adjusted. See Figure 1.



Figure 2 - Installation of end closures.

6.2 Deck

Individual Thinflor™ panels are positioned over end closures and fastened and fastened at each transverse support and at each low to the continuous supporting structure with a #12 screw or shot-fired pin. Additionally, the top flange of the panel should be fastened to the end closure with a #12 screw at one per top flange. See Figure 2.



Figure 3 - Attach deck to support.

6.3 Inside Trims

At longitudinal supports where deck low is appropriately positioned near edge of support, fasten deck low to continuous support with #12 screws or shot-fired pins at **610 mm (24 inches) c/c**. Where deck low is not appropriately positioned, cut deck on top flange and fasten to Inside Trim closure (z shape) at **610 mm (24 inches) max**. Inside Trim closure is fastened to continuous longitudinal support with #12 screws or shot-fired pins at **610 mm (24 inches) c/c**. See Figure 3.

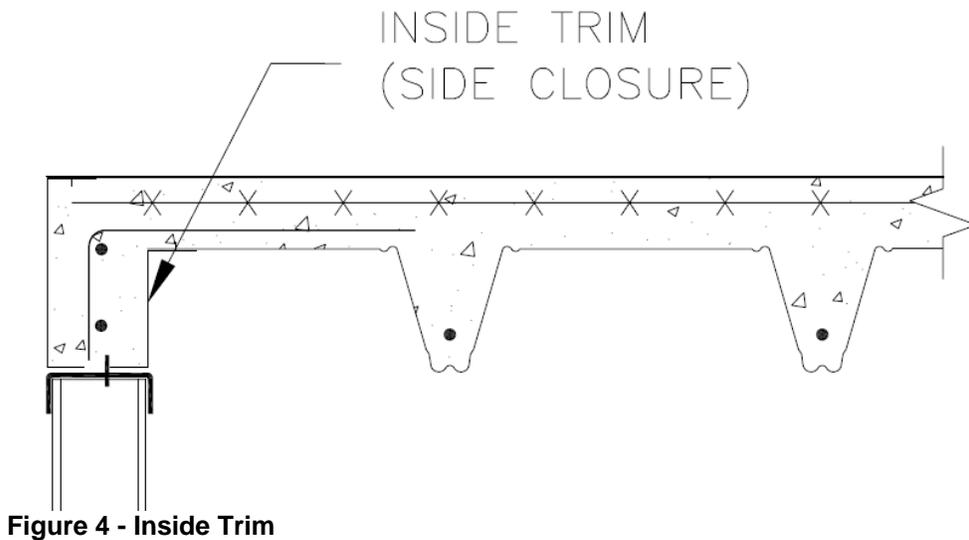


Figure 4 - Inside Trim

6.4 Side-Lap Washers

Individual Thinflor™ panel side-laps are fastened together with #12 self drilling screws c/w side-lap washers at **350 mm (14 inches) c/c**. Washers are pre-punched to receive the screws and contribute to composite action with the concrete.



Figure 5 - Side lap washers visible under shifted rebar.

6.5 Perimeter Trims

Perimeter Trims are required for the retention of wet concrete to the correct level at floor perimeters and designated openings. These angles with a stiffening lip are manufactured for the design slab thickness and are supplied in 3 m (10 feet) lengths of galvanized steel. Perimeter Trims are usually fastened by shot-fired pins to structural steel or by self-drilling screws to the support structure at **610 mm (24 inches) c/c**. See Figure 5.

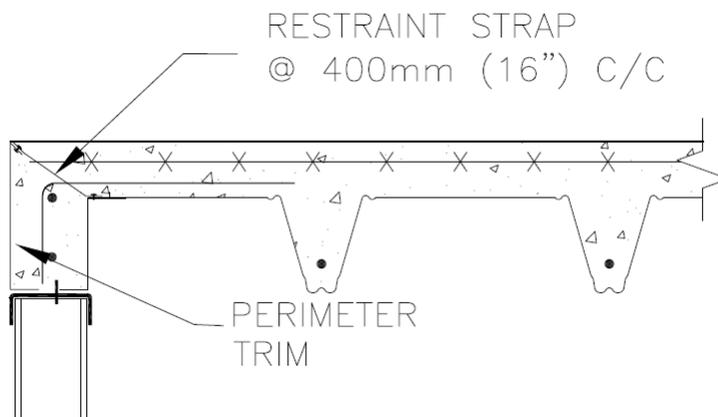


Figure 6 - Perimeter trim & restraint strap

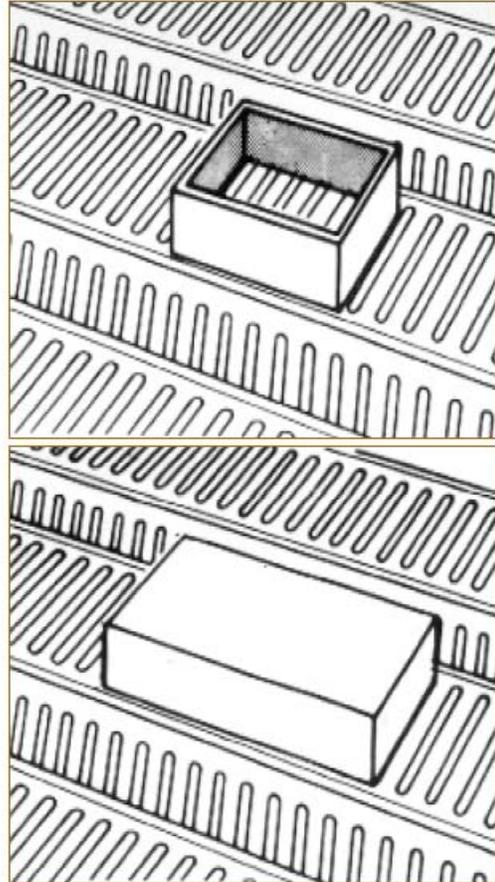
6.6 Restraint Straps

To assist in ensuring that the Perimeter Trim does not deform excessively during the concrete pour, the stiffening lip of the Perimeter Trim is connected to the deck with Restraint Straps at approximately **400 mm (16 inches) c/c** using either pop rivets or self-drilling fasteners. See Figure 5. The Restraint Strap can be adjusted to suit the pitch and alignment of the Perimeter Trim.

6.7 Penetrations

Penetrations through the floor decking shall be cut after the concrete has cured. Before placing concrete, any openings shall be boxed out with form work as specified by the engineer of record. The following guidelines are suggested for isolated openings at right angles to the deck span, or as specified by the engineer of record.

- Up to **300 mm (12 inch)** square penetrations centered on the top of the profile of the deck are acceptable without additional reinforcement other than the minimum shrinkage and temperature mesh.
- Up to **425 mm (16.7 inches)** wide centered on top of profile by **1000 mm (39.4 inches)** long opening with additional reinforcement.
- Openings larger than **425 mm (16.7 inches)** or extending beyond top flange of profile require structural steel framing as specified by the engineer of record.
- Close grouping of openings transverse to the profile shall be treated as one opening, requiring additional reinforcement as specified by the engineer of record.
- After the slab has reached **75%** of the required concrete compressive strength, a nibbler, power saw or coring machine can be used to cut out openings in the top profile with the approval of the engineer of record.



6.8 Columns

The steel deck can be cut and fitted to accommodate various column shaped. Supports such as steel angle brackets shall be provided to support the steel deck as specified by the engineer of record.

6.9 Rib Reinforcement

The Thinflor™ Composite Floor System requires that one steel reinforcing bar be placed in each rib profile. Bar size varies from 10M to 35M (#3 to #9 in US). Bars shall be supported to ensure a **40 mm (1.57 inches)** cover from the bottom flange to the underside of the rebar. Support spacing must not exceed **1220 mm (48 inches)** and should consist of formed steel rebar supports with periodic wire tie down to ensure stability or appropriately sized circular spacers. See Figure 6.



Figure 7 - Rebar support

6.10 Wire Mesh

To control cracks due to shrinkage and temperature, a minimum mesh of **152x152xMW18.7xMW18.7 (6x6x6/6)** should be placed above the top of the steel deck and positioned towards the top of the slab or as specified by the engineer of record. Mesh should be lapped a minimum of **152 mm (6 inches)** onto the adjacent mesh.

6.11 Temporary Supports

Where the design span exceeds the maximum unshored span of Thinflor™, the wet concrete weight and construction loads shall be supported by adding temporary supports (shoring) designed for the condition. See Figure 7. Where temporary supports are required, it is important that:

- Shoring posts and beams have strength equal or greater than the components specified in the shoring design.
- Post spacing must not exceed that given in the shoring design.
- Posts must be plumb and sufficiently tight so they do not topple.
- The floor below must have sufficient strength to support the shoring posts. Where the floors below are also Thinflor™ Composite Floor System, posts may need to be extended down to 3 poured floors or as specified in the shoring design.
- Shoring is normally placed at midspan or at other suitable intervals as required.
- Shoring beams shall provide a minimum bearing width of **100 mm (4 inches)**.
- The shoring structure shall remain in place until the concrete has reached **75%** of its design strength.



Figure 8 – Shoring

6.12 Concrete Placement

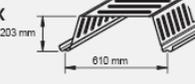
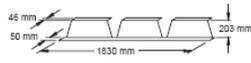
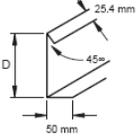
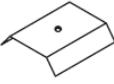
Concrete to be used should have a minimum cylinder strength of **30 MPa (4.35 ksi)** with a maximum aggregate size of **20 mm (0.75 inches)** and normal density of **2400 kg/m³ (150 pcf)**. To lessen the potential for overloading the deck, the concrete should be pumped onto the floor. Buckets and wheelbarrows should not be used.

Before starting concrete placement, the steel deck shall be cleared of dirt, grease and debris as this could adversely influence the composite slab performance. Safety barriers and shoring must be properly in place. Care shall be taken to avoid concrete heaping during concrete placement. Spread concrete from supported area of deck towards areas between supports. In pumping operations, free-fall of concrete should be minimized to avoid impact loading on deck and segregation of concrete.

Riding vehicles or other equipment that would lead to loading beyond the considered design loads for the deck must not be used.

Source and characteristics of the concrete must be recorded. Concrete cylinders for compression tests shall be cast in accordance with applicable standards (such as CSA A23.1/A23.2). Unless otherwise directed, testing should be conducted at a minimum of 7 and 28 days.

7. Thinflor™ Steel Deck and Accessories

MATERIALS	THICKNESS		WEIGHT		PACKAGING Pieces
	mm	in.	SI	Imperial	
THINFLOR™ STEEL DECK (Z275 FINISH) 	0.914 1.22	0.036 0.048	0.118 kPa 0.156 kPa	2.46 psf 3.26 psf	30 pieces per bundle cut to length
90° END CLOSURES (Z275 FINISH) 	1.52	0.060	2.98 kg/m 5.44 kg/pc	1.75 lb/ft or 10.5 lb/pc	50 pieces per bundle
45° END CLOSURES (Z275 FINISH) 	1.52	0.060	3.5 kg/m 6.38 kg/pc	1.71 lb/ft or 14.5 lb/pc	50 pieces per bundle
PERIMETER TRIMS (Z275 FINISH)  <p>D = Overall slab depth</p>	1.52	0.060	17.7 kg/pc to 20.4 kg/pc	39 lb/pc to 45 lb/pc	10 pieces per bundle 10 ft lengths
INSIDE TRIMS (Z180 FINISH) 	0.914 1.22	0.036 0.048	9.1 kg/pc 11.3 kg/pc	20 lb/pc 25 lb/pc	10 pieces per bundle 10 ft lengths
CORRIDOR TRIMS (Z180 FINISH) 	1.52	0.060	13.6 kg/pc	30 lb/pc	
SIDE-LAP WASHERS (Z180 FINISH) 	1.22	0.048	11.3 kg per carton	25 lb per carton	500 pieces per carton
REBAR SUPPORTS (Z180 FINISH) 	0.914	0.036	20.4 kg per carton	45 lb per carton	300 pieces per carton
RESTRAINT STRAPS (Z180 FINISH) 	0.838	0.033	4.54 kg per bundle	10 lb per bundle	50 pieces per bundle
FASTENERS #14 1/4 - 14 x 1" Hex S.D. Zinc SCREWS #8 x 1/2" Wafer S.D. Zinc			1.81 kg per carton	4 lb per carton	300 pieces per carton
			1.81 kg per carton	4 lb per carton	1500 pieces per carton