

DISCLAIMER

By using the LOGIX Design Manual, in part or in whole, the user accepts the following terms and conditions.

The LOGIX Design Manual shall be used for the sole purpose of estimating, design or construction of LOGIX Insulated Concrete Forms used in residential, commercial or industrial structures.

The information represented herein is to be used as a reference guide only. The user shall check to ensure the information provided in this manual, including updates and amendments, meets local building codes and construction practices by consulting local building officials, construction and design professionals, including any additional requirements.

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6.1 – U.S. ENGINEERING ANALYSIS REPORT

INTRODUCTION

LOGIX walls are intended to be used both above and below grade, and can carry large vertical as well as lateral loads. They are particularly effective for residential, commercial and industrial buildings; providing excellent insulation as well as thermal mass and structural strength. They can be easily adapted to accommodate concrete floors and other “non-standard” building systems.

Construction must be in conformance with the LOGIX Design Manual, including assembly of formwork, bracing, accurate rebar positioning, concrete mix design & placement, and details for interconnection with the other building components.

STRUCTURAL DESIGN AND PERFORMANCE

The LOGIX Building System can be used for an infinite variety of building situations with proper engineering. This report, with its load tables and diagrams, is intended to assist with the structural design of buildings using the LOGIX system for the basement only, or continuing to two stories above-grade and/or roof. Where unusual conditions are encountered, it is recommended that the user consult a designer who can evaluate the loadings to the various components and who can appreciate the limitations of “prescriptive” design under unusual conditions. Connection details have generally been excluded from this report because of the great variety of floor and roof systems that can be used with the Logix wall system. The designer should refer to the Logix Design Manual and the literature for the various proprietary products that are available for connections, which are an important part of the total design.

REINFORCEMENT TABLES

Above- and below-grade walls and lintel reinforcement tables are provided in this report. The tables were developed using the applicable sections of Chapter 16 of the International Building Code 2012, Sections 404 and 611 of the International Residential Code 2012, and ACI 318 Building Code Requirements for Structural Concrete.

Table 1 makes use of plain concrete foundation walls adapted from the IRC 2012, Table 404.1.2(8), for LOGIX used below-grade. For walls that fall outside the scope of Table 1, Tables 2A, 2B, 2C and 2D are provided, which cover wall reinforcement for larger walls and larger loading conditions.

Tables 3A and 3B provides reinforcement tables for LOGIX walls used above-grade.

HELIX TSMR TABLES - ALTERNATIVE TO REBAR REINFORCEMENT TABLES

Where applicable, Helix TSMR (Twisted Steel Micro Rebar) Tables 2A-H to 2D-H, and Tables 3.1A-H to 3.6A-H, and 3.1B-H to 3.6B-H, may be used in lieu of the reinforcement requirements in Tables 2A to 2D, and Tables 3A and 3B. Helix is steel fibre reinforcement that can significantly reduce the amount of horizontal and vertical reinforcement in above- and below-grade concrete walls, with exception of lintel and shear wall reinforcement. (For lintel and shear wall reinforcement see Tables 4A to 4E, 5A to 5E and 6A, 6B)

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LIMITATIONS

The limitations of Reinforcement Tables 2A to 2D, and Tabs 3A and 3B, also apply to Helix alternative reinforcement Tables 3.1A-H to 3.6A-H, and 3.1B-H to 3.6B-H.

Building limitations used to develop above- and below-grade tables include:

Building perimeter = 80 ft max x 40 ft max

Roof clear span = 40 ft max

Floor clear span = 32 ft max

Number of stories above grade = 2 max

Number of stories below grade = 1

Tables 4A to 4E and Tables 5A to 5E provide lintel tables for factored uniform and concentrated loading conditions, respectively.

More specific design assumptions and limitations are located with the corresponding reinforcement tables.

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SHEAR WALLS

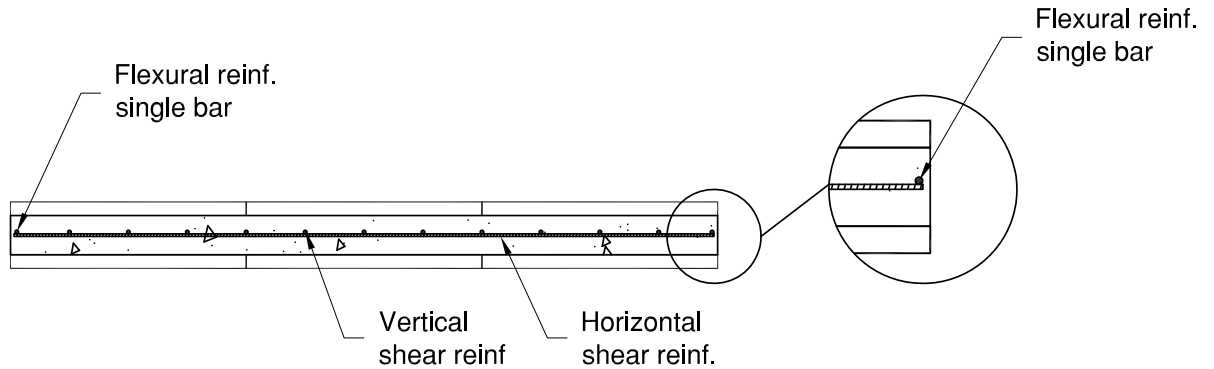


FIGURE 2: PLAN VIEW
LOGIX SHEAR WALL - SINGLE BAR FLEXURAL REINF.
 (Applies to 4, 6.25, 8 & 10" LOGIX)

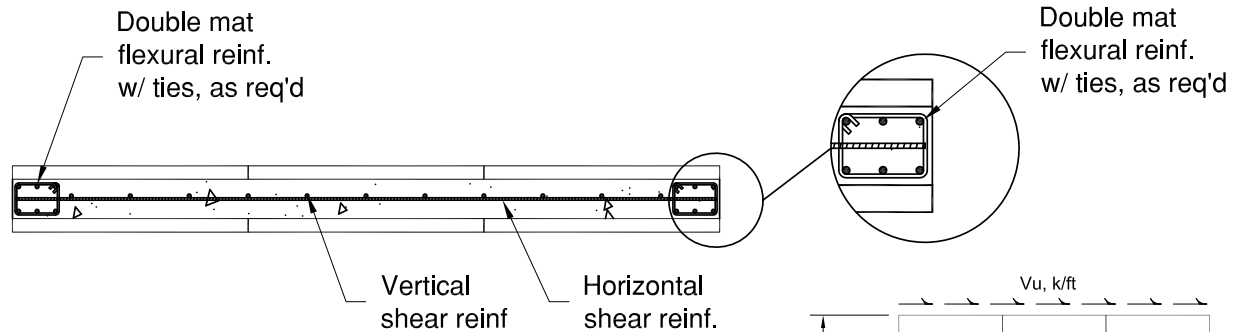


FIGURE 3: PLAN VIEW
LOGIX SHEAR WALL - DOUBLE MAT FLEXURAL REINF.
 (Applies to 4, 6.25, 8 & 10" LOGIX)

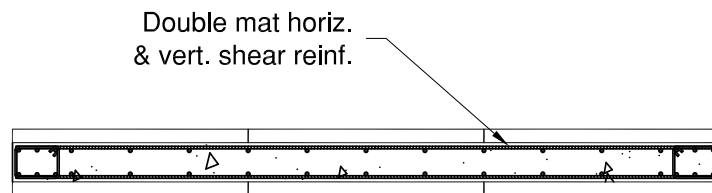


FIGURE 4: PLAN VIEW
LOGIX SHEAR WALL - DOUBLE MAT FLEXURAL & SHEAR REINF.
 (Applies to 12" LOGIX)

NOTES:

1. Shear wall Figures 1 to 4 to be used in conjunction with Tables 6A and 6B.
2. Provide double mat of reinforcement for 12" LOGIX wall. See Figure 4.
3. Fully develop flexural reinforcement into the footing.
4. Min. 28 day concrete compressive strength = 3 ksi. Steel yield strength = 60 ksi.
5. Clear spacing between flexural reinforcement bars = 3in

These tables should only be used if the above conditions are met. For other conditions, consult a structural engineer.

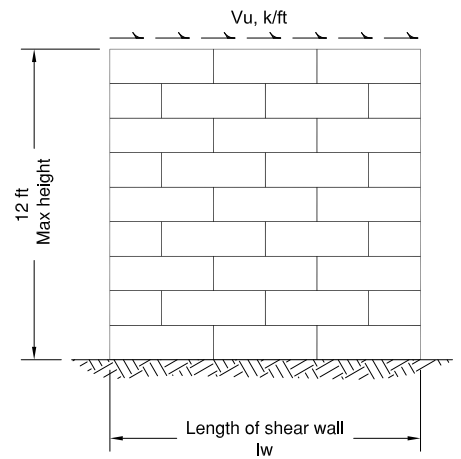


FIGURE 1: ELEVATION

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TABLE 6A - SHEAR WALL: HORIZONTAL & VERTICAL SHEAR REINFORCEMENT

4" LOGIX SHEAR WALL REINFORCEMENT SPACING, in

SHEAR REINFORCEMENT (applies to horizontal & vertical reinforcement)

Bar Size	Wall Length,	SHEAR FORCE, Vu, kpf															
		0.5		1		1.5		2		2.5		3		3.5		4	
		Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.
#4, #5, or #6	2	12	12	12	12	4	4	4	4	4	4	4	4	4	4	4	4
	4	12	12	12	12	8	8	8	8	8	8	8	8	8	8	8	8
	>4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

6.25" LOGIX SHEAR WALL REINFORCEMENT SPACING, in

SHEAR REINFORCEMENT (applies to horizontal & vertical reinforcement)

Bar Size	Wall Length,	SHEAR FORCE, Vu, kpf															
		1		2		3		4		5		6		7		8	
		Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.
#4, #5, or #6	2	16	16	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	4	16	16	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	6	16	16	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	>6	16	16	16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16

8" LOGIX SHEAR WALL REINFORCEMENT SPACING, in

SHEAR REINFORCEMENT (applies to horizontal & vertical reinforcement)

Bar Size	Wall Length,	SHEAR FORCE, Vu, kpf															
		1.5		2.5		5		6		7		8		9		10	
		Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.
#4, #5, or #6	2	12, 12, 16	4, 16, 16	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	4	12, 12, 16	8, 16, 16	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	6	12, 12, 16	12, 16, 16	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12
	>6	12, 12, 16	16	12, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16

10" LOGIX SHEAR WALL REINFORCEMENT SPACING, in

SHEAR REINFORCEMENT (applies to horizontal & vertical reinforcement)

Bar Size	Wall Length,	SHEAR FORCE, Vu, kpf															
		1.5		2.5		5		6		7		8		9		10	
		Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.
#4, #5, or #6	2	8, 12, 16	16	8, 12, 4	16, 16, 4	4	4	4	4	4	4	4	4	4	4	4	4
	4	8, 12, 16	16	8, 12, 8	16, 16, 8	8	8	8	8	8	8	8	8	8	8	8	8
	6	8, 12, 16	16	8, 12, 12	16, 16, 12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12	8, 12, 12	12
	>6	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16	8, 12, 16	16

12" LOGIX SHEAR WALL REINFORCEMENT SPACING, in

SHEAR REINFORCEMENT (applies to horizontal & vertical reinforcement)

Bar Size	Wall Length,	SHEAR FORCE, Vu, kpf															
		1.5		2.5		5		6		7		8		9		10	
		Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.
#4, #5, or #6	2	16	4, 16, 16	16	4, 16, 16	4	4	4	4	4	4	4	4	4	4	4	4
	4	16	8, 16, 16	16	8, 16, 16	8	8	8	8	8	8	8	8	8	8	8	8
	6	16	12, 16, 16	16	12, 16, 16	12	12	12	12	12	12	12	12	12	12	12	12
	>6	16	16	16	16	16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16	12, 16, 16	16

NOTES:

- Table 6A to be read in conjunction with Shear Wall Figures 1 to 4.

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TABLE 6B - SHEAR WALL: FLEXURAL REINFORCEMENT

4" LOGIX - FLEXURAL REINFORCEMENT								
Wall Length, lw, ft	SHEAR FORCE, Vu, kpf							
	0.5	1	1.5	2	2.5	3	3.5	4
2	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	2 - #6	-	-	-
4	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #6
6	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #4, 4 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #6
8	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #4, 4 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #6
10	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #4, 4 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #6
15	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #4, 4 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #5 or 4 - #6
20	1 - #4, 1 - #5 or 1 - #6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #4, 4 - #5 or 2 - #6	4 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #5 or 4 - #6

6.25" LOGIX - FLEXURAL REINFORCEMENT								
Wall Length, lw, ft	SHEAR FORCE, Vu, kpf							
	1	2	3	4	5	6	7	8
2	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	4 - #5 or 4 - #6	4 - #6	-	-	-	-
4	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	6 - #4, 4 - #5 or 4 - #6	6 - #5 or 4 - #6	6 - #5 or 4 - #6	8 - #5 or 6 - #6	6 - #6	8 - #6
6	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	6 - #4, 4 - #5 or 4 - #6	6 - #4, 6 - #5 or 4 - #6	10 - #4, 6 - #5 or 4 - #6	12 - #4, 8 - #5 or 6 - #6	10 - #5 or 6 - #6	10 - #5 or 8 - #6
8	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	6 - #4, 4 - #5 or 4 - #6	6 - #4, 6 - #5 or 4 - #6	10 - #4, 6 - #5 or 4 - #6	12 - #4, 8 - #5 or 6 - #6	14 - #4, 8 - #5 or 6 - #6	10 - #5 or 8 - #6
10	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	6 - #4, 4 - #5 or 4 - #6	6 - #4, 4 - #5 or 4 - #6	10 - #4, 6 - #5 or 4 - #6	12 - #4, 8 - #5 or 6 - #6	14 - #4, 8 - #5 or 6 - #6	10 - #5 or 6 - #6
15	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	6 - #4, 4 - #5 or 2 - #6	6 - #4, 4 - #5 or 4 - #6	10 - #4, 6 - #5 or 4 - #6	10 - #4, 8 - #5 or 6 - #6	12 - #4, 8 - #5 or 6 - #6	16 - #4, 10 - #5 or 6 - #6
20	2 - #4, 1 - #5 or 1 - #6	4 - #4, 2 - #5 or 2 - #6	6 - #4, 4 - #5 or 2 - #6	6 - #4, 4 - #5 or 4 - #6	10 - #4, 6 - #5 or 4 - #6	10 - #4, 8 - #5 or 6 - #6	12 - #4, 8 - #5 or 6 - #6	16 - #4, 10 - #5 or 6 - #6

8" to 12" LOGIX - FLEXURAL REINFORCEMENT								
Wall Length, lw, ft	SHEAR FORCE, Vu, kpf							
	1.5	2.5	5	6	7	8	9	10
2	4 - #4, 2 - #5 or 1 - #6	4 - #5 or 2 - #6	4 - #7	4 - #7	-	-	-	-
4	4 - #4, 2 - #5 or 1 - #6	6 - #4, 4 - #5 or 2 - #6	6 - #5 or 4 - #6	6 - #6	6 - #6	4 - #8	6 - #7	6 - #8
6	4 - #4, 2 - #5 or 1 - #6	4 - #4, 4 - #5 or 2 - #6	10 - #4, 6 - #5 or 4 - #6	12 - #4, 8 - #5 or 6 - #6	14 - #4, 8 - #5 or 6 - #6	10 - #5 or 6 - #7	6 - #7	6 - #7
8	4 - #4, 2 - #5 or 1 - #6	4 - #4, 4 - #5 or 2 - #6	10 - #4, 6 - #5 or 4 - #6	12 - #4, 8 - #5 or 6 - #6	14 - #4, 8 - #5 or 6 - #6	16 - #4, 10 - #5 or 6 - #6	18 - #4, 12 - #5 or 6 - #7	12 - #5 or 6 - #7
10	4 - #4, 2 - #5 or 1 - #6	4 - #4, 4 - #5 or 2 - #6	10 - #4, 6 - #5 or 4 - #6	12 - #4, 8 - #5 or 6 - #6	12 - #4, 8 - #5 or 6 - #6	16 - #4, 10 - #5 or 6 - #6	18 - #4, 10 - #5 or 6 - #7	20 - #4, 12 - #5 or 6 - #7
15	4 - #4, 2 - #5 or 1 - #6	4 - #4, 4 - #5 or 2 - #6	10 - #4, 6 - #5 or 4 - #6	10 - #4, 8 - #5 or 6 - #6	12 - #4, 8 - #5 or 6 - #6	14 - #4, 10 - #5 or 6 - #6	16 - #4, 10 - #5 or 6 - #7	18 - #4, 12 - #5 or 6 - #7
20	4 - #4, 2 - #5 or 1 - #6	4 - #4, 4 - #5 or 2 - #6	8 - #4, 6 - #5 or 4 - #6	10 - #4, 8 - #5 or 6 - #6	12 - #4, 8 - #5 or 6 - #6	14 - #4, 10 - #5 or 6 - #6	16 - #4, 10 - #5 or 6 - #7	18 - #4, 12 - #5 or 6 - #7

NOTES:

1. Table 6B to be used in conjunction with Shear Wall Figures 1 to 4.
2. Where spaces contain "-" consult with a local licensed engineer.
3. Where more than one bar is shown use double mat for flexural reinforcement. See Figure 3 (or Figure 4 for 12" LOGIX).

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