HELIX® STEEL

INSULATED CONCRETE FORMS

APPLICATION GUIDE

Helix® Micro Rebar® reinforcement is the only structural concrete reinforcement technology proven to replace rebar in both above- and below-grade ICF walls, as well as slabs on grade and footings. The design meets ICC-ES ESR-3949 and IRC requirements while providing capacity equivalent to rebar. Every order also gives your team access to professional engineers and field support.

DETERMINE DOSAGE

Helix Steel can design and replace rebar and mesh in ICF structures when provided with loads and soil conditions or the existing reinforcement design. Contact Helix Steel for any additional information needed to determine dosage.

ICF Application	Helix Micro Rebar Reinforcement Dosage
Slab-on-Grade (Temperature & Shrinkage Requirement)	9 lb/yd^3
Wall/Strip Footings (Designed in Accordance with 2018 IRC 403.1)	9 lb/yd^3
Above-Grade Walls	See Table Below
Below-Grade Walls	See Table on Next Page

HELIX® MICRO REBAR® REINFORCEMENT FOR ABOVE-GRADE WALLS

1 in = 25.4 mm, 1 ft = 304.8 mm, 1 mph = .447 m/s, 1 lb/in^2 = 1.895 kPa, 1 ft^2 = .0929 m^2, 1 lb/yd^3 = .593 kg/m^3

Maximum Wind Speed (mph)			Maximum Unsupported Wall Height per Story (feet)	ICC-Approved Helix Micro Rebar Dosage (lb/yd^3)					
Exposure Category				Nominal Wall Thickness (inches)					
B	C	D		6		8		10	
				Top[10]	Side[10]	Top[10]	Side[10]	Top[10]	Side[10]
115	-	-	10	9	9	9	9	9	9
120	-	-	10	9	9	9	9	9	9
130	110	-	10	9	9	9	9	9	9
140	119	110	10	9	9	9	9	9	9
150	127	117	10	9	9	9	9	9	9
160	136	125	10	9	13.5	9	9	9	9

HELIX MICRO REBAR REINFORCEMENT FOR BELOW-GRADE WALLS

1 in = 25.4 mm, 1 ft = 304.8 mm, 1 psf/ft = .1571 kPa/m
1 psi = 6.895 kPa, 1 lb/yd³ = .593 kg/m³

		Minimum Helix Micro Rebar Reinforcement Dosage Rate (lb/yd³)			
		Soil Classes and Design Lateral Soil Load			
		GM, GC, SM, SM-SC and ML 45 psf/ft		SC, ML-CL and Inorganic CL 60 psf/ft	
Wall Height (feet)	Backfill Height (feet)	Nominal Wall Thickness (in)		Nominal Wall Thickness (in)	
		8	10	8	10
6	4	9	9	9	9
	5	9	9	9	9
7	4	9	9	9	9
	5	9	9	9	9
	6	9	9	9	9
8	4	9	9	9	9
	5	9	9	9	9
	6	9	9	9	9
	7	9	9	13.5	9
9	4	9	9	9	9
	5	9	9	9	9
	6	9	9	9	9
	7	9	9	13.5	9
	8	13.5*	9	13.5 @ f'c = 4000*	9

HOW TO SPECIFY

Specifying Helix Micro Rebar reinforcement is easy with this Application Guide and Evaluation Report.

ONE

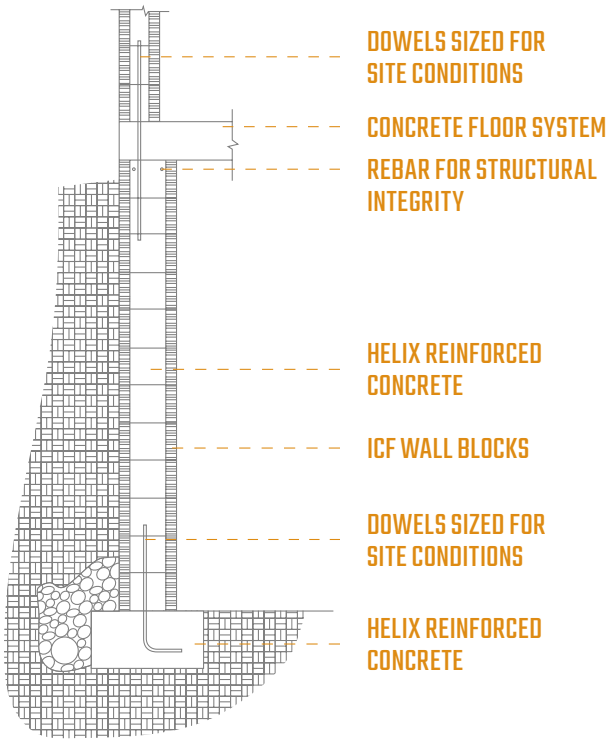
Add a note to the drawing with the Helix Micro Rebar reinforcement dosage indicated on the design tables.

Example: Helix Micro Rebar dosage of 9 lb/yd³

TWO

When a written specification is required, call out Helix Micro Rebar reinforcement by product name and company.

Example: Helix Micro Rebar reinforcement is a 1.0 inch (25 mm) twisted steel wire meeting ASTM A820 Type I. Product is certified under by ICC-ES ESR-3949, IAPMO-ES 279, and UL CBXQ.R25676 and manufactured under ISO 9001-2015 at a facility with 10 or more years of experience operating in the U.S.A. The product shall be transported, stored, and applied to the concrete mixture in accordance with the manufacturer's recommendations. Contact Helix Steel (sales@helixsteel.com or 734-322-2114) or the Engineer of Record with any questions regarding this specification.



HOW TO IMPLEMENT

For complete instructions on how to mix, place, and finish, visit helixsteel.com/resources/implementation.

The concrete mix should have a well-graded combined aggregate blend to maximize workability and minimize shrinkage cracking, segregation, and bleeding. Mix designs may require slight alterations to be optimized for Helix Micro Rebar reinforcement.

The table dosages replace the field reinforcement only. It does not replace any additional local reinforcement noted on the plans such as connection steel, lintel steel, etc.

This Helix Micro Rebar reinforcement alternative design information is provided in accordance with the requirements of performance-based alternative allowances in the code (e.g., IBC/IRC 104.11).

Above-Grade Walls Table Notes

- Applies to both cast-in-place walls with removable forms and flat ICF walls. Design and installation of Helix Micro Rebar concrete reinforcement must be in accordance with ICC-ES ESR-3949. Designs given in the above table are Design "Type S," and walls must conform to all restrictions of ESR-3949.
- Minimum specified compressive strength is 3,000 psi.
- Deflection criterion is L/240, where L is the unsupported height of the wall in inches.
- Interpolation is not permitted.
- 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. Load conditions are outlined in IRC Chapter 3 and Chapter 6 [included are: 40 psf LL (Table R301.5), 10 psf DL (R608.2) and 32' floor span (R608.2)].
- Walls are subject to the requirements of R608.2 (applicability limits), R608.3.1 (Flat Walls) or R608.4 (Stay in Place Forms), R608.7 (Solid Walls for Resistance to Lateral Forces), R608.8 (Requirements for Lintel and Reinforcement around openings), R608.9 (Connections) and R608.10 (Diaphragms).
- Reinforcement shall be provided in accordance with R608.5.5 at construction joints and R608.6.3 to provide continuity between stories.
- The listed Helix Micro Rebar reinforcement dosage rate is adequate to replace the minimum horizontal reinforcement required in R608.6.2.
- See 2018 IRC Table R608.3 for tolerance from nominal thickness permitted for flat walls.
- "Top" means gravity load from roof or floor construction bears on top of the wall. "Side" means gravity load from floor construction is transferred to the wall from a wood ledger or cold-formed-steel track bolted to the side of the wall. For non-load-bearing walls where floor framing members span parallel to the wall, use of the "Top" bearing condition is permitted.
- This table is valid only for walls that have a minimum of two perpendicular end-walls total length of solid wall segments totaling the ⅓ the length of the wall. A solid wall segment is defined as a flat wall extending the full height of the story without openings or penetrations.
- This table complies with IRC and IBC.

Below-Grade Walls Table Notes

- Applies to both cast-in-place walls with removable forms and flat ICF walls. Design and installation of Helix Micro Rebar concrete reinforcement must be in accordance with ICC-ES ESR-3949. Designs given in the above table are Design "Type S", and walls must conform to all restrictions of ESR-3949.
- The same applicability limits of IRC R404.1.3 apply to this table.
- Minimum specified compressive strength is 3,000 psi unless compressive strength, f'c is denoted on the table (in psi).
- Deflection criteria: L/240, where L is the height of the basement wall in inches. No soil surcharge is allowed. Vertical bearing load is neglected and/or assumed to act at the centerline of the wall.
- Interpolation is not permitted.
- Backfill height is the difference in height between the exterior ground level and the top of the concrete footing that supports the foundation wall. The Helix Micro Rebar reinforcement designs assume a 4" thick slab above the top of footing. Walls must be laterally supported at top and bottom of wall before backfilling.
- Soil classes are in accordance with the Unified Soil Classification System. Refer to 2018 IRC Table R405.1.
- See 2018 IRC Table R608.3 for tolerance from nominal thickness permitted for flat walls.
- The table is limited to SDC of A & B – an engineered design is required for higher seismic design categories.
- Reinforcement around wall openings must be provided in accordance with IRC R404.1.3.3.7.3.
- Dowels connecting the footing to the wall must be provided in accordance with IRC R404.1.3.3.7.8.
- The listed Helix Micro Rebar reinforcement dosage rate replaces minimum horizontal reinforcement as permitted by ICC-ES ESR-3949 Section 2.0.
- The unsupported wall height is the wall height minus the interior floor slab thickness, assumed to be 4" thick.
- * denotes an alternative dosage of 9 lb/yd^3 with 3,000 psi concrete may be used with wall returns. Returns shall be equal in thickness to the wall, and shall extend minimum 2'-4" length perpendicular to the wall from the footing to 24" below grade.
- The table is limited to buildings with maximum aspect ratio (length-to-width) of 3.6.
- This table complies with IRC and IBC.