# Helix Steel Application Guide:

# RESIDENTIAL ABOVE GRADE WALLS

#### **Basic Requirements**

- Wall complies with the requirements of the IRC-2015.
- Wall thickness is 4", 6", 8" or 10".
- Wall is braced against lateral translation. The shortest distance between the vertical or horizontal bracing shall be less than 24 times the wall thickness.
- Minimum (1) #4 bar is provided around all openings.
- Dowels provided at all cold joints at spacing equal to or less than the rebar spacing in table below, but not less than #4@48" spacing.

#### **Approval Method, Design Basis and Class**

- Class A (Shrinkage and Temperature): In non-load bearing direction or when original reinforcement ratio is less than 0.002, Uniform-ES ER-0279 Section 4.2.
- Class B (Structural reinforcement): In load bearing direction or when original reinforcement ratio exceeds 0.002, Uniform-ES ER-0279 Section 4.3.

#### **Helix Conversion**

The following table contains dosage rates of Helix that have been calculated to provide the same or larger moment capacity than the original rebar or mesh configurations using Uniform-ES ER-0279 and elastic design methods.

#### Dosage of Helix 5-25 Based on Above Grade Flat Wall and Rebar Configuration (lb/yd<sup>3</sup>) <sup>(1,2,3,4,5,6,7)</sup>

Max. Wind Speed		Maximum		Nominal <sup>(9)</sup> wall thickness															
Exposure Category			Wall Height	4 inches				6 inches				8 inches				10 inches			
В	С	D	Per Story (feet)	Top <sup>(8)</sup>		Side <sup>(8)</sup>		Top <sup>(8)</sup>		Side <sup>(8)</sup>		Top <sup>(8)</sup>		Side <sup>(8)</sup>		Top <sup>(8)</sup>		Side <sup>(8)</sup>	
115	I	-	8	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 48	DR	#4 @ 39	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 41	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
120	-	_	8	#4 @ 48	9.0	#4 @ 43	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 48	DR	#4 @ 36	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 37	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
130	110		8	#4 @ 48	9.0	#4 @ 38	10.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 39	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 34	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
140	119	110	8	#4 @ 43	9.0	#4 @ 34	13.5	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 34	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 34	DR	#4 @ 31	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
150	127	117	8	#4 @ 37	10.0	#4 @ 34	13.5	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 34	DR	#4 @ 33	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 31	DR	#4 @ 27	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
160	136	125	8	#4 @ 34	13.5	#4 @ 34	13.5	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 34	DR	#4 @ 29	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 27	DR	#4 @ 24	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0

Notes:

- 1. The highlighted values are the Helix 5-25 dosage rates in Ib/yd<sup>3</sup> conforming to Helix Class B design.
- 2. Table is based on IRC-2012 TABLE R611.6(1)-Minimum Vertical Reinforcement for Flat Above-Grade Walls.
- 3. Table is based on ASCE 7 components and cladding wind pressures for an enclosed building using a mean roof height of 35 feet, interior wall area 4, an effective wind area of 10 square feet, topographic factor, Kzt, equal to 1.0, and Risk Category II.
- 4. Table is based on concrete with a minimum specified compressive strength of 3,000 psi.
- 5. Table values are calculated using rebar located in the center of the wall.
- 6. Interpolation is not permitted.
- 7. Rebar yield strength of 60,000 psi has been used.
- 8. "Top" means gravity load from roof or floor construction bears on top of wall. "Side" means gravity load from floor construction is transferred to wall from a wood ledger or cold-formed steel track bolted to side of wall. For non-load bearing walls where floor framing members span parallel to the wall, use of the "Top" bearing conditions is permitted.
- 9. Nominal wall thickness. The actual as-built thickness of a flat wall shall not be more than 1/2-inch less or more than 1/4-inch more than the nominal dimension indicated.
- 10. DR indicates design is required. Please contact your Helix Representative.

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The PE stamp signifies that the design tables have been prepared in accordance with Uniform ES ER-0279



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## RESIDENTIAL ABOVE GRADE WALLS

### **Instructions for Conversion**

- Review Uniform ES ER-0279 to assure compliance with restrictions.
- Determine the dosage in the table above based on the wall thickness and reinforcement detail.
- To activate the performance guarantee, submit your design to Helix Steel at <u>sales@helixsteel.com</u>.
- Note in the drawing with the Helix alternative: "Use the rebar as shown on the drawing or XX lbs/yd<sup>3</sup> of Helix 5-25 designed in accordance with Uniform ES ER-0279".
- Instruct contractor to contact Helix for pricing, delivery and installation instructions at 734-322-2114 x1 or <u>sales@helixsteel.com</u>.
- This table shows only a sampling of common configurations. Any wall configuration meeting the basic requirements above may be designed with Helix in accordance with Uniform ES ER-0279 using Class B Design, Section 4.3, and using the methods described in Section 4.6.

#### Example

- Above grade wall 10" thick, 10' tall and 30' long.
- Load is applied by bearing on the top of the wall.
- Vertical reinforcement is #4 bars at 48" at the center of the wall.
- Horizontal reinforcement is #4 bars at 48" at the center of the wall.
- Wind Speed is a maximum of 119 mph; Exposure category C.
- Step 1 -Calculate the bracing ratio which must be less than 24 for the least of height/thickness or length/thickness: Height (120") / thickness (10") = 12; length (360") / thickness (10") = 36 The smaller is less than 24 therefore Class B okay.
- Step 2 -Find the column in the table for the thickness and bearing condition (yellow).
- Step 3 -Read across the table for 119 mph, Category C and 10' tall wall (blue).
- **Step 4** -Select the dosage rate at the intersection, 9.0 lb/yd<sup>3</sup> (green).
- **Step 5** -Add note to drawing with the Helix alternative: "Use the rebar as shown on the drawing or 9.0 lb/yd<sup>3</sup> Helix 5-25 designed in accordance with Uniform ES ER-0279.
- **Step 6** If required, a calculation can be provided for the result shown in the table. Contact your local Helix representative.



Dosage of Helix 5-25 Based on Above Grade Flat Wall and Rebar Configuration (lb/yd<sup>3</sup>) <sup>(1,2,3,4,5,6,7)</sup>

Max. Wind Speed		Maximum	Nominal <sup>(9)</sup> wall thickness																
Exposure Category			Unsupported Wall Height	4 inches			6 inches			8 inches				10 inches					
В	B C D		Per Story (feet)	Top <sup>(8)</sup>		Side <sup>(8)</sup>		Top <sup>(8)</sup>		Side <sup>(8)</sup>		Top <sup>(8)</sup>		Side <sup>(8)</sup>		Top <sup>(8)</sup>		Side <sup>(8)</sup>	
115	-	_	8	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 48	DR	#4 @ 39	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 41	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
120	Ι		8	#4 @ 48	9.0	#4 @ 43	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 48	DR	#4 @ 36	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 37	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
130	110	-	8	#4 @ 48	9.0	#4 @ 38	10.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 39	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 34	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
140	119	110	8	#4 @ 43	9.0	#4 @ 34	13.5	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			9	#4 @ 34	DR	#4 @ 34	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 34	DR	#4 @ 31	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
	127	117	8	#4 @ 37	10.0	#4 @ 34	13.5	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
150			9	#4 @ 34	DR	#4 @ 33	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 31	DR	#4 @ 27	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
160		125	8	#4 @ 34	13.5	#4 @ 34	13.5	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
	136		9	#4 @ 34	DR	#4 @ 29	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0
			10	#4 @ 27	DR	#4 @ 24	DR	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0	#4 @ 48	9.0

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