

LAP SPLICES

A lap splice is when two pieces of rebar overlap to form a continuous reinforcement. This helps transfer loads properly throughout the structure. There are two types of lap splices: contact lap and non-contact lap splices (see Figure 1a and 1b). The lapped sections of contact lap splices are wired together. Lapped sections of non-contact lap splices do not touch and are permitted in practice provided the distance between lap sections meet the specified code requirements.

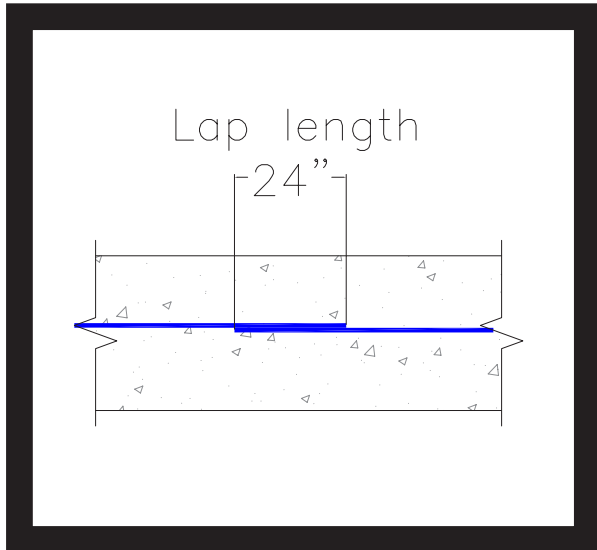


Figure 1a: Contact lap splices

When using LOGIX ICFs non-contact lap splices can be used in lieu of contact lap splices.

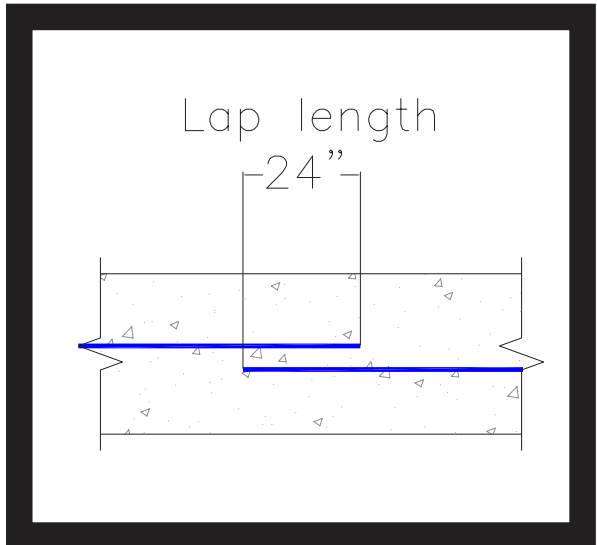


Figure 1b: Non-contact lap splices

LAP SPLICES IN HORIZONTAL REBAR

In traditional construction methods, contact lap splices are more commonly used because it offers the most reliable method of ensuring the lapped sections are secure against displacement, especially during concrete pours. LOGIX ICFs can accommodate contact lap splices. However, the rebar slots in the LOGIX webs are also designed to accommodate non-contact lap splices, ensuring the horizontal rebar stays in place (see Figure 2a and 2b). This minimizes the need to wire tie lapped sections and reduces labor.

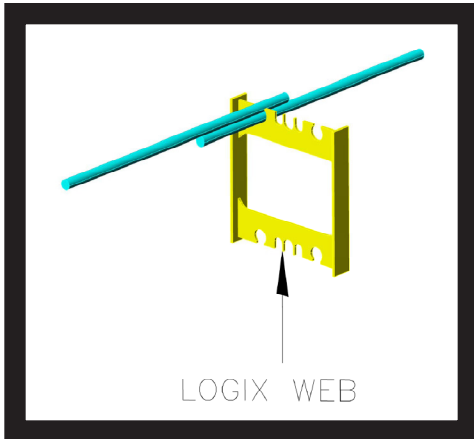


Figure 2a: Contact lap splices

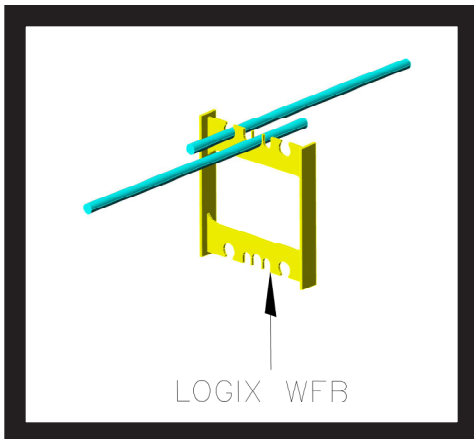


Figure 2b: Non-contact lap splices

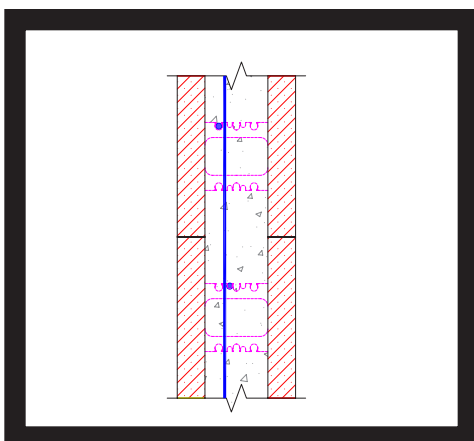


Figure 3: Vertical rebar in LOGIX ICF wall system

The length of a lapped section (or lap length) varies depending mainly on the loading conditions, rebar size, rebar spacing, rebar grade and concrete strength. For residential construction, and as a general rule, LOGIX recommends a lap length of 24" for horizontal reinforcement (vertical reinforcement should be continuous for the full unsupported height of the wall, if possible). (see Figure 1a and 1b).

### LAP SPLICES IN VERTICAL REBAR

For the same reason as horizontal rebar, contact lap splices are also more commonly used in traditional construction methods. However, contact lap splices are not necessary when using LOGIX ICFs. The LOGIX web ties, which are spaced horizontally every 8" (203mm) and about 5.25" (133mm) vertically per block, provides enough stability for placement of vertical rebar. Vertical rebar can be further secured if it is slid through a staggered pattern of horizontal rebar. The slots in the webs have been designed to accommodate this (see Figure 3).

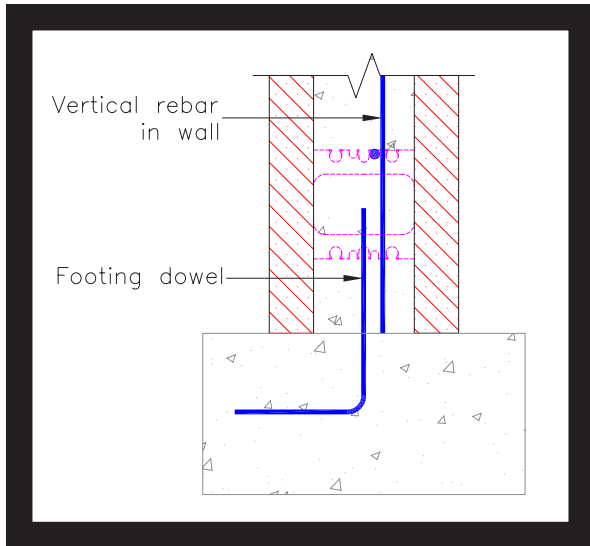
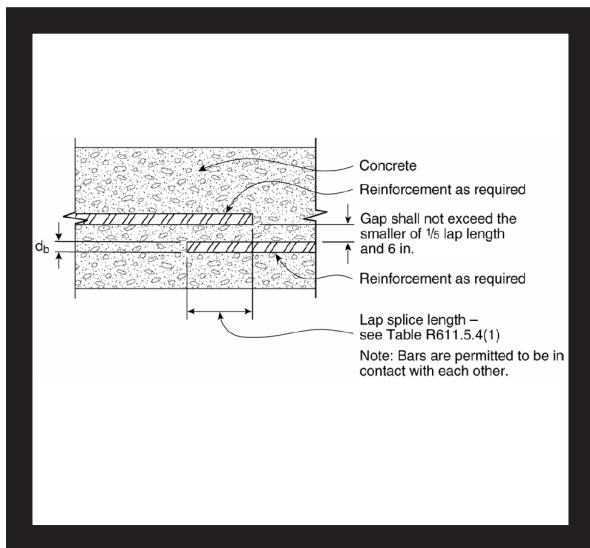


Figure 4: Wall/Footing connection



R611.5.4(1)

### FOOTING DOWELS

Footings dowels connects the wall to the footing (see Figure 4). This prevents wall movement at the wall/footing joint caused mainly by soil loads. In residential construction, the vertical rebar in the wall itself does not contribute to the strength of the wall/footing connection and hence is not required to splice with the footing or match the spacing of the footing dowels. In cases, where lap splice may be required, non-contact lap splices are permitted.

### LAP SPLICES –BUILDING & DESIGN CODE

#### REFERENCE

International Residential Code 2012, R611.5.4.3:

*“R611.5.4.3 Lap Splices. Vertical and horizontal wall reinforcement required by Sections R611.6 and R611.7 shall be the longest lengths practical. Where splices are necessary in reinforcement, the length of lap splices shall be in accordance with Table R611.5.4(1) and Figure R611.5.4 (1). The maximum gap between noncontact parallel bars at a lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches (152 mm). See Figure R611.5.4(1).”*

TABLE R611.5.4(1)  
LAP SPLICE AND TENSION DEVELOPMENT LENGTHS

	BAR SIZE NO.	YIELD STRENGTH OF STEEL, $f_y$ , psi (MPa)	
		40,000 (280)	60,000 (420)
		Splice length or tension development length (inches)	
Lap splice length-tension	4	20	30
	5	25	38
	6	30	45
Tension development length for straight bar	4	15	23
	5	19	28
	6	23	34
Tension development length for: a. 90-degree and 180-degree standard hooks with not less than $2\frac{1}{2}$ inches of side cover perpendicular to plane of hook, and b. 90-degree standard hooks with not less than 2 inches of cover on the bar extension beyond the hook.	4	6	9
	5	7	11
	6	8	13
Tension development length for bar with 90-degree or 180-degree standard hook having less cover than required above.	4	8	12
	5	10	15
	6	12	18

For SI: 1 inch = 25.4 mm.

## LAP SPLICES & DOWELS

National Building Code 2015, 4.3.3.1:

Clause 4.3.3.1 references concrete design code, CSA A23.3 (specifically CSA A23.3, 12.14.2.3):

*"12.14.2.3*

*Bars spliced by lap splices in flexural members shall have a transverse spacing not exceeding the lesser of one-fifth of the required lap splice length or 150mm."*