



RESIDENTIAL CONCRETE

APPLICATION GUIDE

Helix Steel is the manufacturer of Helix® Micro Rebar® reinforcement, a steel reinforcement that increases concrete's shear strength, durability, and ductility while providing industry-leading proactive crack resistance. In 2019, Helix Micro Rebar reinforcement achieved ICC-ES ESR-3949, which makes it compliant with both the IBC and the IRC.

This Application Guide will help you to understand how to use Helix Micro Rebar in residential subsurface applications. Should you ever have any questions, please contact our in-house engineers whose services are complimentary with our product.

DETERMINE DOSAGE

Helix Steel can design and replace rebar and mesh in slabs, footings, and below-grade walls for residential products when provided with loads and soil conditions or the existing reinforcement design. Contact Helix Steel for any additional information needed to determine dosage.

Residential 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
Below-Grade Walls	See Table Below

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/yd ³)			
		Soil Classes and Design Lateral Soil Load			
Wall Height (feet)	Backfill Height (feet)	GM, GC, SM, SM-SC and ML 45 psf/ft		SC, ML-CL and Inorganic CL 60 psf/ft	
		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 table.

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

Visit www.helixsteel.com/resources/implementation for instructions on how to mix, place, and finish.

There are no special instructions needed for Helix Micro Rebar reinforced concrete; convey, pump, and place as with normal concrete. It is compatible with all pump systems, but be sure to check for balls on the pump screen or at the chute discharge. After stripping forms, check walls and remove protruding parts.

WALLS

The Helix design provided replaces the field reinforcement only. It does not replace any additional local reinforcement noted on the plans such as reinforcement around doors, windows and penetrations; dowels connecting walls to slabs; lintel bars; or tie bars at cold joints, etc. Contraction joints should be provided at 24-36 times the wall thickness.

RESIDENTIAL SLABS

Not to be used in exterior and broom-finished residential flatwork.

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).

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 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 dosage rate replaces minimum horizontal reinforcement as permitted by 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/yd³ 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.